DESIGN OF RESPONSIVE

VOCATIONAL EDUCATION AND TRAINING

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Design of Responsive Vocational Education and Training

A Reconstruction of a Systems Change
in Agricultural Education

PROEFSCHRIFT

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Preface

Writing this thesis was an intellectual challenge that provided an opportunity to transform beliefs, hopes and concerns about an aspect of education into logically based information and insight. This learning experience helped me develop an improved and creative handling of problems.
Prior to starting on the thesis, the Qualification Structure for Senior Secondary Agricultural Vocational Education had been developed in the late 1980s and early 1990s. During that time my senior colleagues in the department of Agricultural Education of the Ministry of Agriculture, my inspectorate colleagues and many experts in agricultural education came together in a new working situation.
'Were we be admiring a splendid new edifice or would we be chewing over the rubble of a disaster?' In retrospect, it can be seen that we were creating a new responsive educational system.
From 1993 onwards I spent much of my free time preparing this thesis. I was supported financially by the department of Science and Knowledge Dissemination of the Ministry of Agriculture and was granted 100 work free study days. My senior colleagues and many others in the Ministry of Agriculture, the Ministry of Education and in the field of education showed a warm interest and gave me a great deal of intellectual and mental support.
I shared work on this thesis with Nathalie van Hooff and Margriet de Jong when they were students at the Twente University, with teachers and students from STOAS, with Ineke Lokman from STOAS for statistical elaboration and with Bob Nelson for checking the script. I received information from many people, good support from the library in the ministry and feed back from many others that read drafts and final forms of the script. Above all, I enjoyed the expertise and guidance of Wim Nijhof and Loek Nieuwenhuis in numerous discussions on fundamental questions and, in particular, their guidance on appropriate responses.
Behind all this, and present all the time, was my wife Marij with her open mind and lots of patience and care.

It is fascinating that so many were prepared and needed to produce this document and above all to be able to witness with the field of agricultural education the implementation of the project, which is the subject of the thesis. Thank you all; it is magnificent.

Gouda, January 1999 Jos W.G. Geerligs

Content

1. Introduction

Educational change is a significant issue in a rapidly changing world. The dynamic and structural character of contextual changes demands a responsive quality in Vocational Education and Training (VET). This thesis is a reflection and reconstruction of a systems change that resulted in a responsive system of VET. The aim is to generalise from the case for broad and future utilisation.

1.1 Introduction of the changes in SSAVE

The Education Service is a major responsibility of Government. In the Netherlands, VET at post compulsory school level (16+) is a combined responsibility of the Minister of Education[1] and the Minister of Agriculture[2] acting through various laws concerning education at this level. Senior Secondary Agricultural Vocational Education (SSAVE) is the responsibility of the Minister of Agriculture. He has the dual responsibility to provide for the needs of the individual and to meet the needs of the land-based[3] professional field.

The result is an overall objective to provide qualified students who are capable of being successfully employed in broad agriculture, thereby meeting their own needs and those of the industry for qualified personnel.

The actual providers of SSAVE are the schools (colleges of Further Education in the United Kingdom, Lycée Agricole in France, and Dual System and Fachschule in Germany), which have a private foundation working under the authority of the minister.

A third important contributor to the Agricultural Education scene, again mainly government sponsored, are the Research and Development, and the Advisory services plus various industrial organisations. Their role was to feed into the system information on developments in the industry, and thereby, the manpower needs of the industry.

The three 'operational areas' of agricultural education, government, information network and the providers are shown in Figure 1.1.

Again, three operational levels can be identified and superimposed on the diagram. Government has an overall responsibility and operates at macro level. The information network may also operate at this level but may also

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1 The Minister of Education is a short notation for the Minister of Education and Sciences (O&W), and from 1994 onward the Minister of Education, Culture and Sciences (OCW).

2 The Minister of Agriculture is the short notation for the Minister of Agriculture and Fisheries (Lavi); and from November 1988 onward to the Minister of Agriculture, Nature Management and Fisheries (LNV).

3 In this thesis, agriculture implies all land-based industries, including handling of food and flowers, production and amenity horticulture, arboriculture, agricultural engineering, fish farming, forestry, and horsemanship.

be concerned with regional needs at meso level. This leaves the providers operating at meso and micro level making sure the provision matches local needs and students.

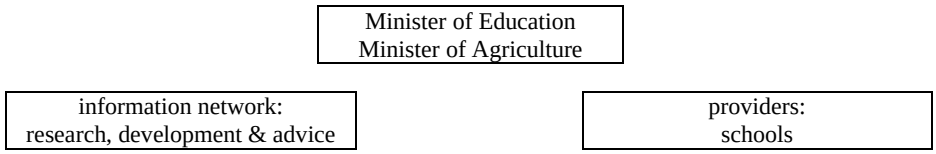

Figure 1.1: The operational areas of SSAVE

Prior to the mid 80s the provision was controlled by regulations of central government with national curricula and centrally decided minimum requirements on timetables. In a fairly stable situation, where safeguarding food production was a prime objective, and where the employment market was also stable, this situation was probably adequate.

Since that time, however, several major factors have resulted in quite dramatic changes in agricultural education and VET generally. Included in these factors are changes -

- in attitude in government itself;
- in the public's attitude to food and methods of producing it;
- to meet the need for diversification in farming;
- for policy on serious youth unemployment.

The context of SSAVE was changing and continues to do so with considerable speed to the point where change is the norm. There was a need therefore, for a system of SSAVE that could respond rapidly to change in the environment in which it operated (flexibility) and the new needs of the rural population. It should be able to produce qualified leavers who can meet the new demands being made upon them, while at the same time being able to respond themselves to an ever changing situation (transferability).

To meet the aims of flexibility in the system and transferability in the products of the system, there were two areas where change was essential -

- an information system capable of detecting changes in the context of SSAVE and translating it into educational objectives through to new qualifications.
- a freedom for the providers to respond quickly and work to the requirements of the new qualifications - that have powers and freedom to be flexible.

If these changes were to come about, there had to be a movement away from the traditional subject based curriculum - which tended to 'throw the whole book' at a student hoping something would stick - to a competence based learning with specific behavioural objectives. At the same time the principles

on which the competence was based remain important, as it is on these that transferability becomes possible.

This thesis traces the developments of the school-to-work transition over a 10 years period and from the lessons learnt, develops a model of responsive SSAVE on which similar changes could be guided. The school-to-work transition is part of the larger problem of linking education and employment market. 'The focus of the school-to-work transition is on the iteration between employment market and production-, recruitment- and qualification strategies of employers at one side and the educational service at the other' (Van Lieshout, 1997, p. 8).

1.2 Introduction of the thesis

Responsiveness[4,5] is a relatively new issue for educational change and VET. The core of responsiveness may be a systems quality that utilises change in the context for the maintenance and development of the functions of the system (Hövels & van den Berg, 1994; Nijhof & Streumer, 1994a; Achtenhagen, Nijhof & Raffe, 1995). The function of responsive VET is to deliver qualified school leavers[6] with transferability and mobility (Achtenhagen et al, 1995). A responsive system of VET maintains meaningful inter-actions within its context with regard to the transfer potential of its objec-tives and the flexibility of its processes. (Nijhof & Streumer, 1994a). Good management implies accountability to its clients and associates with regard to its outcomes.

Systems change in education is complex on account of numerous interactions (Banathy, 1991, p. 25). Relationships between systems and participants may be based on information exchange or on integration. The focus in the system may be on governance, administration, teaching or learning. The context of the system may be self-referential or interactive in response to external demand. The change may be driven from bottom-up, top-down or middle-up-down.

This thesis aims to prove that as a consequence of contextual changes the principles of complex educational systems can be changed and that a

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4 Aspects of responsiveness in Dutch VET are the unequal status of vocational and general secondary education, the broadening or deepening curricula for VET, communication between the worlds of education and work, and teaching staff, their training, work and employment conditions (OECD, 1994).

5 Aspects of responsiveness in German VET are development of continuing training (between initial and on the job training), qualifications offensive for the unemployed, implementation of the new information and communication technology, and innovative learning methods (Lipsmeier, 1993).

6 Transferability is referred to as the ability to utilise prior learning in a new context and mobility as the ability to move flexibly on the employment market.

responsive system can be designed, developed and implemented. The subject is SSAVE in the Netherlands in the early 1990s.

SSAVE is for students between 16 and 20 years - the secondary VET, at what is called sub-baccalaureate employment markets in US. Within SSAVE different ratios of school- and work-based programs are applied in courses, and sequential and dual forms of the school-to-work transition are in operation (Van Lieshout, 1997).

The problem of VET

VET aims to improve knowledge, skills and attitudes in its students. VET has to transmit and maintain the competence to fulfil various assigned tasks at work and to enhance social life and study. The function of Dutch VET is based on assigned tasks to meet specific occupational requirements and public standards for cultural aspects of behaviour. The responsiveness of public funded VET requires the articulation of external demand and transformation to turn the demand into supply.

Articulation and transformation of demand are vital for a responsive system. Responsive VET anticipates, in a flexible way, the changes in the world of work and transforms them into renewed objectives, content, pathways, pedagogy and improved methodology.

In industrialised and industrialising countries, the context of VET becomes increasingly complex and dynamic because of rapid economic, technological, social and cultural developments. Both the policy debate and research focus on VET to enhance productivity, competitiveness and economic growth. VET, however, meets huge difficulties in bringing about the required changes. The traditional educational system has no effective answers. A systems change seems to be a possible solution.

In spite of the call for responsiveness and systems change, profound changes in educational practice have only been followed to a limited extent. The systems change towards responsiveness is an educational challenge as well as a sociological one. A fundamental change of the transition paradigm may be needed (Achtenhagen, 1994). Unfortunately, neither comprehensive theory nor implementation standards, related to systems change, are available (Banathy, 1991; Achtenhagen, 1994; Achtenhagen, Nijhof & Raffe, 1995; Booth & Snower, 1996).

The study of the approach in SSAVE

Because of the dynamics and complexity of contextual changes the national government cannot prescribe the required provision by VET. The system itself has to be responsive; the government should create provisions. A responsive system for SSAVE is a means of realising the change towards responsiveness and meeting the challenges up to 2010. The responsive system was planned, designed, developed and implemented between 1988 and 1992.

For this thesis, a model was made for responsive SSAVE to describe and analyse the responsive system. This model is a reconstruction that will be based on based on contemporary innovation, education, and system theories. It identifies three structures for the vital operational functions (De Sitter, 1994, p. 12) -

- an information structure articulates the external demand and provides at the macro level of the system a qualification structure (QS) with attainment targets;
- a steering structure encompasses the role of the state and links at a macro level attainment targets with funding and quality control of schools;
- a production structure encompasses the schools that are responsible for the innovation of organisation and pedagogy at the meso level and the quality of the educational process at the micro level.

Annex 1.1 positions the present institutions of SSAVE in the model.

The QS is the prescription of the ultimate outcome for SSAVE. The prescription is not only about content. Structure and taxonomy are also important. The structure relates to pathways, course length and study volumes. The taxonomy of qualifications is based on a hierarchy of full qualifications and units, and the content is described through attainment targets (chapter 6).

The responsive system is the basis of a new systems approach to SSAVE in which a QS links the information and steering structure and production structure.

The subject and the relevance of the thesis

The study of SSAVE offers opportunities to reconstruct and generalise the process to improve responsiveness - the experiences and principles that were leading the design and development of a systems change, the successes and shortcomings of methods applied, and the effects of various initiatives.

An all-embracing study of responsiveness of educational systems would be too complex and too large. That is why the focus will be on the transfer potential of SSAVE. The flexibility of organisation, the accountability in respect of outcomes and the transferability of qualified school leavers are discussed when the description and evaluation of the transfer potential requires.

This allows considerable attention to be given to the new information structure of the system and the QS that is produced by the information structure. The implementation of the QS has consequences for the functioning of the steering structure and the production structure. They are described to depict the full extent of the systems change.

There are a number of reasons to study the responsiveness of VET.

The general scientific reason for the study is to generate information and theory about the operational and structural provisions for responsive VET. A

study of the operation of a competence based VET is a novelty; it has not been described and analysed previously. A result may be a model for the analysis of the responsiveness of VET-systems.

Second, the analysis of the educational change in SSAVE can be of specific relevance to future policy. The study may prove that a policy focused on information supply, results in a responsive VET.

The study describes a period of a learning process in search and pursuit of new pedagogy for SSAVE - the aims are summarised in Annex 1.2. Results from the learning process run the risk of remaining tacit (Nonaka & Takeuchi, 1995, pp. 64-67). The third reason is that the aim of the study is to be explicit about tacit knowledge of the practical working of the QS. The transformation of tacit into classified knowledge may support further development of pedagogy for SSAVE.

The research model

The aim is to reconstruct an actual case of educational change and to prove that a QS can support a systems change to make VET responsive. The evaluation model of Stake (Figure 1.2) is used to structure the thesis. This model is chosen, because his theory for the evaluation of educational programs 'is relevant to any curriculum, whether oriented to subject matter content or to student process, and without regard to whether curriculum is general purpose, ..., or special in any other way' (Stake, 1967, p. 528).

Stake (1967) considers description and judgement to be the basic acts of evaluation, which match the aims of this thesis to give a theoretical account of what happened. Whether the immediate purpose is description or judgement, according to Stake three bodies of information should be tapped - the antecedent, transaction and outcome data.

An antecedent is any condition existing prior to acting, which may relate to outcomes; for example, the aims mentioned in Annex 1.2. Transactions are actions; for example the countless encounters in the process of design, development and implementation of the new QS. Transactions are dynamic whereas antecedents and outcomes are relatively static. Outcomes with respect to students are competencies. In the process of educational change of SSAVE, the new QS itself is an outcome.

The research questions

The 'how and why like that' of responsive SSAVE are formulated as research questions with the help of Stake's model. The given aim is responsiveness, particularly transfer potential of objectives and flexibility of organisation. The levels of the system, macro, meso and micro, and the system structures, information, steering and production, are integrated in the research questions.

The over-all question is -

Given the aim of responsiveness, how is a responsive system designed, developed and implemented, and why was it done that way?

The research questions are:

1) What are the intents with respect to responsiveness of SSAVE -
   a) articulation of demand for attainment targets as antecedent;
   b) shared responsibilities as the starting point in transactions;
   c) transfer potential and flexibility as the outcome?
2) What are the observations at macro, meso and micro levels of the educational system in the process of designing and developing a responsive SSAVE -
   a) a policy plan for educational change as antecedent;
   b) an information structure as means for transaction;
   c) a QS as the outcome?
3) What are the standards for outcomes and what judgements should be made -
   a) measurement of the transfer potential of objectives;
   b) measurement of the flexibility of schools;
   c) effects of both and the conclusions?

The research design

The description matrix in Figure 1.2 represents the chapters in the thesis dedicated to reconstruction, description and analysis of a process that took place between 1988 and 1994. The judgement matrix has been developed for this study.

description matrix			**judgement matrix**	
intents	**observations**		**standards**	**judgements**
articulated demand	policy plan	**antecedents**	-	-
shared responsibility	information structure	**transactions**	-	-
transfer potential of national objectives;	Qualification	**outcomes**	qualifications with transfer potential;	T
flexibility of organisation	Structure		efficient & effective pathways	T

Figure 1.2: The research design (Stake, 1976, p. 529)

Some fields in Stake's model remain empty. Evaluation of the antecedents, i.e. standards about articulation of demand as an intention and a judgement about the policy plan, and of the transactions, i.e. standards about shared responsibility as transaction principle and a judgement about the new information structure, would make this study too large.

Relevant theory about the implementation of the QS is available from several sources. Swinkels-Kuijlaars & van Wijlick (1995) analysed the discrepancy between national policy and school implementation. Ros, Swinkels-

Kuijlaars, Theunissen, Visser, Jongmans & Geijsel (1996) measured the bottlenecks of implementation in Institutions for Agricultural Education (IAE's). A study by Gielen & Le Rütte (1998) comments on the policy on responsive SSAVE. Mulder & Raemaekers (1997) give an evaluation of aspects of the new information structure. Lazonder (1998) studied the utilisation of QS-flexibility in IAE's.

A comparison of the employability of qualified school leavers before and after the implementation of the responsive system would enable a judgement about the outcomes of schools. This judgement is not made, however, because the collection of data about qualified school leavers after the implementation of the responsive system is still difficult because of the short time new school leavers have been in employment (Lokman, 1997).

The chapters

The chapters of this thesis have been based on the research design.

Two chapters are about the first column of Figure 1.2 - the intents. Chapter 2 is about *SSAVE 1988's Problems and Possible Solutions.* Chapter 3 is a theoretical interpretation of the observed intents *Towards a Steering Model for Responsive SSAVE*.

Chapter 4, 5 and 6 are observations (2nd column). The observation of policy antecedents for the construction of the QS has been described in chapter 4 *Policy on Change of SSAVE*. The policy plan is the summary of the antecedents.

Chapter 5 is about *Designing the Information Structure for SSAVE* and describes the choice and effects of actions to establish the QS. The factual transactions are described and discussed here.

Chapter 6 describes *Design and Development of the Qualification Structure (QS)*. This description is the observation of the outcome of an educational change. The structure, taxonomy and content of the QS are explained.

The working of the QS in SSAVE is subject of chapter 7 - *The Transfer Potential of Attainment Targets.* The standard on which to base a judgement about the responsiveness of the system is a comparison of the traditional educational objectives and the new attainment targets.

Chapter 8 - *Effects of the Qualification Structure on the Flexibility of IAE's*. The success rate and cost benefit ratio are used to judge the flexibility of the process in schools before and after the implementation of the QS.

Chapter 9 *Reflections on responsive system for VET* are conclusions of the thesis and reflections on them.

2 SSAVE 1988's problems and possible solutions

At the end of the 1980s SSAVE faced rapid technological, social and cultural changes in the rural area. Criticism of agricultural production by the general public, reforms in Dutch VET and poor results of major internal projects on educational change, added to the pressure. SSAVE had difficulty in responding effectively.

A review of experiences in SSAVE (# 2.1 up to # 2.3) and a survey of published papers (# 2.4) showed that change in the rural background within which SSAVE worked, had become the norm. The educational system needed a modus vivendi to meet this situation. How should SSAVE respond and how could it anticipate such changes?

School organisation and the teaching/learning processes may need a great deal of freedom to respond effectively. VET may require a new system of 'market intelligence' to be able to respond consistently.

2.1 *Changes in the context of SSAVE*

In the next paragraphs the changes in the context[7] of SSAVE are summarised briefly to highlight the points of change necessary for SSAVE. There are changes in primary economic production in the rural area and the desire to balance the needs of production, the natural environment and recreation. Also the agricultural knowledge network[8], in providing support for primary functions, has changed. The diverse layers of public authority at local, regio-nal, national and European Union (EU) levels, which support both the prima-ry functions in rural areas and the knowledge network, are a third field of change.

2.1.1 Changes in agriculture

SSAVE needs to anticipate and adapt to change in the rural area. The identification of the real nature of the change is difficult. The risk of a fruitless follow-up of misleading signs is very real.

Since the 1880s, the rationale of the Dutch agricultural knowledge network has been based on technological development and economic efficiency. Farmers had to provide cheap food for the internal market and foreign currency from export surpluses. Post World War II and European Union policies did enforce this rationalisation perspective more recently. Since the 1970s the attitude of farmers has been to utilise technological

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[7] The nature of contextual changes themselves will not be analysed in this thesis. Contextual changes are conceived as being continuous but not regular, thus difficult to foresee (Gibbons et al, 1996).

[8] The agricultural knowledge network encompasses all knowledge intensive activities and includes the traditional Research, Extension and Education network.

innovation to respond to the market pressures in the Dutch agribusiness. Education and extension played key roles in the diffusion of new technical knowledge (Goudswaard, 1986).
However, the times of one-sided increase of output and rigid land reform in Dutch agriculture are over. Since the 1980s, the aim could no longer be to make the fields flat and square and to keep as many layers in a cage as possible. Attitudes have changed because of the negative effects of unrestricted production and intensification on the environment (LNV, 1990c and 1990d).

Consumer demand has also become more discerning. Perceived aspects of well being have been transformed into quality demands, not only in terms of nutritional qualities but also in methods of production and presentation. There is also an increasing awareness of animal welfare. An egg for example, should not only be a healthy food but a free-range layer should produce it.
At the same time the socio-economic policy has hardened, particularly since the fall of the Berlin Wall. Free market policies supported by the World Trade Organisation have become the point of departure for the Common Agricultural Policy in the EU.

Farmers have lost much of their electoral influence. 20.2 % of the Dutch work force were engaged in agricultural production in 1930. This declined to 12.0 % in 1960, and to 4.4 % in 1990, (CBS, 1998).
The new ethical and ecological values and the new market situation change the functions of the rural area. The dominant new functions for the Dutch rural area are quality food production, the conservation of the environment and provision for recreation. The understanding of the new markets requires an insight into the differences and sometimes contradictions between fundamental attitudes of various sections of the population. The new political situation, the change of values and the new functions of the rural area come on top of tangible change - the environmental issues, information technology, and policy on regulated markets.

Changes in the rural context are new technology, new values and a new field of force. The changes determine the work of the knowledge network, educational institutions and public authorities. New values and complex influences have broadened the occupational area, which includes production, recreation and the environment. The term ‘Agriculture’ may be too narrow to embrace the whole range of land-based activities. Responsiveness to a consumers market and accountability to the public about the methods applied, are new issues. Broadening the occupational area and new issues require new competencies in the participants and new competencies to be included in educational/ training programs.

2.1.2 Change in functions of the knowledge network

In a dynamic and knowledge intensive context most educational qualifications have their highest value in an individual's first job and then lose much of their market value over the following years. Fortunately the compensation for the loss of value of initial qualification is the knowledge and experience gained on-the-job.

Commerce and industry expect VET to prepare students for immediate employment and also to meet the demands of a continually changing situation. The problem is that the nature of the change needed within educational qualifications, to meet these two aspects, has not been identified. That is the reason to look from an innovation perspective to the problems of SSAVE and to search for an applicable innovation strategy for change in SSAVE and change in the knowledge network with which SSAVE is associated.

The functions of beneficial knowledge networks are creation, diffusion and utilisation of knowledge (LNV, 1993b). At an individual and organisational level creation, diffusion and utilisation appeal respectively to -

- the rational and mental processes of knowledge generation;
- the supply and demand side of empowered knowledge exchange;
- the utilisation in production, leisure and development.

These functions apply to the activities of all participants in a knowledge intensive area of production.

The description of the functioning of the knowledge network shifts from a research, development and dissemination model (Havelock, 1969), via a market pull and technology push model, into a model in which knowledge cycles and innovation cycles reinforce one another (OCV, 1996). The demand side of production processes has become knowledge intensive and the level of education of those who participate in production has become high (Vijverberg, 1996). A tailor-made supply of knowledge, combined with short-term delivery has become typical. Production and innovation should be approached in the same way (De Sitter, 1994) and working and learning go together (Senge, 1990).

Innovation and learning as a complex, compared with evolution (Saviotti & Metcalfe, 1991) and organisms (De Geus, 1997), are not through serendipity or technology but to decisions at the level of individuals, institutions, organisations and in sectoral, regional and national contexts (McKelvey, 1997, pp. 201-203).

The new knowledge community is organised in flexible networks, but is not without structure. Communities of practice are knowledge networks in them-selves and are fed by communities of information and research. Knowledge intensive networks support all stages of the production processes (in policy, product and services) as summarised in Figure 2.1 (Kline & Rosenberg, 1986, p. 290).

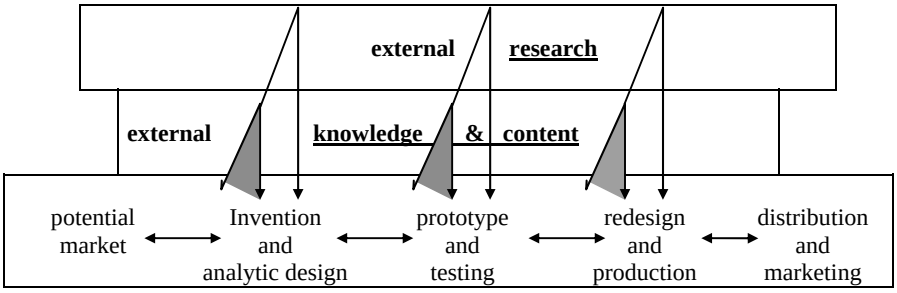

Figure 2.1: Knowledge intensive networks (Kline & Rosenberg, 1986)

'What does this mean for an individual's learning?'
Three phases of learning appear in knowledge intensive networks -

- initial learning, which VET provides to prepare for participation in the process (Brown & Duguid, 1991);
- professional learning is the next phase reaching and maintaining the highest level of skill in the process - lifelong learning (OCW, 1998);
- the final phase is with innovation and the improvement of the process (Senge, 1990). This learning is a change of the state of the art in a knowledge community and linked individuals' competence.

SSAVE needs to prepare for all three forms. In the knowledge intensive networks, knowledge is not individual. In cyclic processes, explicit and tacit knowledge (Nonaka and Takeuchi, 1995) flow through the chain-linked model. This is a problem for SSAVE.

Explicit and tacit knowledge are important in knowledge systems. Explicit knowledge is expressed with words and numbers, and is easily shared in the form of hard data, scientific formulae, universal principles or categorised procedures.

Tacit knowledge is segmented into a technical and an imaginary dimension. The technical dimension holds the kind of informal and hard-to-pin-down skills or crafts captured in the term 'know-how'. The imaginary dimension consists of paradigms, mental models, beliefs that shape the world around us; tacit notions are perceptions so ingrained that we take them for granted. The management of explicit *and* tacit knowledge has been of importance for the development of the qualification structure (chapter 5).

The flow of tacit knowledge requires transformation. Transformation has modes of externalisation, combination, internalisation and socialisation when tacit knowledge grows from the individual, towards groups, organisations and between organisations (Nonaka & Takeuchi, 1995). Knowledge creation together with providing the service, is the basis for the value-added potential of a community of practice (Tissen, Andriessen & Lekanne Deprez, 1998, p. 22).

Another problem for SSAVE is the interdisciplinary nature of tacit knowledge. In agriculture and other knowledge intensive fields of applied science and technology, the sole disciplinary utilisation of knowledge loses significance in favour of knowledge used in combination with other knowledge and with art and policy, in an trans-disciplinary setting (Gibbons, Limoges, Nowotny, Schwartzman, Scott & Trow, 1994).

The future context for work is depicted by Tissen et al (1998, p.197) 'you need the ability to respond swiftly to changes in the market, while at the same time anticipating customers future needs. You have to produce products and services while at the same time learning from your experiences. You need to develop your professional ability to create knowledge while at the same time building a company that will last.'

The starting point for a new SSAVE needs to be that every work process is knowledge intensive; this means that production and innovation in the production process, and working and learning of employees need to go along together. The innovation theory of Kline & Rosenberg (1986) shows the internal and external interaction in the subsequent phases of the production process. The flow of classified and tacit knowledge depicted by Nonaka and Takeuchi (1995) describes the competencies required for the interaction. The preparation of qualified school leavers to utilise knowledge from knowledge intensive networks requires new educational goals and methods.

2.1.3 Change in functions of public authorities

Changes in the role of public authorities in the 1980s are expressed with the concept of 'privatisation' and with the slogan 'from regulating towards involved government'. The changing roles may not be without consequence for educational establishments and students; the problem is to transform this notion into organisational and curricular measures. Therefore underlying mechanisms should be understood.

A possible cause of the changing role of central government is that the belief in planning and design has lost ground to trust in a process of variation and selection. For alike problems the validity of values and principles differs in different situations. This makes decision making contingent. Facts are not always everywhere and for everyone of the same value, as positivism presumed. But, although ... 'the adherents of extreme positivism become singular among scientists and civil servants, ... the shared language, data and methods used in knowledge and knowledge policy might still be based on positivism and might give dominance to positivism against the wish of the majority of those involved' (Van Gunsteren & Van Ruijven, 1995, p. 184).

A less philosophical and more social point of change is the departure from the corporate model. In the past, shared views and co-operation were the general rule in a corporate model for negotiated steering of agriculture in the Netherlands. Since the mid-1980s the corporate model has lost signifi-

cance and central bodies have given up their leading and co-ordinating role. Closing down the mighty Dutch Agricultural Board is an example. The corporate model has been exchanged for a coalition model - sometimes, public authorities co-operate, sometimes they compete.

Public funding is shifting from subsidising institutions towards stimulating desired developments. The government is becoming a more equal partner in a coalition - the financier of demand for knowledge and the sponsor for weak parties at the knowledge market (LNV, 1995b). Private competition is introduced in fields where the government used to offer central and exclusive services, and a reshuffle of the division of public roles has taken place. National authorities have shared responsibilities with regional and EU authorities.

The development of new roles rests on the relation between the Minister of Agriculture and the schools, and between the minister and the market regulated agricultural sector. The change illustrates the new socio-cultural context for everyone in the rural area and the need to adapt the educational objectives and pedagogy of SSAVE. In this context pressures will increase for the responsiveness of organisations and self-responsibility of individuals.

More than before, SSAVE needs to educate for self-reliance and personal development.

2.1.4 Change of functions within work situations

The rapid change, the diversity and knowledge intensity of products, and the demand for tailor-made products cause ‘information congestion’ in traditional work situations. The same has been seen in VET. The complaint about the massive amount of paper sent from central government to regulate the schools and the impossibility of executing the instructions is universal. The situation demands a solution.

In response, firms have established new approaches with slimmed down hierarchical systems, autonomous production-units, horizontal instead of vertical attuning, less specialisation and differentiation, and team production. De Sitter (1994, p. 61) advises responding to change in a complex situation by encouraging creativity and improving the knowledge of those involved. To support creativity, the structure should leave freedom for flexibility and allow the workforce to be responsive.

The Minister of Education (O&W, 1988a & 1988b) decided to make the schools more responsive. This implies that the approach to complexity is not managed through control and standardisation on traditional lines or based on functional structures, but based on flexible task management. In this concept, task management[9] is central to mobilising human resources. It is the execu-

[9] The task management (Simon, 1989) and task group (De Sitter, 1994) are executive units in a hierarchical system with a strategic dependent position (Figure 3.6).

tive of related operations, based on autonomous steering of internal and external processes. Preparatory functions, and as many supportive and creative functions as possible are assigned to task management. This also applies to operational, infrastructural and strategic matters. Complex hierarchical problems are avoided by maximising occupational freedom.

With regard to innovation, the basis does not change. De Sitter (1994, p. 359) considers innovation to be a form of management; non-routine management. In complex situations nothing is sure due to interference in the context and time and again checks and corrections are necessary. Running a process is, in the main, the same for a routine or non-routine situation.

Most innovation comes from task management; but there is always an external component. At operational level the external component may be small, but it is essential at the design stage and selection of process structure. Fundamental change may require transformation and this needs to be proved at the systems level (De Sitter, 1994, pp. 359-365).

De Sitter states that conventional practices in the system do not require consensus at a systems level about goals in the first instance. Consensus is necessary for taking management decisions on strategic and infrastructural matters[10]. The administrative development requires the allocation of control loops, the range of control and, where necessary, the linking of control loops at macro, meso and micro levels of the system. Micro, meso and macro levels are understood to be respectively the level of the learning itself, the institutional level and the systems level. At macro level only homogenous information can be handled. Segmented information needs to be processed at meso level and integrated tasks are executed at the micro level (De Sitter, 1994, pp. 101-105).

Flexible enterprises have much in common with responsive schools. Solving the congestion of information due to a rapidly changing situation, two alternatives are applied in business - control and standardisation, or flexibility (De Sitter, 1994). These principles may be applied in education. The approach to management, development and innovation in routine and non-routine situations may be reflected in VET and in the curriculum.

2.2 *Changes in VET*

The accents on change and the actual changes in Dutch VET have a long history. The recent external messages are conveyed from four govern-mental committees. The committees supported the development of new legislation and the merger of schools (O&W, 1993a).

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[10] Senge (1990) differentiates between practices *what you do*, principles *guiding ideas and insights* and essences *the state of being of those with high levels of mastery of the discipline*. Our view is that the operational and strategic aspects of practices can be the responsibility of institutions. When it comes to principles and essences, a trans- institutional discourse is required and procedures must regulate discussions at the systems level.

2.2.1 Governmental committees on educational change

In the second half of the 1970s, the level of unemployment increased worryingly in the Netherlands and many solutions were proposed (O&W, 1988c; Van Meyel & van Mechelen, 1989), but none seemed to have a significant impact. In the early 1980s the political starting point evolved. The improvement of the school-to-work transition would be a suitable measure to solve unemployment and possibly be a rationale for the change of VET. These thoughts were the main starting point for four governmental committees.

The Wagner Committee

The Wagner Committee, commissioned by the Minister of Education, concluded that isolated groups could not achieve educational change. The responsibility for educational change should be tripartite and vested with commerce and industry[11], the field of education and the government (Wagner Committee, 1984). The issues were occupational profiles, educational profiles, curricula, regulations, examinations, planning of provisions and equipment. These are the tools to improve the school-to-work transition. Trade and industry and education should communicate on the tools mentioned to ensure the desired inputs from the parties for a good quality of VET, or to prepare proposals for the government to guarantee this quality.

The Rauwenhoff Committee

Wagner's proposals needed to be worked out at school level[12]. The Rauwenhoff Committee, also commissioned by the Minister of Education, recommended strengthening three relationships - enterprise-school, school-student and school-government. Schools needed to meet all demands for VET, respond to all target groups, and supply all qualifications in a variety of combinations of working and learning.

This would require optimal freedom of action for the schools. They should define their own objectives and quality control, be owners of their buildings and appoint their own professionals. Enterprises would make contracts with schools about course provision in the region and provide information on curriculum development. Students could claim a minimum length of stay in the system and a minimum qualification for everyone. The government would be a client of the schools and one of the financiers of education; the government would monitor the information and define standards for entrance, length of stay, financing, and quality control (Rauwenhoff Committee, 1990).

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[11] Commerce and industry are conceived as a body with one identity; this is a misconception, business aims with regard to education are inconsistent and diverse (see § 2.3.2).

[12] The school is *de jure* the competent authority of the school; *de facto* a school is a complex community with a variety of changeable spheres of influence and drive.

The Biesheuvel Committee

The tripartite responsibility of commerce and industry, education and government as proposed by the Wagner Committee, had been thought over to clarify the role of Ministries, and the 'reserved position' of the Ministry of Agriculture and of SSAVE. The Biesheuvel Committee, commissioned by the three Ministers of Economics, Education and Agriculture, concluded that the Ministry of Education was responsible for the educational system and other ministries contributed to coherence and content of VET. Agricultural education should be an integrated part of the agricultural knowledge network and be placed in the Ministry of Agriculture. The Biesheuvel Committee (1992) introduced the warp-and-woof model to explain the specific position of the ministries. Biesheuvel assigned the responsibility for the educational system to the Minister of Education, and, as far as agricultural education was concerned, to both the Ministers of Education and Agriculture; this was the warp aspect of the roles. The coherence and content of VET required contributions of business ministries; this was the woof aspect. The Minister of Agriculture had a woof responsibility for SSAVE for the implementation of policies on rural development.

The Van Veen Committee

The Van Veen Committee, commissioned by the Minister of Education, advised about the factual possibilities and desirability of a school and work-based component of VET. The advice was a moderation of earlier proposals and this opened the way to proceed with the combination of laws on VET. The Van Veen Committee (1993) advised maintaining at least two pathways[13] with different accents on school- and work-based training. It should also be possible for students to attain qualifications independently from set pathways. The funding should depend on the position of the participants - the government should pay for students in initial education, the employment stimulation body for unemployed, the employer for employees and the others should pay for themselves.

The Committees created a climate of change for Dutch VET. They made a choice in the continental tradition and proposed an initiative from business, VET and government together to define new approaches to VET. In the UK model, schools themselves define the objectives and programs, whereas in the continental model the definition of outcome requires a governmental approval (Dercksen & Van Lieshout, 1993). Rauwenhoff (1990) did propose an UK approach, but the legislation for secondary education (O&W, 1988b) and VET (OCW, 1995) is based on the continental model.

The recommendations of the Wagner Committee (1984), the theory on flexible task management (De Sitter, 1994), and the innovation model (Kline

[13] The two pathways are the educational and the training routes.

& Rosenberg, 1986, and Nonaka & Takeuchi, 1995) fit perfectly. The analysis now confirms the conclusion from Wagner that responsive VET needs to be based on the principle that schools are responsible for the quality and development of the process and for the quality of the product. The responsibility for development of the product is for schools, commerce and government together.

2.2.2 Merger of schools and new legislation

Small schools are flexible, but they may suffer from being too small to cope with continuous change or lack power when principles change.

Table 2.1: The change of legislation for SSAVE in IAE's.

pathways in 1988	legislation: before 1990	from 1990 to 1995	after 1995
JSAVE	Law on JSVE	Law on JSVE	Law on BE Law on JSVE
educational routes:			
= S-SSAVE	Decree on S-SSVE	Law on SE (1990)	Law on ET (1996)
= SSAVE-B	Decree on SSAVE	As above	as above
= SSAVE-A	as above	As above	as above
training routes:			
= SSAVE-AS	Law on AS	Law on VT (1992)	as above
= part time-SSAVE-B	Provision on pt-SSVE	as above	as above
= agric. short courses	Provision on ASC's	as above	as above
IPC courses	Provision on IPC's	Provision on IPC's	as above

In line with the development described in § 2.1.3 and § 2.2.1, the Minister of Agriculture gave up being the competent authority of 50% of schools for SSAVE. In 1990 all agricultural schools merged into Institutes for Agricultural Education (IAE's) and became independent publicly funded institutions. IAE's were designed to meet regional needs in a dynamic way. IAE's are a vertical combination of schools for junior and senior agricultural VET[14]. The change of legislation prepared new roles for schools (Table 2.1).

[14] The IAE consists of *junior secondary agricultural VE* (JSAVE) for the 12-16 year old, based on the law on Basic Education (BE) and the law on JSVE, and *senior secondary agricultural VE* (SSAVE) for > 16 years with educational routes (courses at three levels: S-SSAVE, SSAVE-B and SSAVE-A) and training routes. The training pathways are the apprenticeship schemes (AS, at three comparable levels with the pathways), the part time SSAVE-B, and agricultural short courses (ASC's). Roughly three periods in legislation are to be distinguished for SSAVE: 'before 1990', '1990-1995' and 'after 1995'. Before 1990 Dutch agricultural education was based on several decrees and provisions. Based on the Law on Secondary Education (SE), the IAE was established in August 1990. The law on Apprenticeship Schemes (AS) was replaced by the law on Vocational Training (VT) in August 1992 and on this occasion the decree on part-time SSAVE-B and the provision on ASC's were integrated in the law on VT. In October 1995 government passed the law on Education and Training (ET). The law on ET established one Dutch VET and replaced the

These changes were the conclusion of a long process of structural adjustments in SSAVE. Sooner than expected, in 1988 a coherent new curriculum was needed. The requirements for that curriculum are worked through in chapter 6.

A responsive VET required a new division of roles. The design and development of new legislation to establish these new roles in Dutch VET took place between 1988 and 1996. The development meant a major change for the government and administration of SSAVE. The conclusion of # 2.2 is that, a new information structure was needed to accommodate the responsibility of commerce and industry, education and the government for changing the content of VET.

2.3 Changes within SSAVE

The changes described in # 2.1 did not come suddenly for SSAVE. Transitions were in progress from separate programs towards the one provider - SSAVE (§ 2.3.1); from 1:1 training concepts towards a coherent concept of qualifications (§ 2.3.2); and from subject learning towards competence-based learning (§ 2.3.3).

Competence and competency

Competence is dealing with 'know why and when' questions within changing structures, whereas competencies have been perceived as connected with 'know how' questions. Competence has a generic and holistic meaning and refers to a person's overall capability, whereas competencies refer to specific capabilities (Eraut, 1994, p. 179). 'Broad competence is a multi-dimensional, structured and coherent set of expert, methodological, strategic, administrative, social-communicative, normative-cultural and learning ability to approach effectively core problems within the profession.' (Onstenk, 1997, p. 128). These perceptions have consequences for the definition of occupational profiles (§ 3.2.2) and qualifications (§ 3.2.3).

Competence is not a descriptive concept but an expected behaviour concept (Short, 1984; Van Zolingen, 1995). As a consequence competence is to defined and also the way in which agreed statements on expected behaviour are constructed. The whole process is necessarily subject to subtle nuances of language (Hirsh & Bevan, 1991) and suffers from conflicting interpretations of key words; so it would be useful to have a sociological as well as a psychological account of how generic competence has been constructed (Eraut, 1994). This has consequences for the perception of the policy concept of a QS (chapter 4) and for the way a QS is constructed (chapter 5).

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law on VT and the SSVE-regulations in the law on SE. Also the Innovation and Practical training Centres (IPC's), which were based on a previous provision, were introduced in the law on ET. IPC's are for the practical training and innovation that is more efficiently executed by national institutions than in regional work-based or school-based training.

In this thesis competence-based learning has been perceived as a pedagogy directed to learning procedures to deal with 'know why and when' questions within changing structures, whereas subject based learning has been perceived as a pedagogy connected with declaration and performance of 'know how' questions (Eraut, 1994). The basis for competence based education lies in the educational tradition of SSAVE as will be described in this section 2.3.

2.3.1 Towards one provider of all SSAVE pathways

In the past century, a variety of providers started agricultural courses for diverse target groups. In the initial phase research, extension and education for a particular branch were often in the hands of a single person. As a result agricultural education was adapted to specific situations and was very diverse in form. This became a problem when the old contextual differences lost significance and the system had to change to adjust to new demand. Examples will underline this.

One example is the forcing into line of the horticulture and agriculture schools in 1958. Because of differences in the structure of the sectors and the administrative organisation, some horticultural courses had been day release education from 1890 onwards and agricultural courses had been winter-courses from 1890 until 1958. Another merger was the transition of adult education from the extension service to agricultural education; launched in 1958 and finalised in 1983. Work-based training in horticulture is a third example; the complementary 'in service' training of employees was often organised by research stations from 1919 onwards. This was transformed into an independent apprenticeship scheme for agriculture and horticulture from 1965 (Goudswaard, 1986).

At the end of the 1980s the clarity and coherence of educational provision was still not satisfactory. SSAVE had internal communication problems and only teachers working at several levels of course could discuss meaningfully the curricula of JSAVE and SSAVE. Also industry suffered from the lack of a common language. Entrepreneurs did not see a difference between students from SSAVE-A and the SSAVE-B pathways (Lavi, 1987c). The new IAE's would be an opportunity to change this for the junior and senior level.

Schools also met external communication problems with new target groups, which came to the schools because of change in the rural area and broadening of the curricula. The old target groups were insiders and they were guided to the most applicable pathways. The new targets groups were not made aware of the opportunities SSAVE had to offer.

Another motive for the Minister of Agriculture to increase scale was expectation of a strong decline in traditional recruitment to courses (Lavi, 1986). The subsequent loss of a minimum school size for efficiency and innovation in the system was feared.

The conclusion is that fragmented responsibility for pathways, differences in program structure and the loss of an effective school size hinder a responsive SSAVE. Linking programs to one educational system could improve the clarity of the provision and the size of schools. Such linking causes the loss of identity for some components of the system and also a loss of the structural links between research, extension and education in the course of time.

2.3.2 Towards one coherent concept for qualification

The idea that qualifications match 1:1 with occupations is naive (Van Hoof & Dronkers, 1980). The idea 'once qualified, qualified for ever' is outdated. Thus educational objectives should cover more competencies than those required for the first job. The competence required for an occupation cannot become an educational objective immediately. The problem was to find a clear concept for the 'new qualification'.

In the 1980s the leading principles for SSAVE were 'entrepreneurship' and the skill orientation of programs. 'Entrepreneurship' was not clearly defined; Zachariasse (1974) rejected the belief that it was a matter of 'green fingers'[15]. Entrepreneurship and skill orientation as such were difficult to apply when changing SSAVE. This will be illustrated with examples from a project on the application of learning through participation (LTP) from 1982-1985.

LTP is based on the educational utilisation of links between work-based and school-based learning (IPC, 1978). A project group designing an operational LTP needed to have a clear concept of how the two aspects were linked. The objectives of the traditional subject matter were not suitable for the work-based program and the experiences from practical work in the work-based program could not be utilised in the school. LTP needed one set of objectives to assign mutual tasks to a school- and work-based program. The principles of entrepreneurship and skill orientation were hard to apply in practice. They were names for a concept and had no concrete significance for educational content.

The group analysed the functional hierarchy of work in the work-based program and developed a matrix with four levels of qualifications for SSAVE. Skill orientation implies mastery of practical routines in a specific employment sector, demanding specific psychomotor skills, technical knowledge and related attitudes at operative level and for the craftsman. Entrepreneurship implies mastery of creative skills and transferable skills as well as skills, knowledge and attitudes at a managerial level and a considerable degree of practical skill orientation. (Table 2.2, details in Annex 2.1).

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[15] Thesis II from Zachariasse (1974): 'The assignment of the so called 'Fingerspitzengefühl' is a sign of insufficient analysis of the successful decision-making process.'

Table 2.2: Taxonomy for entrepreneurship LTP (Van de Lagemaat et al, 1985)

	psychomotor	affective	cognitive
Operative	doing manual routines	enjoying physical labour	looking some steps ahead
Craftsman	self efficacy at routines	desiring responsibility	knowing facts and norms
Manager	controlling routines	shaping own values	planning execution
Entrepreneur	handling information	feeling coherence and trends	planning objectives

The matrix was made to guide the discussion between an agricultural and a horticultural school about qualifications/objectives relevant for the organisation of school/work-based programs. The views on required qualifications however differed and were difficult to bridge. Employers, for example horticulturists with only a few employees, demanded trainees who were ready for work without any additional training in the enterprise. Other employers, however, for example self-employed farmers and also personnel managers of large companies, demanded flexibility rather than immediate readiness. These different views extended into the staff-rooms of the two schools.

The discussion about flexibility and readiness is not unique to SSAVE. In the Netherlands (as described in § 2.2.1) the most dominant demand by business is practical skill. 'They should know how to hold a hammer' (Wagner, 1984). Practical competency meets needs of practical employment and contributes to the motivation of teachers, students and commerce. The Minister of Agriculture stressed the value of skill orientation of SSAVE (Lavi, 1988a).

But the coin has another side. Pierik (1993) analysed the satisfaction of students with their SSAVE-diploma and identified the wish to put less stress on job requirements and to pay more attention to supporting occupational competence and general subjects.

The development of a coherent concept on the qualifications required, has much to do with content as depicted above, but also with specific educational processes. The design, development and application of a provisional tool (the Table 2.2) took a lot of time and discussion. The members of the project group realised that LTP could not be designed, developed and implemented in one cycle. From the project and from curriculum technological research (Fullan, 1991) it was evident that the development and institutionalisation of an LTP-based curriculum would take many cycles and many years of effort (Annex 2.1). The conclusions from the LTP project are -

- the design of a concept for a competence based SSAVE needs a strategic basis; this is not available;

- the aspects of readiness for employment and flexibility to move employment are accepted as fact and need to be incorporated in competence based education;
- experiences with design and development of a competence-based education are not well documented, making it difficult to pass them on to other developers. The development process can be, therefore, a lengthy one.

2.3.3 Towards competence based learning

Traditionally the aims and contents of SSAVE have been expressed in terms of required skills rather than subject matter. When the 'agricultural winter-courses' ended in 1958 and full-time education was introduced, agricultural VET lost its applied character, according to Goudswaard (1986). He describes the difficulties schools had with the introduction of more general subjects and the programming of a 'broad-and-practical education'. Unfortunately the generalisation of the required skills has often become a move to general subject matter, rather than to acquiring broadly applicable competence. The confusion increased with the assignment of broad competence to work-based training, and general subjects to school-based learning. This deceptive simplicity needed structural and pedagogical correction. Attempts at correction are described below.

In 1964, to meet the differences in abilities and motivation of students, a practical and a technical pathway were established - a practical, 2-year SSAVE-B-route and a theoretical, 3-year SSAVE-A-route. The structure was re-modelled in 1971.

This new format was a response to complaints by farmers who could not accept that their sons, for whom a farm was available, could not attain a diploma. The farmers demanded a second pathway in SSAVE for less able students. The approach was unique within Dutch VET.

The aim to teach required skills in SSAVE was supported by initiatives from the field of education and by the Minister of Agriculture with the stimulation of new pedagogy. In retrospect the work in SSAVE was a search for a model for competence-based learning.

The competence-based learning model is based on constructivism. This is not a teaching theory but a theory of knowledge and learning; learning is regarded as an active and not an absorptive process. 'We teach a subject not to produce little living libraries on that subject, but rather to get a student to think logically for himself, and to take part actively in the process of acquiring knowledge. Knowing is a process, not a product. Instruction needs to take account of the fact that a curriculum reflects not only the nature of knowledge itself (the specific capabilities) but also the nature of the seeker and of the process of acquiring knowledge' (Bruner, 1966). Vygotsky (1962) 'knowledge generates from communication' and Piaget (1957) provided a

basis for the concept. Bruners' idea is that learning is a cyclic process with enactive, iconic and symbolic phases. These backgrounds support Eraut's definition given in the introduction of this section.

As a concept, constructivism was applied to projects in S-SSAVE and SSAVE-B (Van de Lagemaat, 1986). The attempts to improve pedagogy in SSAVE will be illustrated with these two projects.

It is worth while mentioning that educational change has been relatively successful in Dutch VET; the success rate and the cost benefit ratio of SSAVE are good (Figure 8.2). It is likely that the structure of the SSAVE-B and SSAVE-A pathway - a form of external differentiation that suits two levels of ability - is the prime element in this success. As explained above this was in response to farmers' complaints.

Considering the problems with the definition of the required qualification (§ 2.3.2) and the problems with improvement of pedagogy that will be reported below, the conclusion may be that in the past 30 years structure has been more effective than other features.

The SSAVE-B project

In 1975, a working group for SSAVE-B reported that the improved selection in Primary Education and the extension of the part time compulsory education to 18, had pushed the better students to higher level pathways of education. Also the intake of students with a non-agricultural background increased and teachers complained about their lack of ability and motivation. The working group recommended change of content, methods and organisation to improve the climate in the schools (Borkhuis, 1976)

More attention should be given to self-reliance of students in working and learning. The farming enterprise as a whole, the decision making and taking responsibility should receive more attention. There should be fewer subjects and general subjects should be integrated in appropriate vocational subjects. Work-based training should get more attention and practical experience should be used in the school-based training. LTP was advised. The course should be three instead of two years for the integration of work-based learning in the curriculum. The work-based learning should be organised in blocks of some weeks duration and also in part-time day programs.

Working groups of teachers should develop new concepts of learning. Teacher training and in-service training of teachers should encompass a wide variety of methods. Based on these recommendations, the SSAVE-B project ran from 1978-1986.

The development project had a school-line and a subject-line. In the school-line, selected schools worked on the reforms of organisation, curriculum and pedagogy. The interpretation of the recommendations was left to schools and this resulted in a wide variety of concepts. The transfer of these concepts from the project-schools to other schools appeared to be

difficult (Boomsluiter, 1986). Many teachers joined in with additional in-service training. The design of a model for a schoolwork plan, an objective of the project, was not carried out because the emphasis on the development of individual schools changed the objectives of the project. It became clear that every school had to go through its own process and also that the outcomes in schools would be rather diverse (APS, 1984).

In the subject-line, national teacher-working-groups wrote a large set of textbooks and they tried to keep pace with technological development and diversity (Boomsluiter, 1986). The project objectives with regard to new teaching aids were partially achieved. Lack of co-ordination, lack of manpower and lack of expertise made the work in the writing groups a difficult job (APS, 1984). The number of textbooks increased every year and it became difficult to keep them up-to-date.

The S-SSAVE experiment

The S-SSAVE experiment in 1984-1987 was a follow-up of S-SSVE (short-VET) from 1973-1983 in general education (O&W, 1978). S-SSAVE aimed to combat youth unemployment with low threshold VET for youngsters (Lavi, 1984).

JSAVE, the main supplier of students to SSAVE, pressurised SSAVE to offer advanced studies for all students[16]. The social partners, however, did not want an extra pathway. Also the apprentice schemes did not favour the new S-SSAVE because of competition with the primary education courses. The Minister of Agriculture did not favour the S-SSAVE because of the SSAVE-B-route, which provided a second option for the students in the target group. Thus, the S-SSAVE experiment made a poor start.

The S-SSAVE experiment was motivated by a social problem, a well defined educational objective, a clear organisational structure, sound planning, a strong backing from general policy and sufficient funding. The adapted Regulations were a strong basis. A weak point was the small scale of the projects and the small numbers of participating teachers, often only part-time (Van der Steen, 1986).

The ARVO[17] (1988b, pp. 13 & 32-33) evaluated the S-SSAVE experiment and concluded that 'the experiment yielded results to be continued along two lines -

- the implementation of short courses for all branches of SSAVE;

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[16] As a result of a broad social and political discussion about the orientating function of education at the age of 12 - 16 years, the broadening of the curriculum for junior secondary VE (JSVE) started in the 1970s and was finalised with the introduction of basic education (BE) in the 1990s. The broadening of the curriculum in JSVE (and JSAVE) often caused the loss of the concrete context of primary VE and consequently loss of motivation with students. Industry did not value the new JSVE diploma and –after some hesitation- welcomed the qualified school leavers with the new S-SSVE qualification.

[17] The ARVO was an advisory body of the Ministers of Education and Agriculture (§ 5.2.1)

- the introduction of the pedagogy from S-SSAVE in other courses'.

This implies a qualification structure (QS) for SSAVE.

'The organisation of work-based training and the educational administration of the experiment should be implemented in SSAVE-B and -A courses. The examination programs should be based on units. The Core Committees[18] should co-ordinate the teachers' work on joint intermediate qualifications for S-SSAVE and primary courses in the apprenticeship scheme; to be implemented before 1993'. The ARVO recommended a project to progress students from JSAVE in early stages to the SSAVE.

The conclusion from # 2.3 on changes within SSAVE, may be that in 1988 transitions on vital aspects of the system were on their way. It appeared to be likely that the movement towards one provider of all pathways, supported by new legislation (§ 2.2.2) would reach a satisfactory conclusion. The new provider would have a terrific challenge to arrange a complete provision in a region.

The development of one coherent concept of qualification, necessary to run the institution of the new provider, appeared to be a problem. The development of new teaching methods to improve the learning climate in schools is also a difficult issue. The complex context of SSAVE invited the development of very different types of course and detailed learning aids. This reaction, to provide instruction material for subject based learning (Skinner, 1961), leads away from broad applicable skills and is counter-productive to developing competence-based learning. Here again, there is the difficulty of transfer of newly developed concepts, from one school to another for example.

In 1988, adult courses were a strong and well-recognised element of SSAVE. Life long learning (LLL) (OCW, 1998), however, was not yet as strong an issue of policy. SSAVE has many connections with LLL and responsiveness has become a common issue (Gimbrère & Nieuwenhuis, 1998). Section 2.3 is a reconstruction. In reality teachers, educational advisory staff and administrators felt that the real aim was to change the way schools worked and to improve pedagogy. In 1988 it became clear that the development of a new set of educational objectives was a condition for such change.

2.4 Possible solutions

Solutions needed to be found for the development of a coherent concept of qualification and of a new pedagogy for SSAVE. The advice of the ARVO (1988b) to turn away from subject-based and to turn to competence-based learning as in S-SSAVE meant a deeper change than ever tried before. It was

[18] A Core Committee was an umbrella for the working groups of eight occupational divisions of SSAVE; the Ministry of Agriculture organised and co-ordinated within a Core Committee the educational development by 10 - 25 teacher-working-groups.

a new way of working in schools and that needed the support of objectives and regulations (a new way of steering by the government) at the level of the educational system.

Various authors in Northwest Europe have analysed the relevance of external change for VET. There is a common opinion about the importance of economic, social, technological and cultural trends in further development (e.g. Raffe, 1992; Achtenhagen, 1994; Prais, 1995 and Ellström, 1998). This section will indicate that the response to external change is not organised through regulations and interventions. Too much effort has been put into structural changes and too little into the procedures that recognise external influences and develop appropriate clearly defined outcomes for participants in VET, to motivate new pedagogy.

2.4.1 Contextual change and structure

The changes in the context of VET are new in the sense that traditional approaches do not yield effective responses (Achtenhagen, 1994). The educational system needs new structures. The EU-politicians however, tend to react with hasty decisions and simple harmonising strategies in an European context. An institutional and organisational approach instead of a pedagogical person-, content-, goal- and process-related approach hinders the desired development. Achtenhagen wanted to turn the problem around. He supported a way of thinking that starts with pedagogical categories as mentioned above and that ends with institutional alternatives.

Some examples underline the difference in theoretical views when it comes to structural matters. The choice of an appropriate combination of school- and work-based education (dualisation) for example, is not just a pedagogical issue. Nieuwenhuis (1993) points, in addition, to didactic considerations of dualisation as aspects of steering, funding and career development.

Also, duration and certification are fundamental (Achtenhagen, 1994). The two problems have been analysed for the German context. In Germany as in many other countries the duration of initial general or VET is felt to be too long. Some politicians suggest strengthening general education, assuming that general education would be the best preparation for general challenges, and leaving VET to commerce and industry. There are arguments opposed to this strategy. The USA is an example of the proposed approach and it hardly has a public first phase VET. Analysis shows that the lack of the vocational basis in the USA impedes successful continued training and education. Research shows that basic VET is necessary to build a solid foundation of vocation-related abilities (Achtenhagen, 1994; Berryman & Bailey, 1992). Dutch investigations also reveal that students from VET contribute better to innovation in work than those with only a general education (Gelderblom, Koning & Van der Weijde, 1996).

Duration is connected with certification. The longer students follow general education and the more subjects they take, the higher the certification level. The problem is that this does not count for occupations and that is why vocational competence does not feature in this concept of value (Achtenhagen, 1994). The tradition of general certification, going back 2500 years to the *Enkyklios paideia*, claims to develop the whole personality. This is a questionable claim since the disciplines of economy, law, medicine, technology and pedagogy are not built into the system. The conclusion is that general education cannot replace VET, and that VET needs specific certification systems (Achtenhagen, 1994) in their own rights (Prais, 1995).

De Vries (1988), Frietman (1990) and Nieuwenhuis (1991) studied the success of different forms of dualisation and concluded that 'the best learning spot' cannot be defined. VET however, must be founded on a deliberate sequence and combination of working and learning. It is desirable to program pathways with a gradual increase of practical application. The school- and work-based program should depend on the requirements of the student within his/her occupational domain.

Is a work-based program necessary for the career prospects, occupational choice, increase of motivation, and possibly the conception of life long learning? The answer is 'yes' when the workplace acts as a 'learning organisation'. The learning opportunities of the workplace need to be investigated.

'Who should oversee the school- and work-based program?' Diversity of branches and/or regions and the desired interchangability of qualifications at a national level hamper the clarification of views.

'Who should be funding the school- and work-based program?' Practice differs in Germany (Achtenhagen, 1994), UK (Prais, 1995) and the Netherlands (Van Veen, 1993), but the question is the same.

'Who pays for the national social-cultural interest, the employers' human capital interest and the individual's economic and self-realisation interest?' A simple shift from public funding to funding by business organisations and branches is not logical; it could endanger long term national and specific individual interests in VET.

The principles of general education and dualisation show how structural matters pervert valid pedagogical freedom in the learning process. To respond to contextual change, VET needs a system of qualifications with a currency of their own, which are independent of the structure of institutions providing the educational experience.

VET needs a specific QS of its own that reflects the outcomes of the individual and has a national currency. It should not stem from institutional and structural matters or other issues such as responsibilities for steering and funding.

2.4.2 The interpretation of contextual change

The available research literature about the interpretation of contextual change lacks theoretically integrated and empirically substantiated views about the desired interventions and is largely norm-oriented (Ellström, 1998). Few conceptual and theoretical frameworks are available for understanding the phenomena and processes of competence development (Dreyfus & Dreyfus, 1986; Eraut, 1994; Nijhof, 1997). Most of the research is informed by a rather narrow and often implicit, technical-rational perspective on issues of qualification. In the narrow view, performance technology tends to mould and adapt work skills to some set of predetermined qualifications, which, in their turn, are more or less automatically determined by autonomous technological change. Brown & Duguid (1991, p. 40) criticise the concept that working, learning and innovating are thought to conflict with each other. Ellström (1998, p. 2) condemns the view that innovation is primarily conceived as the result of exogenous technological progress and investment in research and development, rather than as the outcome of learning processes and pro-active behaviour by individual or collective participants at the level of the business itself. Ellström suggests that many of the problems of current research on qualifying objectives are a consequence of an attempt to solve the wrong problem. Instead of trying to derive the consequences of technological development for work organisation, work content and qualifications, it might be better to turn the problem upside down, and focus the analysis on required skills in order to facilitate and shape the work context in a desired way.

Nieuwenhuis (1993) indirectly confirms the views of Achtenhagen and Ellström when he points at parallel, but also conflicting consequences of contextual change for training and education. Nieuwenhuis points at the discrepancy between the occupational domain and the educational profile. There is no distinct 1:1 relationship. The employment market itself is also ambiguous about professional domains. The occupational domain as defined by the segmentation of the employment market, as a company, professional, complex and residual sub-market (Figure 3.3), has to be taken into account (Van Hoof and Dronkers, 1980). The variable mobility of students and the changing recruitment strategies of employers enforce the heterogeneity of the employment market. Also the cyclic nature of the employment market and the effects of the cyclic process contribute to the vague meaning of occupations (Teulings, 1990). In times of an excess supply on the employment market the employers demand higher quality. The higher standards are resisted in times of poor supply. This is due to the decreased investment in internal training in times of high supply on the employment market. Structural and qualitative gaps between education and production may impede a direct translation of required qualifications into curriculum content.

The observations underline the need for safe justification procedures for curriculum development (Nijhof, 1984). The conclusion is to use multiple sources for the investigation of external demand and the articulation of required qualifications.

2.4.3 Focus on definition of output from VET

Raffe (1992) mentions a consistent set of goals for educational change. The goals are education for all, smooth school-to-work transition, compensation for the loss of professional identity and a reference for qualification, qualification for work for all, firm description of abilities and more efficient and more motivating educational technologies. These goals are criteria for defining outcome.

Among the goals mentioned by Raffe, qualification for work takes a central position. 'What is qualification for work?'

Because of the difficulty of being precise about the quality of vocational qualifications, labour sociologists stress the importance of a range of extra-functional, social normative, work-process-independent, or non technological-instrumental abilities (Van Hoof and Dronkers, 1980). They reject occupational profiles as a hard point of reference and prefer to take a global occupational image as a reference for educational change. The occupational image includes, at a higher level of generalisation, the actual occupational profile and also derived task profiles, applicable study and social profiles, and a status dependent on qualifications and level of education of the occupational group. A broader perception makes the occupational image into a more stable concept than the occupational profile.

Hövels (1989) and Nieuwenhuis (1993) conclude that the qualifications for VET require three qualities. Qualifications are operational in the labour process - the technological-instrumental aspect - fit in the organisational and social context of the work situation - the social-cultural aspect - and follow the change in the labour system - the creative-transformative aspect.

Nieuwenhuis (1993) and Ellström (1998) suggest being pro-active when it comes to qualifying objectives. Students should learn in advance to handle the change in required qualifications. Understanding the concept of transferability is an important point, but in schools little has been done yet (Nijhof, 1991). Because of dynamics of occupational development and limitations in initial education, VET cannot offer vocational qualifications for a lifetime.

VET should lay the basis for employability; this means a set of vocational qualifications to get a first job, and a set of broad qualifications to attain transferability.

VET needs a QS with esteem comparable to the general certification. The QS should describe the abilities necessary to cope with a changing occupational context. Technologically robust and legitimate procedures should

support the development of such a QS. Three principal proposals of Prais (1995) support these prerequisites. In developed economies the government should keep a balance between the funding of vocational and scientific education. The government should prescribe objectives that link training objectives with broad-based transferable knowledge. The government needs to lead main stream students away from the academic university courses.

VET needs clearly defined outcomes in the form of a QS. The structural nature of change in the occupational context making the traditional occupational profiles unstable and objectives of VET moving targets, requires this.

2.4.4 Approach to contextual change

In order to articulate demand, curriculum theories support both theoretical analysis (Goodlad, 1979) and conferencing (Frey & Aregger, 1975). Theory places the justification of educational content with a 'body of knowledge' of subject experts, with the competent authority of schools (Tykociner, 1966) or with the government (Blankertz, 1970). The justification of the product definition when assigned to macro level rests with subject experts and/or the government.

Van Rienen (1983) has designed the way educational objectives are determined in Dutch VET. Van Rienen distinguishes occupational profiles, educational profiles and educational objectives. For the implementation all theoretical options mentioned above are applied.

Brandsma, Nijhof & Kamphorst (1989) and Moerkamp & Onstenk (1991) have elaborated Van Rienen 's approach. The present state of the art includes transformation from an occupational domain into a task profile, a qualification profile, an educational profile and finally into a curriculum (Nieuwenhuis, 1993). In this process students and teachers must be consulted. Interested parties in education and industry, and professionals must be heard in conferences, to gather information about the qualifications required and how they might be provided.

2.4.5 Change of pedagogy

The format of requests for technical knowledge and its provision are changing in both education and extension. The Dutch extension service is changing the way it provides information and recommendations to groups and individuals into an offer of counselling and advice. Instead of a prescription, a range of possibilities is offered. A similar, but much slower change in education is seen where forms of competence-based learning are tried and combined with teaching in the traditional way. Competence-based education refers to educational approaches in which originality, problem solving and productivity are leading principles; self-reliant working and learning are expressions of these principles. Competence-based education provides conditions for creative learning (Ellström, 1998), double loop

learning (Argyris & Schön, 1978), cognitive apprenticeship (Berryman & Bailey, 1992), expansive learning (Engeström, 1987 & 1994), or shaping (Heidegger & Kuhn, 1995).

Engel and Van den Bor (1995) recommend agricultural schools to restructure themselves and shift their focus from classroom teaching and start 'search and persuade' conduct together with future rural entrepreneurs. This is recommended not because the traditional categories of knowledge have become less important, but because joint problem-oriented search and persuade conduct have become the backbone of the continuous practical and professional innovation. Linking school- and work-based learning provides opportunities to program competence-based learning.

The conclusion of # 2.4 is that change in VET should not attempt to restore with new objectives the 1:1 relationship between occupation and qualification. The gaps between qualification and occupation place constraints on VET responding directly to external change.

Traditional education laid down in structures and processes should not be allowed to restrain the transformation of external demand into educational objectives. That is why educational objectives should be descriptions of required outcomes and not process requirements; objectives should act as the definition of outcomes for VET.

The articulation of external demand requires a systems approach with a statement of outcomes at a national level to facilitate the development of organisation, pedagogy and learning in autonomous schools. The new statement of outcomes needs to be clear at all the levels of VET: for guidance, and management of schools and the education provided. Because of the named difficulties and requirements, the procedures to deal with contextual change need to meet technological and justifying standards.

2.5 Conclusion about problems and approach

This final section shows how the problem of SSAVE may be perceived and concludes with possible approaches of the problem.

2.5.1 Conclusion about problems

It is obvious that SSAVE needed and tried to change, but in the 1980s was not clear how to respond because of the complexity of the problems. Now, the response of SSAVE, the development of the responsive system and theoretical views on the matter, are better understood and more easily expressed. A set of issues had to be resolved in 1988.

The basis for an insight into the problems is an understanding of the meaning of external change, for required skills and the future of VET. What is achieved when shifting rural functions, technological development, ecological and environmental issues, changing markets, opinions about the issues among the public and a changing knowledge system are transformed

into meaningful skills in work, social life and continued learning? This however, would only be a temporary solution if the educational system itself was not responsive. The most significant outcome of the dynamic situation is that rapid change has become the norm. Learning and working will need to go together and only a responsive SSAVE may maintain a sustainable public function.

'How can this be achieved?'

'How can external change be articulated? Are occupational profiles or analysis of production cycles sustainable means to reveal the required skills?'

'How can the required skills be transformed into concrete outcomes for SSAVE? Are competency-based objectives a possible vehicle for constructing concrete outcomes?

'How can competency-based objectives be linked with organisation and teaching in schools in such a way that the system becomes responsive?' Without consistency between the supply of information and the way schools work, initiatives to improve SSAVE lose impact once projects stop or political interest is reduced.

'How can vital issues be stressed and acted upon at the systems level?'

'How, for example, can the importance of competency-based objectives and pedagogy on one side be linked to funding and quality control on the other?'

'How can the way the government steers schools be kept in-tune with the way schools need to work?' Educational change requires a way of steering by government that supplies external support to the change in schools. With the exception of the experiment on S-SSAVE, where new regulations were made, the Ministry of Agriculture used to ease or exempt from existing regulations to facilitate change. It is naive to presume that exemption from regulations is a measure to change education. The problem is that during a transition the traditional way the government steers schools remains implicitly the point of reference. This turns against effective change when a break-through in a project demands external approval.

From the points of view described above, the projects in SSAVE described in # 2.3 can be criticised - they started without a suitable supply of information, without a clear concept of a new way of working in schools, and with a traditional way of steering by government. All three are critical success factors, which need to be co-ordinated at the system level.

The over-all problem is to develop a long-term responsive system that deals effectively with the structural nature of contextual change and to maintain political interest for design, development, implementation and maintenance of such a system (Fullan, 1991).

Also, the responsiveness of the system will only work when students and teachers have explicit answers on the meaning of external change for

assigned tasks and the necessary initiatives in the learning process (Van den Berg & Vandenberghe, 1981, 1995).

2.5.2 Conclusion about the approach to the problem

The developments in the first three sections of this chapter may be seen as a description of a phase in a learning process for a new approach to SSAVE and for new pedagogy. It is the history before the event. A next step in the learning process may be the design, development and implementation of clearly defined outcomes to make the system responsive. The question then is how the learning process can be enhanced and guided.

Teachers and school managers, representatives from industry, educationists from educational advisory centres and advisory councils, and civil servants from the Ministry of Agriculture must learn together in a community of practice. The organisation and support of this learning process may be the essence of the design, development and implementation of a responsive SSAVE. Poor results of educational change may stem from the fragmented approach to problems and the lack of a systems concept for change.

A theoretical way to escape from the fragmented approach is to take contextual change as a starting point and to transform the desired response into a consistent form at macro, meso and micro levels of the system. Or in other words, the communication of the changes in the context of SSAVE could be based on a new form of information supply, which should be a coherent part of a new pedagogy and a new steering, by government.

The conclusion, based on experiences with educational change in the 1980's in SSAVE and elsewhere, and the survey of the theory, is that the development of new content and a new system need to go along together. An effective response to contextual changes -

- identifies the new competencies required;
- transforms into competence-based objectives;
- links these objectives to the new learning strategies;
- links these objectives to the roles of schools and government;
- develops a coherent information, production and steering system.

Chapter 3 is a systematic analysis of the sociological and technological aspects of these requirements and describes/reconstructs a model to organise the change.

3. Towards a steering model for responsive SSAVE

The conclusion of chapter 2 was that new ways needed to be explored to deal effectively with continuous changes in the environment in which the education system operates - the contextual changes. A new approach should start from the contextual changes and rethink educational content and the way in which it is provided. The consequences of this new approach for the educational system are considered.

SSAVE should become responsive. The design of a responsive SSAVE requires a statement of what needs to be done and what the procedure should be. No such guidance was available for SSAVE in 1988. In this chapter a model is reconstructed for the design and development of a responsive SSAVE.

Section 3.1 outlines the principles on which the model was developed and 3.2 describes the new content and defines the outcomes. Sections 3.3 and 3.4 deal with conventions and procedures at macro, meso and micro levels.

3.1 Principles of the model

This section aims to answer essential questions about the content and procedures of a responsive SSAVE. 'What do new contents and procedures mean at macro, meso and micro levels of the system?' The aim of this section is to identify what the participants in the system ought to be doing and what they should be advocating to all levels of the new system.

3.1.1 Structures of a responsive SSAVE

'What should be the role of the schools, the government and the tripartite responsibility[19] for objectives as recommend by the Wagner Committee (1984), and the relationship between them?'

A structural design is needed to place these bodies in a structure before the main issues are considered. The leading principle for the design is the articulation of demand based on information about contextual changes. In the field of force 'participants think and act from different starting points, values and facts. They have their own perceptions of a public problem, notably the difference they perceive between the present and the ideal situation' (Dirven & Kusiak, 1998, p. 34).

Information on contextual changes, the articulation of the demand arising from it and transposing the demand into educational objectives, is vested in a new structure - the information structure. It is independent and separate from overseeing the schools by the state (steering structure) and the management

[19] The Wagner Committee proposed the responsibility for educational objectives to be shared between social partners (employers and employees), education and government.

of schools and the learning processes (production structure) (De Sitter, 1994, pp. 101-105).

The design identifies three vital areas of operation and clearly demarcates the responsibilities of the participants. They are -

- a steering structure responsible for deciding policy on educational objectives and acquiring resources;
- a new information structure to articulate demand and recommend appropriate educational objectives;
- the production structure - the schools - responsible for the teaching and learning.

Responsive SSAVE therefore, has one vital structure more than traditional SSAVE (Figure 3.1).

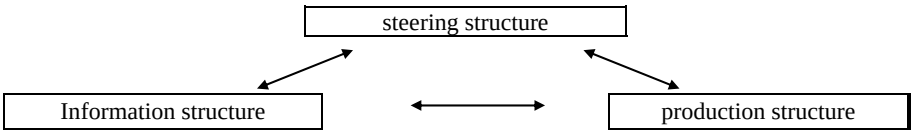

Figure 3.1: The vital areas of activity of a responsive SSAVE

The system structure of a responsive SSAVE gives a clear place to the information structure (see Annex 1.1 for the constituent institutions). A gateway is provided through which the question of contextual changes can be addressed. The tripartite responsibility for articulation of demand can be at the core of the information structure.

3.1.2 Issues of a responsive SSAVE

Vital issues of a responsive VET (Nijhof & Streumer, 1994a, p. 3) are -

- competence based educational objectives;
- flexibility of organisation;
- transferability of school leavers.

'Who should be responsible for each of these aspects?'

Dutch VET is a system with national objectives (Dercksen & Van Lieshout, 1993). Thus achievement of transfer potential of qualifications is an issue at the macro level of education, and has consequences for the meso and micro levels. National qualifications could result from the analysis of contextual changes (# 2.1) and gain tripartite support as proposed by the Wagner Committee (1984).

The next issue is flexibility of organisation, in tuning educational programs to local demands (Rauwenhoff Committee, 1990), for example, and to meet the needs of target groups (Van Veen Committee, 1993). Flexible organisation of schools, for example by modularization, is a responsibility at meso level of the system with consequences for the macro

and micro levels. The considerations at meso level are national objectives, demands of target groups and local demands of the employment market.

The third issue is the transferability of school leavers. Transferability is a result of the learning process at the micro level. The organisation of learning is a responsibility of teachers. National objectives, regional demands and individual needs influence education at micro level. The achievement of transferability requires skills of reflection in a process of competence based learning (§ 2.4.5), in which students discover similarities and differences when knowledge is applied in other situations. Reflection decontextualises personal experiences (Gielen, 1995) and is helped when the national educational objectives are decontextualised (Nijhof & Streumer, 1994b, p. 137).

Issues at meso and micro levels are the concern of the production area. Schools should note the requirements, and adjust educational goals to regional and individual needs and choose appropriate pathways and pedagogy to meet the objectives. The issues affect inputs, processes and results at all levels of a responsive SSAVE. The national objectives are essentially a common issue at all three levels and that is why the national objectives can be a means of developing and implementing the transfer potential of the system (Table 3.1).

Table 3.1: Dominant educational issues for a responsive SSAVE

	inputs responding to	process requirements	outcomes
macro: system	Contextual changes i.e.: employment market changes, changing patterns of work,	articulation of external demand and of public roles	funding and control of qualifications with transfer potential
meso: schools	Diverse regional demand, multiple target groups, and	flexibility of organisation	pathways motivating and catering for different ability levels
micro: learning	Individual needs add to heterogeneous demand	competence based learning	transferability of qualified school leavers

Table 3.1 shows also the accumulation of constraints in schools; requirements/inputs accumulate at micro level in the learning process.

In retrospect the central dilemma of a responsive SSAVE can be recognised - the balance between the generation of required qualifications at macro level and the creation of freedom at micro level to deal with a multiplicity of requirements. The supply of information through the system is one problem and accumulation of demands at micro level another (Table 3.1).

3.1.3 The procedures in the model

The relationships between the areas of activity and the vital issues of a responsive SSAVE have been explored. These must now be combined into the model for a responsive SSAVE.

The model pinpoints the educational issues (Table 3.1) in each of the structures of the system (Figure 3.1) and shows the policy links between them. Direction within the system rests with overall policy development, the implementation of that policy and its adjustment at regional level. Overall policy is concerned with the approval of qualifications for public funding; the implementation policy assigns educational responsibilities and necessary funding to schools; regional policy adapts the objectives and processes to regional requirements and individual demands.

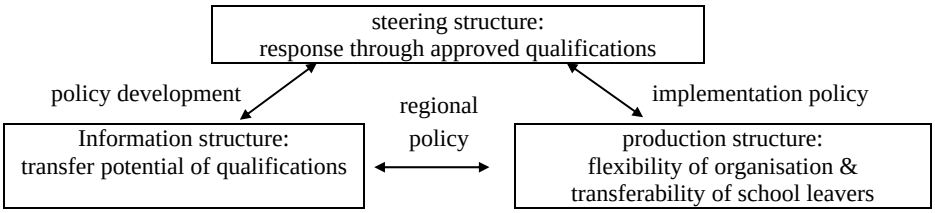

Figure 3.2: Framework of the model for a responsive SSAVE

The elements form the framework for the model (Figure 3.2). Additional views on content (# 3.2) on management at meso (# 3.3) and macro (# 3.4) levels add actual content to the frame of the model and make it operational.

Schools with a large self-regulating capacity can direct their own programs, but features inherent in the system limit autonomy. The information structure designs a national set of qualifications and the steering structure decides on funding and quality control, thereby enhance the responsiveness of the schools. The interdependency of the areas of activity may modify powers and move SSAVE away from self-referential change.

Direction within the system is complete when the production structure participates in the articulation of demand at a national level; and when the information structure in its turn takes part in making regional adjustments. The steering of a responsive SSAVE can vary from a one-sided activity of the state through to self-regulation.

The clarity and coherence of qualifications determines the quality of direction in the system. Communication about other issues at the systems level is made more difficult by the heterogeneous quality of information on other issues. It could cause the system to become impeded and affect its responsiveness (De Sitter, 1994, pp. 14-16). Directive steering turns the traditional 'regulation of' the educational process into an 'information supply for' the educational process. Communicative steering and the balancing of powers in the system can lead to more even relationships between public authorities and their clients (§ 2.1.3).

The issues and procedures in the model for a responsive SSAVE show that an information structure can be integrated in the educational system and be linked with the traditional steering and production structure of education.

3.1.4 The status of the model

One may question the relevance of the framework for the model.

'Are the starting assumptions correct, do they describe a realistic situation or are they simply a useful means of designing a system?' The framework of the model (§ 3.1.3) is based on an understanding of the usual situation. Alternatives are then provided, with examples showing the different responsibilities (§ 2.4.1) and structures (# 4.6) of VET in the countries of Western Europe.

'What then does it mean?' The model adds to the conventional Dutch system and at the same time fits in with the tradition of Dutch VET. The framework of the model includes clear choices, which can be defended and will be explained in the first part of this paragraph. The precise policy choices will be considered in the policy plan (chapter 4).

Some theoretical considerations for the reconstruction of the model as a tool for this thesis are made in the second half of this paragraph.

Dilemmas behind the model

Archetypal curricular dilemmas described by Nijhof (1983) apply to the framework and are used to explain the choices made for the design of the model.

'What function is given to the school, as schools have tasks for the future, but also for here and now?' In the model schools have full responsibility for their present courses while allowing for a quick response to contextual changes. Directed educational objectives for future provision are a counter balancing influence for a too short-term policy for schools.

'What type of learning is involved?' In the model, there are opportunities for forms of competence-based learning to be created at the macro level of the system. At meso and micro levels, however, schools must decide for themselves on the format of the organisation and pedagogy.

'What classification of objectives is chosen?' The objectives in the model are classified by content and outcomes - modularised and competence based units, and not timetable-dominated subjects.

'How is the articulation of demand organised?' The aim is that the information structure enables the interested parties to participate in the identification and clarification of demand through analysis of the contextual changes.

'By what means are the demands converted into curricula?' The model aims to draw on the expertise at macro, meso and micro levels of SSAVE by a systems approach to structures, issues and processes.

The place of the model as a development tool

'What is the status of the model as a tool for this thesis?' 'Should the model for a responsive SSAVE be a historical or technological construction?' 'Should it be descriptive or prescriptive?' The original 1987 goals of

changing SSAVE, and also the goals as perceived in 1998, can be taken as a reference.

'Is it admissible at a later date to use information that was not used or available at the time the responsive system was designed and constructed?' 'Is it acceptable to overlook the situation in 1998 to learn from a case that started in 1987?'

The conclusion is that the best available contemporary thinking should be chosen to construct the model. Such an approach allows the use of the model to set the 1987 goals in a well-considered context and to evaluate the achievements of the original goals. The model could also be used to evaluate the 1987 goals with reference to current thinking.

'Should the model be advanced in its recommendations and empirically tested or should it be applicable in all current operational conditions and contexts, and ready for immediate implementation?'

A forward-looking model can be clearer and better balanced, but it is more vulnerable in a variable situation. The nature of contextual changes requires a flexible approach. A flexible model, applicable in all operational conditions and contexts will be more prescriptive than descriptive and be directed towards outcomes rather than processes (Nijhof, 1983). Such a model is in line with Dutch policy, which aims to prescribe results (chapter 4).

The view of curricular development as social interaction lends support to the choice of a prescriptive model (Van den Berg & Vandenberghe, 1981) in which the context is determining the success of change (Hameyer, 1978). Besides, implementation theories (Fullan, 1991 and others) advocate definition and monitoring success and fail factors and to approach educational change with a mix of procedures.

The model for a responsive SSAVE must be clear on the why, what and how of its educational content. Clarity is needed to communicate the urgency and direction of educational change, which itself is necessary to be able to respond to the changing demands being made on SSAVE. The choice of a multi-operational model, instead of a specifically advanced model, broadens its possible use in VET.

The framework of the model for a responsive system of VET is based on current social and educational precepts and for that reason it is a prescriptive and normative model. Nevertheless, experiences from the responsive system development are drawn upon and that is why the model is partly descriptive, empirical and partly a reconstruction of what has gone before. It is, therefore, a reliable and applicable model on which to base this thesis.

3.2 The new approach of content for SSAVE

'What should be the approach to the content for SSAVE? Why is content important?' 'How should attainment targets be transformed into content

(O&W, 1990b, 1992 and 1993b; § 4.1.1)?' 'How should the policy be matched to theoretical aims in constructing competence-based objectives (# 2.5)?' The development and implementation of a responsive system for SSAVE requires coherent answers to these questions.

This section analyses the requirements for attainment targets (§ 3.2.1) and their production, that is, the translation from the external changes into competencies (§ 3.2.2), transforming competencies into attainment targets (§ 3.2.3) and attainment targets into study tasks (§ 3.2.4). The result is competence-based education (§ 3.2.5).

3.2.1 The requirement for attainment targets

Response to contextual changes requires attainment targets that are free from the regulations, methods, processes and structures of the traditional educational system.

'How can the hierarchies of subjects and what is learnt, become secondary to a new hierarchy of functions (chapter 2)?'

'What form should an attainment target take, as an expression of educational content, and why is it necessary to transform them to make them deliver a responsive SSAVE?'

Content is presented in different formats and at different stages; compare a natural setting of a tree, an oral description of a tree, or a book about a tree (Achtenhagen, 1994, pp. 215-217). Content is the objective aspect of subject matter, where knowledge is the subjective aspect. Knowledge is a level of transformation of content. Different stages of transformed content are, for example, the knowledge content of the subject matter for the teacher, the pedagogical knowledge of the teacher and the curricular knowledge of the student. These categories are not integrative structures; they can be incompatible.

Achtenhagen concludes that what is understood as content correlates with the degree of expertise in the specific field. Content is defined as an individualised and specified understanding of that specific content and its structure. It has, therefore, to be defined with regard to specific situations with all their syntactic, semantic, and pragmatic components. Achtenhagen (1994) takes content, which can be perceived as classified theory, as a starting point and states that the levels of mastery of content differ. Thus, a responsive SSAVE requires an analysis of contextual changes, an identification of required levels of mastery and a description of the levels of mastery in attainment targets (chapter 7).

Ellström, (1998) adds to the concept of mastery a theoretical, explicit knowledge and an experience-based, implicit know-how. These apparently contrasting perspectives belong to different research traditions. The cognitive-rationale perspective has its roots in cognitive science and

cognitive psychology and the intuitive-contextual perspective belongs to a more humanistic research tradition (for example Dreyfus & Dreyfus, 1986; Schön, 1983).

The cognitive-rationale perspective fits the action structures of less experienced employees using abstract information in defined tasks, for example in hierarchical organisations where decisions need to be communicated to superiors not directly involved in the problem-solving efforts. The intuitive-contextual perspective on the other hand seems to give a good picture of the work of experienced employees, as for example, when working under pressure in complex situations (Ellström, 1998).

The desirable combination of the cognitive and intuitive perspectives is important for a responsive SSAVE. The analysis of contextual changes and description of attainment targets should match the continuous movement between routine and non-routine work as characterised by defined repeated tasks and/or poorly understood unpredictable problem situations.

The incorporation of the cognitive rationale aspect and the intuitive-contextual aspect of content in attainment targets gains importance when the two aspects are relevant in the innovation theory of the knowledge networks where SSAVE belongs.

The cognitive rationale aspect and the intuitive-contextual aspect resemble classified and tacit knowledge in knowledge-intensive networks as described by Nonaka and Takeuchi (1995). In the agricultural knowledge network, communities of information and of research interact with communities of practice (Kline & Rosenberg, 1986, § 2.1.2). In these interactions classified content becomes meaningful when it becomes a part of the mastery of others.

Thus, when working in practical agriculture, school leavers from SSAVE need to link the cognitive and intuitive-contextual aspects of content.

LTP[20] and competence based learning, as aimed at in SSAVE (§ 2.3.3), may support linking cognitive and intuitive-contextual aspects of content. LTP and competence-based learning link school- and work-based learning, and knowledge and learning.

Workers and students need to learn through experience and understand that content can acquire a different meaning from the continuous change of context and interference between issues in the context. They can support one another, when production and innovation in the workplace, and working and learning in SSAVE go along together. LTP and competence-based learning will be based on attainment targets that link cognitive and intuitive-contextual aspects of content. These attainment targets may be easily recognised in the workplace.

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[20] Learning through participation, i.e. the linkage of school- and work-based programs.

It is clear that attainment targets call for a new vocabulary, which facilitates clear explanations of the contextual changes and employment needs. The phrasing should be equally clear for parents, students and businesses. It would also be applicable in VET and would require translation into tasks for students. Achtenhagen (1994, pp. 218-219) recommends the content structure in VET should be expressed in terms of content units. They would be defined by situation and would need to be applicable at all levels of education.

Units of content as Achtenhagen specifies -

- refer to a coherent context;
- have a consistent structure;
- are concerned with the abilities of students;
- follow modern structures of life and not ancient patterns;
- have a standard size.

In response to the external changes, units should hold requirements of

- employment (occupational perspective);
- society (educational perspective);
- learning (pedagogical perspective).

These are the aspects of triple or broad qualification (6.3.3). The levels of mastery imply cognitive and intuitive-contextual aspects of content.

There is no integrative structure for the content of knowledge in a competence as required for employment, or the attainment targets as aims in education and the study tasks in a student's learning program. Translation may make the core of external changes compatible with competencies, with attainment targets and with study tasks. The way one category might be transformed into the next is worked out in the next three paragraphs.

3.2.2 From contextual changes to occupational development

Translation of contextual changes into occupational development, is the first step towards the development of content.

'How should tasks and competencies, jobs and occupations be interpreted to arrive at the information for responsive competence-based objectives?'

Tasks

Tasks have to do with expressing aims and taking action. An aim is the expression of what someone has in mind. Aims, goals, objectives and targets may be used in connection with different levels of aims in education/learning, policy or other issues. An attainment target in our model is an aim at the level of educational objectives, or to quote Achtenhagen (1994) pursuit of curricular content knowledge.

Taking action changes something in the immediate environment. Taking action is possible in single acts, subsequent acts, processes, units and

organisation. Acts in a sequence are action structures. For example, selling a bunch of flowers requires a sequence of single acts. An attainment target in the model for a system of responsive VET may include one or more action structures.

A task is taking action in pursuit of a change; a task is what someone aims to do. The task of an employee is his interpretation of an order. In the learning process, a task is the students' interpretation of a given task (Holleman, 1993). The aim of the student is to transform an initial stock response into achievement targets.

Competence and competencies

Competence is the capacity of a person to perform, a capacity to act. A competency is a characteristic of a person, a skill for example. The concept of competence may be better understood by distinguishing between five meanings of competence.

The competence as a characteristic of someone may be a formal competence, measured e.g. by successfully completing x years of schooling, or an actual tacit competence, e.g. the potential capacity to handle a situation. Focusing on formal competence has been criticised for the stress on knowledge and intellectual skills (subject matter) and the exclusion of non-cognitive components of competence e.g. attitudes, motivation, and interests.

The competence of someone to do a job can be an official demand for competence, e.g. prescribed to set a wage, or a competence actually required by the job, e.g. the actual utilisation. Both the demanded and the required competence are in a certain sense socially constructed. They are the result of interplay between economical, technological, and political factors at the macro level and factors at the level of the firm concerning business strategy, work organisation, and the design and use of technology.

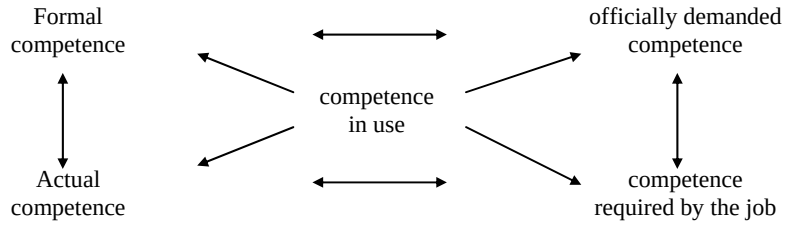

Figure 3.3: Different meanings of (occupational) competence (Ellström, 1998)

The dynamic relationship between the individual and the task, and between the competencies actually demonstrated by the worker and the task itself, is a reason for an interactive view on competence. Expressions like 'he made the job' or 'the job made him' illustrate the interaction. Ellström (1998) sees a competence in use as a dynamic factor mediating between potential capacity of the individual and the requirements of the job (Figure

3.3). The conclusion for SSAVE is that the translation of contextual content into occupational content should focus on descriptions of the competence in use, and the levels of mastery of a competence in use.

Jobs and occupations

Tasks reveal the meaning of job and occupation. Assigned tasks are concept tasks made by others, which you accept as your own tasks. Work orders and study tasks are examples of assigned tasks.

Work is competent action on a (set of) task(s). Assigned work is called a job. Occupations[21] and professions are generalisations of jobs. A job refers to a function of someone in a particular work situation, e.g. an administrator. An occupation or trade refers to comparable jobs within or between branches. A profession is a socially stable occupation, which is connected with a recognised group of workers (professional administrators). Functions of employees are generalisations of assigned tasks. Systems are descriptions of relations between functions. And educational system describes the relations between i.e. articulation of external demand, formulation of required qualifications, steering, management and teaching.

A job is precisely defined, a range of competence, applied to assigned tasks with a certain frequency and relative importance. Monitoring and analysis of occupational change need to focus on generalisations of these vital issues. The assigned task and competence in use provide the basis for classification of content, context and attainment level (capacity) for the development of attainment targets.

The relationship between aim, action and assigned task, and capacity, competence and job has been summarised in Figure 3.4.

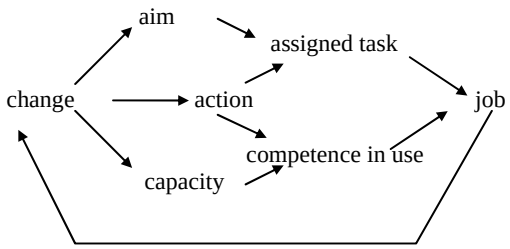

Figure 3.4: A job as a combination of assigned task and competence in use

Occupational development

Occupations and occupational development are not just a matter of definition. The context of occupational development is complex and dynamic and decisions on relevant levels of mastery are a problem. The

[21] In this study *vocation* is only used in relation with VET.

object of analysis is the change of functions in businesses - rather than the more quantitative employment market, where competence in use cannot be studied. Change of functions is related to product innovation. The effects of product innovation on tasks and competence in use and assigned tasks, respectively on jobs, occupations and functions, should be understood.

Table 3.3: The social mechanism of occupational development

main dimensions of labour division (Diederen, 1985)	development of occupations	driving forces (Mok, 1973)	segmentation of the employment market (Lutz & Sengenberger, 1974)
social labour division: enterprises			company sub-market
occupational labour division: occupations	social group: justification		professional sub-market
organisational labour division: functions	individual: institutionalisation	knowledge	(Hövels, 1990 & 1998): complex sub-market
technological labour divisions: assigned tasks	work: differentiation	control social function	residual sub-market

The pressures for occupational change are technology applied by new knowledge, needs of interest groups applying new technology and market forces, and an expression of the social function of new technology on the market or in public service (Mok, 1973; Table 3.3, 3rd column). These driving forces cause reorganisation of work in the workplace, which changes the division of tasks and the development of occupations (2nd column). The level of impact, and sustainability of the changes, and the power of employees involved, determine the degree of formalisation and redefinition of occupations (1st column). Fast changing assigned tasks are hardly ever formalised and often result in occupations with a short half-life.

With a rapid pace of occupational change, the redefinition process lags behind the differentiation process. Occupations do not emerge or mature or are not sustained. They remain without a profile and are not recognised in the employment market (4th column). Skilled staff are often not available on the employment market, in fields with a rapid development of knowledge. Consequently employers seek their employees in the low profile residual sub-market or educate a nucleus labour force of their own and create a company sub-market (Geurts, 1989). Hövels (1990, 1998) recognises a specific segment of the employment market where combinations of professional qualifications and company-specific qualifications are relevant. He speaks of complex sub-markets. Hövels (1985) observes political and distributional backgrounds and Brandsma (1993) strategic conduct of players in the employment market.

A large professional sub-market with strong profiles is of great value for occupational and school choice and identification on the employment market (Geurts, 1989; Prais, 1995), so a clear register of formal qualifications has an important social function. The professional sub-market is relatively homogeneous (Hövels, 1998). Employment advisors, in a period of fast occupational change, may use a clear presentation of occupational profiles as a basis for their advisory function.

The 'invisible hand' does not lead people to acquire skills (Booth & Snower, 1996); dynamic driving forces increases the demands on the complex and residual sub-markets.

During dynamic occupational change, therefore, the process of occupational development will lag behind or may even be constrained. A technological construct with clear, detailed and strong occupational profiles may support or partly replace the socio-economic process. VET cannot respond effectively to a growing residual and complex sub-market and short half-life occupations without an alternative to the social process that leads to occupational profiles.

The translation of contextual changes into occupational development should be based on analysis of assigned tasks and the competence in use. The analysis should provide information on classified content and required levels of skill. The translation should not only take into account assigned tasks at work but also tasks in social life and learning (3.2.1). A further observation is that traditional objectives for SSAVE focus on the professional market-segment; these qualifications are complex and scarcely correspond to company needs or areas of activity. The challenge for the new qualification structure is to include the broad requirements of the residual and complex sub-markets.

The translation of content into competence and the selection of the relevant levels of competence is not only a complex professional process, but one which also requires the involvement of the participants in the social process of occupational development.

3.2.3 From occupational development to attainment targets

Translating competence into attainment targets is the second requirement for a responsive SSAVE. Attainment targets are the constituent elements of qualifications. That is why the meaning of required and formal qualifications will be discussed to define the target of the translation.

Qualifications

A competence and qualification are both about capability. Competence is the subject and supply side of capability and qualification represents the demand and object side. Capability is a form of added value (Tissen et al, 1998, p. 166). Thus a qualification is not something personal, it is a capability that

people have in common in order to do a particular task – to achieve an outcome. A qualification is the competence that is required or demanded, formal or actual, to complete a task. Van Hoof & Dronkers (1980) define a 'qualification as the continuum of know-ledge, skills and attitudes that enables someone to fulfil various tasks'.

When a qualification is used as an educational objective in Dutch VET, it needs to be broader than Van Hoof & Dronkers' definition. That is why the object of qualification in the definition was extended to assigned tasks in work, social life and study. Where Van Hoof and Dronkers (1980) mentioned tasks, this was changed into assigned tasks to stress the impersonal and cultural character of a qualification. A qualification, redefined for this study, is a continuum of knowledge, skills and attitudes that enables someone to fulfil various assigned tasks at work, in social life and for learning.

'Qualification' has different meanings in different contexts (Table 3.4). The use at an individual level applies to formalised requirements for someone undertaking a task. At an institutional level, the word qualification refers to a volume of quality. Qualifications may refer to one of five competing mechanisms of the employment market.

Table 3.4: The meaning of qualification in different contexts

context of use	meaning of qualification
individual level:	qualifications are the continuum of knowledge, skills and attitudes that enables a person to fulfil various assigned tasks (Van Hoof and Dronkers, 1980) at work, in social life and for learning.
1a. practical value and exchange value	
1b. specific task	qualifications are the requirements of someone's function.
institutional level:	qualification is a capacity to plan, organise and evaluate work, and to assign employees with the required qualifications to tasks (Geurts, 1989).
2a. in the firm (at a management level)	
2b. in the school	qualifications stand for a volume of course ware (loads for students, or for development, logistics and execution); in regulation, qualifications are items to finance.
2c. in the organisations for professionals and trade unions	qualifications represent professional groups, which groups connect qualifications with their leading principles of quality and solidarity.
2d. for the organisation of the 1:1 school-to-work transition	on the employment market, qualifications are the basis for the interchange of exchange value and practical value in the professional sub-market (Brandsma, 1993).
system level:	(required, offered, demanded and available) qualifications, segmentation, selection, elimination and absorption, and technological development, are competing mechanisms on the employment market (Brandsma, 1993).
3. one of five mechanisms for the working of the employment market	

The continuum in the definition may apply to the following aspects -

- knowledge, skills and attitudes are interwoven in a qualification. Searching and presentation, for example, require integrated know-ledge of context, social abilities and an open mind;
- a qualification leaves room for different individual expressions of knowledge, skills and attitudes in competencies. A qualification is not a 1:1 equivalent of a number of competencies;
- a qualification encompasses knowledge, skills and attitudes for assigned tasks at work, in social life or for learning and has a possible value in all three contexts. For example, reproduce, reflect, and observe, are verbs that apply to almost every context.

As a qualification is made up of attainment targets, the definition of qualification also applies to attainment targets. An attainment target is (a part of) the continuum of knowledge, skills and attitudes that enables a person to fulfil an assigned task at work, in social life and in study.

Required and formal qualifications

The definition of qualification at the individual level may apply to a required qualification demanded for a specific job or to a formal qualification describing an occupation. 'Which one is the most reliable reference for responsive SSAVE?'

A required qualification describes a competence for a specific assigned task. Required qualifications are important as an expression of their practical value, of the required capacity for an activity. The exchange value of a required qualification has to do with the price of the qualification on the employment market (2d. in Table 3.4) and the price depends on supply and demand.

A formal qualification is a generalisation and the socialised form of a required qualification. It is important for the functions of qualification at the institutional and system level mentioned in Table 3.4.

With dynamic contextual changes and rapid occupational development, the gap between required and formal qualification may become too large. That is why the call to improve the school-to-work transition, with reference to formal qualification, is not always the core of the problem. Brown and Duguid (1991) claim that reliance on accepted practice can blind an organisation's management to the current and usually valuable practice of its members. In the business there may be a large gap between classified knowledge about qualifications and tacit knowledge in working groups (Nonaka & Takeuchi, 1995).

Established formal qualifications are important but possibly misleading sources for attainment targets. Contextual changes should be analysed and monitored and be critically referred to established formal qualifications.

Multiple sources may be used. An aim in the process of articulation of demand is to put accepted practice into perspective, to classify tacit knowledge about qualifications, describe the conclusions in the form of required

qualifications and encourage the conclusions to be incorporated as formal qualifications and attainment targets.

The operational level and task area of required qualifications

§ 3.2.2 has concluded that attainment level and detailed content are important elements for the description of occupational development. These two principles may help to transform occupational development into required qualifications and/or attainment targets.

Assumptions are made for the translation. A first assumption is that a required qualification is the best possible articulation of external demand. A second assumption is that a formal qualification is the best possible means of meeting an educational objective. The two assumptions focus the translation of occupational development into attainment targets and the question is how to transform required qualifications into formal qualifications?

To answer that question, a third assumption is made - a qualification, any qualification, is about added value. Added value through a required qualification is expressed as a competency for an assigned task. Practical value is the physical representation of the added value; exchange value is the economic representation of added value.

An example of practical value is for example, that a qualified milker milks 60 cows in one hour and collects US $ 400 worth of milk in a tank. The exchange value for that hour of work could be $ 25, the exchange value for milkers on the employment market.

The added value to someone before and after attaining a qualification can be expressed in financial terms. The differences in exchange value of work before and after attaining a milking qualification is the practical value of that formal qualification. Two years SSAVE may yield an extra annual income of $ 5,000. The exchange value of that formal qualification is the additional financial return for the efforts of someone to attain the qualification. The cost of two years study and 2 years delay of a working career are together $ 55,000 (Table 3.5). Would a student be motivated by the prospect that the exchange value might equal the practical value in 11 years time?

Table 3.5: Added value of qualification in milking

	required qualification: added value at work	formal qualification: added value of attainment
physical representation: practical value	milking 60 cows/hour yields $ 400 in a tank	annual earning $ 25,000 instead of $ 20,000 with a milking qualification
economic representation: exchange value	earnings $ 25/hour for milking 60 cows/hour	personal costs of a 2 year course $ 55,000

The example is theoretical and one sided. Snower (1996, p. 113) points to market failure culminating in insufficient training and illustrates it with a model of a low-skill, dead-end job. The example, however, is to show that a required and a formal qualification can have added value.

The physical representation of a required qualification is a description of the added value (Table 3.5). The description of added value has a verb and a context. In the example the verb is 'milking' and the context is the 'milking of 60 cows in one hour yielding $ 400 worth of milk in a milk tank'.

The example seems to be no more than an economic approach to qualification. But, the real value of the concept of added value is through its concrete expression of results that it contributes also to occupational analysis, curriculum development, pedagogy, governance and policy debate.

The 'milking' is the attainment level (level of skill and decision making) of the described assigned task. The attainment level is not conception, instruction or description of the process; these would be action structures of a researcher, a teacher and a reporter. Occupational analysis (skill analysis) is concrete when it provides the verbs that describe added value in a context. In contemporary occupational analysis the added value is expressed at an operational level in a task area (Westerhuis, 1987). Translation of competence required for tasks in related jobs determines the operational level for the task area in an occupational profile.

The principle of added value as applied to the employee can apply in a similar way to the student and his study task. The added value in education is a level of attainment of a student; a level of attainment is a reflection of an operational level. A student can transform the task area at work into the learning of a subject area. So, the attainment target as a constituent of a formal qualification, can be described as a level of attainment of a subject area.

Table 3.6: The description of required and formal qualifications

	constituents of qualifications:	
types of qualifications:	capacity	context
required qualification: operational action structure	operational level	task area
formal qualification: educational action structure	attainment level	subject area

Added value is different for working and learning. Working yields products; learning yields competence. That is why action structures differ. Required qualifications are obtained from task analysis of the work situation and are described through functional action structures. Formal qualifications refer to outcomes from learning and are described with educational action structures. The conclusion in Table 3.6 depicts essential information in occupational profiles and curricula.

Description of added value supports pedagogy because it stresses level of study rather than subject or subject area. The encouragement towards competence-based learning (§ 2.3.3) should make knowledge the servant of the outcome. He/she needs to know this in order to do that.

SSAVE used to transform operational levels on task areas into levels of mastery of subject matter. This approach cripples response to external demand because task areas are holistic representations of content and subject matter represents disciplinary content.

The transformation of cognitive and intuitive-contextual aspects of content is carried out through procedures that describe algorithms and heuristics. An algorithm is an action structure with a strict sequence of specific actions to create a well-defined cognitive objective; comparable to the programming of programmed learning. A heuristic is an action structure with a variable sequence of coherent actions to solve a well-defined problem in an intuitive context, for example the way a customer is treated.

Activities allow the consideration and formulation of syntactic, semantic and pragmatic components of content (as proposed by Achtenhagen, 1994) and socially normal, process independent or non technological-instrumental abilities (as proposed by Van Hoof and Dronkers, 1980).

The description of occupational development with competence needed for assigned tasks is an analogue of the description of occupational profiles with operational levels in task areas. Both are descriptions of added value to work. Qualifications and attainment targets are also descriptions of added value in education i.e. they can be described through attainment levels in a subject area.

3.2.4 From attainment targets to study tasks

'How are attainment targets to be transformed into study tasks?'

Well-chosen verbs provide the basis for describing the difference between operational levels and attainment levels.

The meaning of verbs is illustrated with three examples. The verbs refer to different added value (Van de Lagemaat, 1986, pp. 159-164; Table 3.7). Selecting the best point of sale is an operational task of an entrepreneur. Observing and analysing points of sale are educational action structures of a student.

A second example is assessing the annual report of a shop by a manager; the related educational action structures are interpreting and appraising annual reports.

An entrepreneur decides on the purchase of a cash register; the student sets norms and integrates values for the purchase of a cash register, including its ability to handle cash flow.

According to Van de Lagemaat's taxonomy (1986), select, assess and decide are verbs that refer to actions at work. The verbs are not suitable for the description of attainment targets and study tasks. Observe, analyse, interpret, appraise, set norms and integrate values are possible verbs for attainment targets.

Table 3.7: Action structures and study tasks (Van de Lagemaat, 1986)

Operational action structure:	educational action structure:	criteria for study task:
Contemplate	reproduce and reflect	define a problem
select	observe and analyse	study the facts
assess	interpret and appraise	develop a theory
decide	set a norm and integrate	make a plan
execute, check, wind up	practise, evaluate, arrange	do/rehearse practical work

The study task for a student is a specific task with a specific attainment level for a defined subject area. Van de Lagemaat suggested criteria for each type of added value (Table 3.7). The criteria for study tasks seem to suggest an ideal teaching method but this suggestion is not intended. The intention is to transform external demand into clear educational objectives and to avoid hard and fast teaching methods. The description of study tasks suggested by Van de Lagemaat, resembles an approach described by Roth (1957) and Kolb (1976, 1985), and has been applied successfully in S-SSAVE.

In conclusion, attainment targets may be described through educational action structures. The subject studied in the action structure ought to be a generalisation of a task area implying cognitive and intuitive-contextual aspects of content. Attainment targets should allow choice of subjects for study tasks. For example the noun 'medium' (for a culture) may be used when referring to soil types, artificial substrates or even hydro-cultures. This transformation results in decontextualised attainment targets, which may stimulate transfer in the learning process as proposed by Nijhof and Streumer (1994b). The transformation also allows the school-based program to be linked to multiform work-based programs.

Three levels of translation were described

Required qualifications relating to competence are translated into formal qualifications, which reflect a demand in the employment market.

Operational action structures of formal qualifications are transformed into educational action structures of full qualifications. The full qualifications provide a basis for competence-based learning.

The next step is breaking down the full qualification into attainment targets. The attainment targets in their turn are transformed into criteria for study tasks with verbs that give an educational directive for a specific subject of study (Table 3.8).

Table 3.8: Transformation of required qualifications into assigned study tasks

social context	type of qualification	described through an
Competence	required qualification translated into:	operational action structure
formal qualification	a formal qualification transformed into:	operational action structure
full qualification	a formal qualification broken into:	educational action structure
attainment target	a formal qualification transformed into:	educational action structure
assigned study task	criteria for study task	instructional action structure

The procedure describes, in logical steps, the why, what and how for acquiring competence. The description of competence answers the why question. The description of the full qualification the what and the description of the assigned study tasks the how question.

The full qualifications are not limited to required qualifications for jobs. Attainment levels and subjects need to cover the general educational aspects of VET with the contribution to -

1) personal development;
2) civic development;
3) vocational training (O&W, 1989a); and
4) the knowledge dissemination (Biesheuvel, 1992).

The verbs include aspects of knowledge, skills and attitudes, as described by Bloom (1956), Simpson (1967), De Block (1973) and others. A responsive SSAVE requires an effective supply of information to translate workplace competencies into formal qualifications and study tasks. The three steps of translation are applicable to all competence-based objectives and not only for vocational qualifications. The content of qualifications is described in terms of attainment targets. Attainment targets are expressed as action structures. Educational action structures describe the levels of the cognitive and intuitive-contextual contents.

3.2.5 Discipline-based education and competence-based learning

At this stage the new classification of new content for SSAVE becomes visible in its full extent. The new classification has consequences for taxonomy, pedagogy and organisation.

‘How big is the gap between ‘old’ and ‘new’?’

‘Who should do what?’

‘What gaps need to be bridged?’

Competence-based learning differs from traditional discipline or subject based education (Saylor, Alexander & Lewis, 1981). Table 3.9 shows the main points of difference. In spite of the suggested absolute antithesis, the two can be combined in one curriculum.

The classifying principle of educational content in discipline-based education is the hierarchy of scientific disciplines, for example from basic principles towards complex relations or from the past to the present. A functional hierarchy, based on knowledge of content or practical action structures, determines the structure of competence-based learning.

In discipline-based education the competence is based on mastery of a content of technical knowledge; in competence-based learning the competence is based on acquiring capability (Eraut, 1994).

In discipline-based education, names of qualifications relate to the educational structure - the names of pathways, learning years of courses or subjects, for example, 4 years chemistry at high school level. In competence-based learning, a full qualification describes an attainment level of a subject.

In discipline-based education, the structure of educational taxonomy is based on a hierarchy of levels of pathways and available subjects; discipline and timetables define the programs. In competence-based learning, the structure is determined by verbs in a taxonomy of attainment levels and generalisations on related knowledge; the programs are defined in units in educational profiles; and within a unit the attainment targets, the outcomes, are identified within the unit descriptor.

Table 3.9: Discipline-based education and competence-based learning

	discipline-based education	competence-based learning
Taxonomy	disciplinary hierarchy	functional hierarchy
Competence	mastery of content knowledge of disciplines	attainment level of capability and experience with technical knowledge
name qualification	pathway	attainment level and task area
Structure	pathways in division; within pathway subject matter (discipline) in examination programs; within discipline a scientific taxonomy	full qualifications in division; within full qualification are units in an educational profile[22]; within units the taxonomy is an applicable practical theory
Pedagogy	subject based learning; analysis and memorising	competence based learning; learning through participation
learning and working	- day school - adult education	educational route
working and learning	- apprenticeship scheme - short courses	training route
Organisation	transmission discipline based	transaction/problem centred
Regulations	process definition: time table	outcome definition & quality control

In discipline-based education, the provision which may have little or no component of work based training, is called day school and adult education, and the provision with a large component of work based training is called a

[22] Definitions of structural principles are enlightened in chapter 5.

training course - sometimes linked to an apprenticeship scheme. Van Veen (1993) proposed a flexible relation between school-based and work-based components for VET in the form of an educational route and a training route; this is the basis of the law on ET (OCW, 1995).

In discipline-based education the government prescribes timetables and examination programs to regulate the educational management. For competence-based learning attainment targets and procedures for quality control on outcomes are prescribed, and schools are responsible for the organisation of school and the learning process.

Competence based SSAVE has consequences for taxonomy, pedagogy and organisation. The model (Figure 3.2) shows the responsible participants for these three areas. Taxonomy is a vital part of the qualification structure and needs to be prepared by the information structure. Pedagogy is a responsibility of teachers in the production structure. Organisation at meso level is also a responsibility of the production structure. Table 3.9 shows that the aim of transfer potential in the qualification structure requires consideration throughout the system.

3.3 The organisation of learning and schools

After the why and what questions of a responsive SSAVE, this section focuses on the how question. The how answer should hold solutions for the load and complexity of educational constraints accumulating at (meso and) micro levels of the system (Figure 3.2). Specific attention should be given to transfer potential of school leavers at micro level and the flexibility of organisation at meso level.

3.3.1 Flexible organisation of learning

'How should a responsive SSAVE be guaranteed at micro level and, in particular, the transferability of school leavers?' 'With what pedagogy can learning respond to attainment targets, and to regional and individual demand?' Studies from the late 80s and from the early 90s may contribute to the model for a responsive SSAVE.

Insights from the late 80s

In addition to the development of competence-based learning in the projects and experiments described in § 2.3.3, insight and experience are derived from three conferences on modularization in the 1980s.

Expected internal effects, as discussed in the first conference, from modules are better motivation, a solution to the problem of early school leaving, shortening of course length, accommodation for individual differences, more opportunities for up- and down streaming and educational quality. External effects may be better communication with industry, parents and aspiring students, easier response to change in business, more flexibility in tailoring programs, and possibly easier access to education.

To achieve such expectations, modules should have a recognisable meaning for work, learning or social life. The content should be described with attainment targets or outcomes. And blocks should be constituents of a unit. Units in their turn need to be able to be accumulated towards a required full qualification (APVO-2, 1987b).

Organisational requirements, the subject of the second conference, are the following. Modules need to be interchangeable between pathways and between different full qualifications; and attainment targets need to be valid for modular and subject-based programs. Schools should examine units according to nationally defined guidelines. Competence taught should relate to the outcomes of the unit; the staff of the school should complement each other to cover content in modules, units and full qualifications. Schools select units appropriate to the region. Teachers should be paid to develop module descriptors as a basis for program development in the schools. The action structures to implement modularization require national project co-ordination. The government should define, effect and produce criteria at the system level. (APVO-2, 1987a).

A third conference focused on development and implementation of learning through participation and modularization for the field of SSAVE. In the conference a top down modularization project in a Dutch apprenticeship scheme and a bottom up project in Dutch higher education were presented. The top-down story is about system and structure. The bottom-up process is about commitment of colleagues and efforts to keep the process going. The project on modularization (§ 5.1.2) was the result of this last conference.

Studies from the early 90s

Studies from Achtenhagen (1994) about content units apply to thinking about modularization and learning through participation in SSAVE. They also apply to competence-based learning as tried in SSAVE-B (Van de Lagemaat, 1986) and in S-SSAVE (ARVO, 1988b).

The content unit as perceived by Achtenhagen is more able and has greater freedom to define levels and subjects, than have the traditional subject matter objectives. Richardson, Spours, Woolhouse & Young (1995, pp. 5-6) propose strict distinctions between the words module, unit, outcome, credit and level (Table 6.1).

‘Within a credit framework or credit-based system, the term module is used to describe blocks of delivery/teaching as distinct from the assessment of learning or the credit values which may result.

‘A unit comprises a coherent and explicit set of learning outcomes. Outcomes describe what learners have demonstrated they know, understand and can do. Each unit has ascribed to it a level (the complexity, autonomy, and range of learning) and a size (the amount of learning ouytcome). The

size of the unit can serve to identify resource allocation within learning programmes.

'Credit is specifically linked to student certification. It functions as the currency of the system and is used by institutions to place a value on the student's learning. The student can accumulate such credits until a recognised qualification is attained.'

The distinctions of Richardson et al (1995) summarise the core of the experience from projects in SSAVE and the insight from conferences as far as the structuring of educational content is concerned.

Modularization creates preconditions for flexible and competence based learning. The definitions of units, modules and credits by Richardson et al (1995) are very discriminating and useful for design and development.

3.3.2 Flexible organisation of schools

'How can a responsive SSAVE be achieved at meso level and flexibility of organisation in particular?' The flexibility of schools cannot be enhanced with a single measure, but is shaped by a set of conditions that function between macro and micro levels. Conditions relevant to a responsive VET are described in this paragraph.

Change in schools

Change in schools can be defined as a temporarily unstable situation while transferring from one situation to another. This is an over-simplification of the reality because of the unstable nature of the original and eventual situations (Marx, 1991). Change is not only the transition from A into B, it is also the change of A and B in the course of time. Because these targets are moving a transformation is not one project but a sequence of subsequent and parallel projects.

Flexibility in schools

A flexible school is an organisation with the capacity to gear its policy to contextual changes and priorities of policy bodies. Marx (1991) develops this definition of the flexible school with reference to three ideal typical descriptions. These are the segmented organisation, the co-operative regulated organisation and the learning or unit organisation.

Traditional schools are segmented organisations with a great deal of freedom for the professional teacher and a limited capacity for influence by the policy bodies. The segmented organisation has what de Sitter (1994) calls a structure of functional concentration.

The co-operative regulated organisation is much more policy centred. The administration expresses views and decides on policy, the management transforms the policy into regulations and communicates the regulations to the loyal teachers who implement them. This type of organisation has a line structure in the typology of De Sitter (1994).

The learning organisation (Figure 3.5) has an extra layer on top of the co-operative regulated organisation, where it is usual to compare the results of the process with norms and theory and improve the product and the process at weak points (the loop 1, 2a and 3 in Figure 3.5).

In a learning organisation also the organisational starting points are the result of evaluation (the loop 2a, 2b). Following reflection on principles a school can change its organisational procedures. In an organisation with double loop learning like this, the production and innovation can be constituents of the same process. Such an organisation has a structure based on flexible task organisation (De Sitter, 1994).

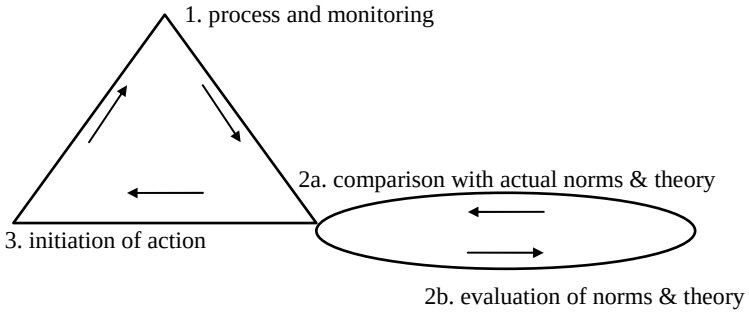

Figure 3.5: Three steps of single and double loop learning (Morgan, 1986)

Single loop learning is the strength of the co-operative regulated organisation. It makes the organisation effective and efficient within the frame of the stated policy. The learning organisation is less efficient and effective as far as the execution of policy is concerned, but is much more responsive and flexible with regard to contextual changes.

Marx (1991) mentions three important characteristics of the learning organisation - a well developed information system, a structure with much freedom for executive decisions and a culture in which mistakes feed comparison and evaluation. The learning organisation at meso and micro levels of education is a feasible option to change the structure of the educational system as a whole. The consequence for the learning organisation is a shift of steering from micro to meso level in schools (Giesbers & Marx, 1986).

The flexibility of schools will be improved with a well-developed information supply. The information supply should be directed to outcomes, for example units, and give freedom for self-regulation.

3.4 The approach to steering schools

This section is about steering schools by outside bodies including government. The ways of steering schools should relate to the conclusion in chapter 2. The traditional approach to educational content (Achtenhagen,

1994) and the familiar line and functional concentration structures (De Sitter, 1994) for steering schools hinder the responsiveness of VET. The how of steering should be the logical consequence of the conclusions in # 3.2 to base responsive SSAVE on attainment targets and provided in units that allow modularization of educational programs (# 3.3).

'What does the steering of schools in a dynamic context mean?' De Sitter refers to a set of seven preconditions for flexible schools. The goals of schools need to be flexible and negotiable; goals can change in a process of search and persuade. The school needs information about input, output, internal structure and condition. This is possible when functions are not divided according to into specialisation such as specific sectors, pathways or levels of education[23]. The school needs a model to handle contextual changes. Operational flexibility allows change of method and external procedures. Innovative flexibility allows change of products, for example new content or context for the school- or work-based program. The school needs the means to evaluate and utilise information, to develop initiatives (for example an injection of finance to develop its own policies on staffing and infrastructure).

De Sitter (1994) added an outcome definition at the systems level as an eighth precondition (already discussed in § 2.1.4 and § 3.3.1). The outcome definition for SSAVE is expressed in attainment targets.

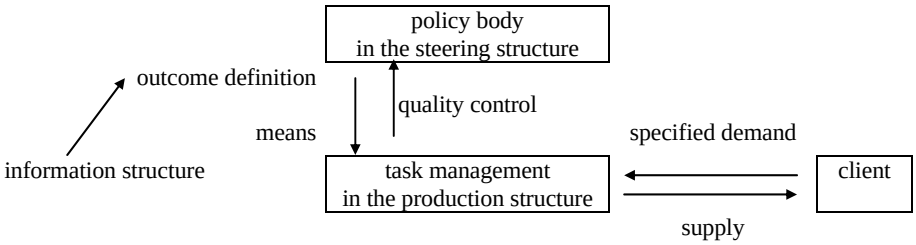

Figure 3.6: Steering of task management (Simon, 1990)

All participants, issues (including outcome definition) and functions for a responsive SSAVE are placed in one system. A systems approach (Romiszowski, 1981, p. 18) is chosen to depict the QS. Simon (1990, p. 81) designed a task-organisation model that provides a suitable basis for steering SSAVE (Van Dinten, 1991; In 't Veld, Tseng, Verhey & Dekker, 1994). The basis (Figure 3.6) is made operational for SSAVE.

Simon's task- management (1990) is placed in a rural context. Agricultural education is a component of rural society. The major participants within

[23] The examples have been taken from Dutch common practice and policy of the 1980s.

education are schools, students and government. For SSAVE, companies have a major role in society, which brings the total to four.

The functions/roles of the participants in the QS are the following (Figure 3.7). The government finances the schools for the execution of programs. Attainment targets, funding and quality control are issues in the relationship between government and schools (O&W, 1988b & OCW, 1995).

The second relationship for the school is with the student. The dominant issues in this relationship are the student's demand for qualifications and the school's supply of modules/ credits. The model assumes that the students do not pay for modules; education is not a market where the client is also a purchaser.

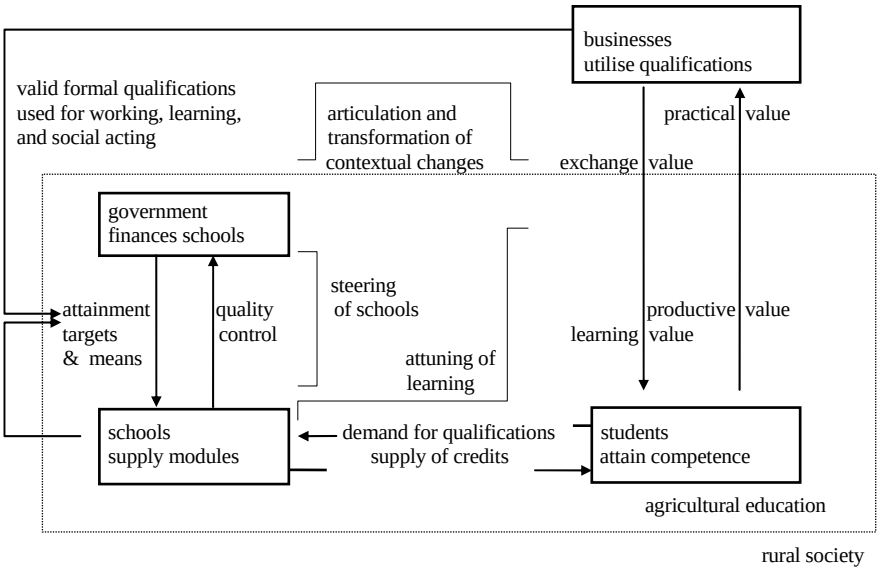

Figure 3.7: A steering system for SSAVE

The participants and issues in the relationship between agricultural education and rural society are the following. School leavers are future employees of a rural business; the issues between employee and employer are practical value, productivity of the employee and the exchange value, wage, of formal qualifications. Businesses contribute to learning. The issues in the contract between school, student and business are productive value for the employer and learning value for the student and school. Businesses utilise the qualifications of school leavers and act as interpreters of contextual changes for the formulation of formal qualifications. The businesses, schools and the government convey the demand for formal qualifications to keep the qualification structure up to date.

The augmented Simon's model consists of the participants, issues and functions of the QS (Figure 3.7) discussed above. Functions connect participants and issues.

A QS can be organised in a clear way. The qualification structure is the means for all interested groups at all structures and levels of the system to consider the definition of output. There are well assigned places to discuss required content, required means and attained results. This clarity is the corner-stone for a responsive SSAVE.

3.5 Conclusions about a responsive SSAVE

The aim of this chapter is to describe a robust and precise model for the articulation of external demand. That model is needed to design and develop a responsive SSAVE, but as concluded in § 2.5.1, little is achieved when the educational objectives are updated without making the system responsive. This chapter concludes with a section about the tentative model for a responsive SSAVE and some final conclusions.

3.5.1. A model for a responsive SSAVE

The first problem is to find a way to match 'Figure 3.2 - Framework of the model for a responsive SSAVE' and 'Figure 3.7 - A QS for a responsive SSAVE'.

Looking at Figure 3.7 and utilising phrasing of Figure 3.2, the conclusion is the following. The model for a responsive SSAVE puts the focus on six central issues (summarised in Figure 3.8).

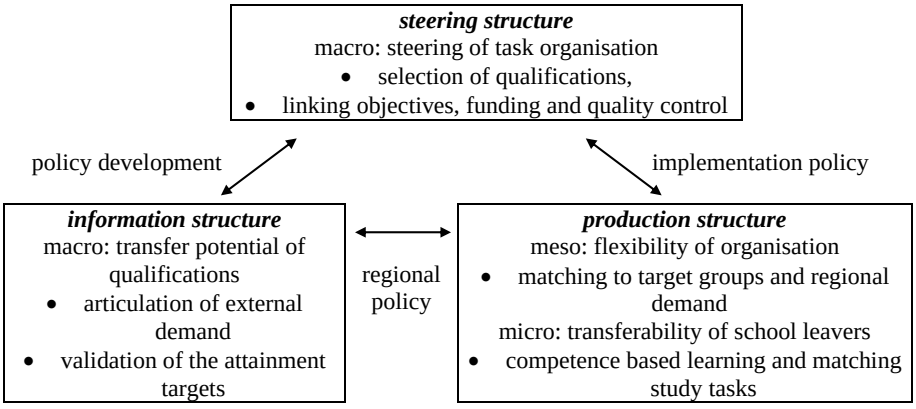

Figure 3.8: A model for responsive SSAVE

The creation of an information structure that *articulates external demand* and the translation of that external demand into an outcome definition with *valid attainment targets*.

The establishment of a steering structure *selecting national qualifications* and *linking objectives with funding and quality control.*

A production structure with flexible schools that relate *to target groups and regional demand,* and with a competence-based learning process that produces *school leavers with transfer potential.*

The assumption at the base of the conclusion is that the information, steering and production structures of a responsive SSAVE can meet the essential requirements. It also implies that a responsive system can function once the communication in the system is organised with a qualification structure. The model is clear about the structures, issues and processes for a responsive SSAVE. Thus, the model assigns to macro, meso and micro levels of the system what the participants ought to do and what they advocate.

Reconstruction and review of policy development in the steering structure (chapter 4), design of the information structure (chapter 5) and design and development of the QS - the linking pin between the three structures - (chapter 6) are the core of this study.

3.5.2. Final conclusions

This chapter explored the theoretical possibilities and backing of new ways to deal effectively with contextual changes. The result is a model for a responsive SSAVE. The model consists of three structures for information, steering and production.

The most innovative structure in the model is an information structure at the national level that articulates external demand and generates information for use by SSAVE. The steering structure at national level is for selection of qualifications to be publicly funded. The production structure at meso and micro levels of education encompasses flexible schools.

The system for a responsive SSAVE is based on the organised supply of information about the expected results from the system. This steering assumption is new for SSAVE and changes the roles of all participants - a change in line with developments elsewhere (§ 2.1.3). The expected outcome of a responsive SSAVE is communicated in terms of attainment targets. Attainment targets are competence-based learning objectives in the form of precise action structures.

The functioning of the information structure requires new ways to deal with information about contextual changes. The conclusion is that three translations need to be made to feed a competence based learning process. The way schools work and the way the system should be steered have been explored. The conclusions contributed to the shape of the steering model.

This conclusion creates a perspective for logical next steps. The big issues of change are the new information structure and the new qualification structure produced by that information structure.

The production of the information and qualification structure is more than just a technological matter. The systems change needs powerful and long-lasting policy support at a national level.

The design and development of the new qualification structure, and also the implementation and internalisation of the change, require the involvement of all participants in the system. The following chapters describe the observations during the development of a policy plan, an information structure and a qualification structure.

The aim is to improve the school-to-work transition. The most threatening pitfall is that it is not demand but other preferences and habits that may determine aims and targets. Any old or new regulation, method, process or structure in the educational system can hinder positive response when it is used as a self-referential motive to reject signals from the context. The idea behind the model is to be objective about self-referential motives, to focus on external change in the first place and only then to decide on all necessary steps for educational change.

The structure of this thesis may give the impression that problem definition, theoretical framework, policy plan, information structure and qualification structure are the result of linear planning. In reality they went along together and all the different requirements influenced each other. That is why this thesis is not a chronological report.

4. Policy on Change of SSAVE

An authoritative and permanent political commitment is vital for the establishment and maintenance of an information structure and a QS as described in chapter 3 (Fullan, 1991; Wesselingh, 1993). A reconstruction of the policy makes clear the extent to which it was supported once developed.

A procedure for the formation of policy (Hoogerwerf, 1984; 1992) has been used to describe the policy order, the identification of problems, the actions necessary to formulate aims and to achieve the desired effects, the possible initiatives and the clearly defined targets.

The demands of the policy order (# 4.1; O&W, 1988b, p. 5) were -

- 'to improve school-to-work transition;
- to provide access for all target groups;
- to ensure mobility of qualified school leavers;
- to develop the effectiveness and efficiency of VET'.

That order has been transformed into an operational policy model for a responsive SSAVE, providing it with a coherent set of policy criteria.

Following the description of aims in chapter 2 and 3, this chapter describes the development of observed antecedents for a responsive SSAVE (Figure 4.1); that is the policy plan.

description matrix			**judgement matrix**	
intents	**observations**		**standards**	**judgements**
articulated demand	policy plan	**antecedents**	-	-
shared responsibility	information structure	**transactions**	-	-
transfer potential of national objectives; flexibility of organisation	qualification structure	**outcomes**	qualifications with transfer potential; efficient & effective pathways	T T

Figure 4.1: The research area (shaded)

The central issues in this chapter are the basis of a policy for a responsive SSAVE (Figure 4.2); the utilisation of relationships between work and learning in SSAVE (Figure 4.3); the required initiatives at the respective levels in the system (Figure 4.4); and the policy for the QS (§ 4.7.1) and information structure (§ 4.7.2).

4.1 The policy order to improve VET

The policy recommended by the Wagner Committee (1984) was to improve the school-to-work transition. The improvement of programs with competency-based objectives was stressed with the phrase - 'they should know how to hold a hammer.' This perception of the problem is the starting point of a policy order for VET.

The policy order, the position of the Minister of Agriculture as client, his perception of the desired policy, the directives in the order, the designers' interpretation of the order and the relationship between existing and new policy are discussed in this section.

4.1.1 The order

'Educational and organisational reforms of Senior Secondary VE (SSVE) are needed both to strengthen the position of SSVE in society and to increase the autonomy of schools, and this will contribute to the economic recovery and economic innovation by society, and to the school-to-work transition'. This is a proposal for the change of the law on SE (O&W, 1988b, p. 4 of explanatory memorandum - em -).

The proposal for the change in the law on SE deals with sectors[24], divisions, courses and attainment targets. 'Attainment targets are descriptions of student qualities with respect to knowledge, insight, skills and vocational attitudes' (O&W, 1988b, p. 10 of em). A great deal of attention is given to the development of attainment targets for SE and the role occupational profiles should play (O&W, 1986). They are the means to improve the school-to-work transition and reference for -

- the demand for qualifications;
- the minimum objectives for schools;
- the examination by the competent authority of schools;

and - under responsibility of the minister -

- the decision on course length;
- the identification of public funded courses (O&W, 1988b).

A parallel policy order was given for vocational training in apprenticeship schemes, short courses and part time SE (O&W, 1988a).

4.1.2 The client

'First of all, who is the client?' 'Will the client be the user of the product of the policy or does he want the policy to be applied to someone else?'

The change of educational legislation developed a dialogue between the Ministers of Education and Agriculture, and the Parliament. The national aim was to improve the administration of VET and, thereby, of SSAVE. The ministers wanted a policy for VET. Thus the Ministers of Education and Agriculture were their own clients.

On the one hand they wanted a policy for strengthening the autonomy of schools and on the other hand stipulating specific educational goals i.e. attainment targets. In the new policy, in effect, schools and the government become equal partners with regard to access to background information (§ 2.1.3). So after implementation of the policy, the clients of the new

[24] Details about the educational structure, including sectors, divisions and pathways will be described in chapter 6.

legislation now include rural society and agricultural education as depicted in Figure 3.6.

'What are the functions of the client?' The Minister of Agriculture is responsible for meeting the needs of the public for food production and the needs of the rural area in general. The provision of information, and as a part of that, agricultural education, are included in this responsibility.

The Minister of Agriculture shares his responsibility for VET with the Minister of Education, who is the minister with overall responsibility for VET. The core function of VET is to provide for the public need for vocational education. Agricultural education makes a provision *for* the rural area, but is itself a *part of* the rural area. The fulfilment of this role means that SSAVE supports the implementation of rural policy. Meeting the needs of rural society implies adjusting programs to local needs and providing IAE's within reach of students (within 1 hour travelling distance). Within these conditions the Minister of Agriculture develops policy.

In the light of the new policy, the position of the clients and their roles needs to be broadened, as shown in Figure 3.7. The identification and translation of contextual changes into attainment targets is a responsibility of the social partners in the information structure. The steering of the system rests with the Minister and adjusting the provision becomes a major responsibility of the school and its clients in the region.

The change of roles (government at distance and autonomous schools) is not only subject to new legislation, but also means change for clients during its implementation. The Wagner Committee (1984) and the Rauwenhoff Committee (1990) advised on these new roles.

4.1.3 The clients' vision on the effect of the policy

With a policy for SSAVE, the Minister of Agriculture regulates one of his own components in the agricultural knowledge infrastructure (Lavi, 1986, p. 13-14). The general policy aim of the Minister of Agriculture is to sustain a competitive and sustainable agriculture, an attractive and vital rural area and a well-preserved and varied natural environment. With respect to knowledge the policy has been based on the following statement.

'To an increasing extent, knowledge and information generation, transformation, dissemination and application will determine the functioning of Dutch agriculture. The traditional instruments, Research, Extension and Education need to gear to that new challenge' (LNV, 1993b, p. 6).

The development of IAE's is one means of implementing the policy on the dissemination of agricultural knowledge. This instrument is linked to the general aims of education formulated by the Minister of Education. The position of the Minister makes the policy order a means -

- of supporting general educational policy aims;

- of setting intermediate goals for the development of his own agricultural knowledge infrastructure;
- of having a means of steering IAE's.

The participants as represented in Figure 3.7, respected the aims of the policy order. At the end of the 1980s, however, the schools were tired of developments in SSAVE including the change of legislation for schools, experimental teaching methods, change of legal status, the merger of schools and other initiatives. Industry wanted better-qualified school leavers. The rigid organisation and regulations of education frustrated representatives from business & industry and civil servants working within general agricultural policy development.

In 1988, the different views on roles of participants and clients (§ 4.1.2) were considered during development of the policy.

4.1.4 The directives in the order

The next step in the procedures for policy design (Hoogerwerf, 1992), is a survey of the directives in the policy order. The memoranda in the policy order about VE (Vocational Education) (O&W, 1988b) and VT (Vocational Training) (O&W, 1988a) are about innovation. Innovation in VE includes six aims -

- the improvement of the school-to-work transition;
- making programs flexible;
- the transfer of experiences from S-SSVE;
- the rapid introduction of new technologies;
- the participation of minorities[25];
- a professional approach to school management (O&W, 1988b).

Related policy aims were formulated in a separate legislation procedure for VT (O&W, 1988a). The two policy orders on VE and VT focus on the improvement of qualifications, of outcomes, of up- and down streaming and of quality control (ARVO, 1988a). The Minister of Agriculture developed one consistent strategy for IAE's (Lavi, 1986 and 1987a) and combined the aims for VE and VT in an early phase of development (Table 2.1).

The policy aims on VE and VT are comparable - both are to be supplied by autonomous regional institutions with a better school-to-work transition. The different areas of influence in VE and VT - i.e. the input from trade unions in VT - forced the Minister of Education to follow separate policies for VE and VT. As a result the timing of the implementation of each policy differed. The Minister for Agriculture followed a single policy in the agricul-

[25] VE and VT should accommodate all target groups at the basis of the employment market and provide every citizen with a (not precisely defined) minimum qualification to attain paid jobs. This requirement has far reaching consequences. For example due to differences in time utilisation by target groups (§ 6.1.4) and employment market failure (§ 6.4.1).

tural sector and combined the VE and VT aims in IAE's. He had advantages of scale and was, however, confronted with formal differences in laws and procedures.

4.1.5 The designers' interpretation of the order

An important consideration for the designer, the Agricultural Education Division of the Ministry for Agriculture, was the interpretation of the order. Two interpretations of the order were important for SSAVE. A choice for national policy aims on VET would mean blindly following the Minister of Education. Specific policy aims for SSAVE would mean policy for its rural function and place within a knowledge network.

The national policy aims on VET

To meet the national policy aims on VET, the Minister of Education intended to give schools a strong and independent place and the means of facilitating an innovative educational approach.

For the educational route (VE) the aims were to combine all pathways in one institution, and achieve a flexible system of financing and a flexible legal position for teachers (O&W, 1988b). For the training route (VT) the policy was to develop one system for apprenticeship schemes, short courses and part time VET (O&W, 1988a). New legislation would be designed and the merger of schools would be brought about. Flexibility would be achieved with a new regulation for examinations and modularization of programs (O&W, 1988b). The Minister of Education in 1987 established branch commissions of industry and education for updating of educational content. The branch commissions were to design new educational profiles and attainment targets.

Occupational profiles[26] play a key role in the policy for implementation. The state would determine attainment targets and the schools would exercise autonomy in meeting the attainment targets (O&W, 1986, 1988a & 1988b). Later on and in a separate section the policy order is committed to uniting the educational (VE) and training (VT) routes, and also adult education into one institution (O&W, 1993a). The law on Education and Training (ET) is, amongst others, based on the community college concepts from the UK and the US. In retrospect, the policy of the Minister of Education matched the philosophy for a responsive SSAVE. A policy on SSAVE was possible within the national framework.

The policy for SSAVE

The Minister of Agriculture adopted and adapted the policy described above. The focus is on five types of initiative. Two of them, development of legis-

[26] An occupational profile (§ 3.2.3) describes the core of an occupation and is an overall description of tasks, with respect to operational level and task area.

lation and merger of schools, absorbed much of the attention of the government administration and the education service in the late 1980s. Three other initiatives were the design for steering, the management of IAE's and the educational development of SSAVE (LNV, 1989d, p. 1).

The problems in SSAVE to be solved by these initiatives, however, differ from actual problems in SSVE. That is the reason for a different interpretation of the policy order.

The efficiency problem in SSAVE is comparatively minor. The cost benefit ratio[27] of SSAVE in the 1980s is 1.3 and this figure is favourable in comparison with the national average of 1.5 – 1.75 in SSVE (CBS, 1990; Figure 8.2). While the vocational level and the skills aspect of agricultural education, seem to be satisfactory, the qualified school leavers needed to improve on broadly applicable competence (Pierik, 1993). They did not face unemployment, providing they were prepared to accept less attractive jobs. The problem was that the demand for traditional agricultural occupations was shrinking and that the traditional divisions of SSAVE provided for a decreasing replacement rate (ROA, 1997a, 1997b).

The aims of the Minister of Education gained a specific reference in SSAVE. The challenge to SSAVE was to gain and sustain a minimum school size to maintain high efficiency and maximise the educational opportunities. For this reason, in agriculture, both the educational and the training route, and junior and senior SAVE merged in 1990 in the IAE.

Educational change in SSAVE needed to copy S-SSAVE, introduce LTP and competence-based learning (ARVO, 1988b). The old terms of competency-based objectives and the training for entrepreneurship needed a new impetus. Agricultural education ought to exploit that need to respond to new functions in the rural area.

The really challenging tasks were seen to be development of a curriculum responding to diversification, rapidly changing occupations and catering for interesting new target groups to maintain the critical size of schools. The Minister of Agriculture took responsibility for the improvement of qualifications. Two reasons overcame the doubts about such a role. The new management of the complex IAE's would need a coherent set of attainment targets, and further educational development required 'units'. The Minister of Agriculture established the means by which industry, schools and the Ministry could discuss attainment targets.

The director of the Agricultural Education Division summarised the goals for a meeting of teachers (LNV, 1989f) as follows - 'You will be working in a larger context, with firm objectives, on occupational qualifications, with fewer teacher-qualification regulations and with fewer prescriptions.'

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[27] The cost benefit ratio (# 8.2) is the number of school years per course year that students need on average to attain a diploma.

The policy order for SSVE got a systems interpretation in SSAVE; a responsive SSAVE can already be recognised in the 1988 aims - competence-based and innovative objectives, efficient linking in the system, and qualified school leaving. The interpretation of the policy order was not an explicitly phrased, planned or designed responsive SSAVE. The clients and the participants of the policy order shared more or less a united view on the policy aims.

4.1.6 Existing policy

'What are the most relevant points in existing policy (and legislation) that are linked to the new order?' The main policy points have been mentioned above. Two points of existing legislation require an explanation.

Article 23 of the constitution is about the freedom of education -

§ 2. 'Delivery of education is free, except for the supervision by the government and, as far as forms of education assigned by law are concerned, the search for competence and morality on the part of teachers, as regulated by law.'

§ 5. 'The criteria of validity, applied to publicly funded education, will be decided by law, with respect, as far as private education is concerned, to the freedom to determine the religious or ideological foundation of the school.'

With respect to objectives, a difficult and vulnerable point of policy is the constitutional right of the 'competent authority' role of Dutch schools to decide on direction and administration of the school. The dilemma is to prescribe objectives that have an impact on the quality of education and that respect the constitutional freedom of education at the same time. The freedom means in practice that the government can prescribe minimum targets, but schools are free to add to those targets and choose their own system of management, pedagogy and study objectives. The Dutch Parliament accepted attainment targets to be minimum objectives for schools with a way out for schools that have problems with them. Through its competent authority status a school has the right to acquire recognition unilaterally of any attainment targets it develops (O&W, 1989b).

EU policy on training levels is a second important area of existing policy. EU policy aims at one European employment market. Clear levels and recognition of formal qualifications are prerequisites for a flexible European employment market. The European Community Training Level Structure (EU-levels) is a reference for vocational training qualifications between the Member States (Table 4.1) (EC, 1985). The aim is to enable workers to make better use of their qualifications, in particular for purposes of obtaining suitable employment in Member States. The adoption or use of European levels for the design of a QS for SSAVE is inevitable.

Table 4.1: EU-Training Level Structure (EC, 1985)

Level	Training providing access to the levels of work	Performance on the job
1	Compulsory education and work experience	The amount of technical knowledge and practical capabilities involved is very limited. This form of training must primarily enable the holder to perform relatively simple work and may be acquired fairly quickly.
2	Compulsory education and vocational training (also apprenticeships)	This level corresponds to a level where the holder is fully qualified to engage in a specific activity, with the capacity to use the instruments and techniques relating thereto. This activity involves chiefly the performance of work, which may be independent within the limits of the relevant techniques.
3	Compulsory education and/or vocational training and additional technical training or technical educational training or secondary-level training	This form of training involves a greater fund of technical knowledge than level 2. Activity involves chiefly technical work which can be performed independently and/or entail executive and co-ordinating duties.
4	Secondary training (general or vocational) and post-secondary technical training	The high-level technical training qualification covers a higher level of knowledge and of ability. It does not generally require mastery of the scientific bases of the various areas concerned. Such capabilities and knowledge make it possible in a generally autonomous or in an independent way to assume design and/or management and/or administrative responsibilities.
5	Secondary training (general or vocational) and complete higher training	This form of training generally leads to an autonomously pursued vocational activity - as an employee or as self-employed person - entailing a mastery of the scientific bases of the occupation. The qualifications required for engaging in a vocational activity may be integrated at these various levels.

4.1.7 Conclusion on the policy order

The conclusion of this section on the policy issues is that the aims of the policy order, the directives in the order and the interpretations of the statement, point in the direction of a responsive SSAVE. That is why the responsibilities for the implementation of the elements mentioned in this section are easily incorporated into the model for a responsive SSAVE (Figure 3.8). The preconditions for implementation at the different levels of responsibility are created at a meta-level[28]; the allocation is the basis for a structured policy for the design of a system (Figure 4.2).

Such a structured policy base is a combination of a theoretical concept and a policy concept. This base is of practical value when other aspects of change can be attached to it, i.e. the actual aims (Annex 1.2), or when used to construct a policy model. The aims for educational change as summarised in Annex 1.2 form a patchwork quilt of initiatives. The actual aims are detailed and fragmented. Some of them are achieved through the structural changes resulting from the merger of schools and the development of AEI's.

[28] The Minister has (with possible other financers) the executive responsibility for the steering structure; he has also an overall systems responsibility.

Many, however, are related to the establishment of a responsive SSAVE and come within the policy base. All the aims, however, can be given a clear place in the policy base. Naturally, Annex 1.2 does not discriminate between aims for the information and the steering bodies.

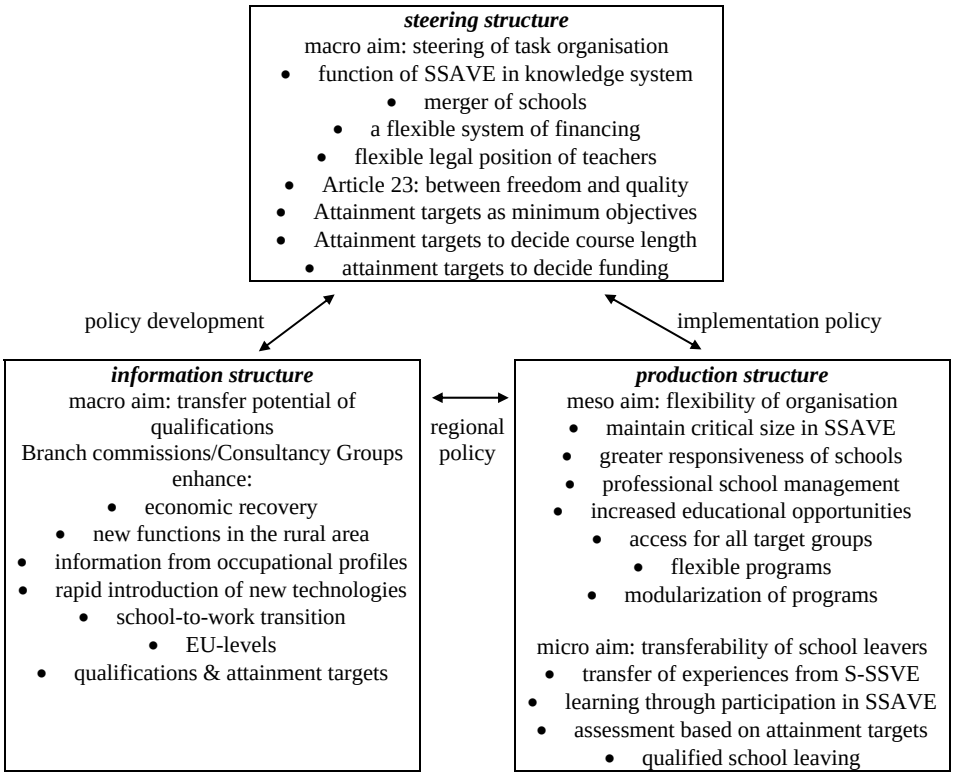

Figure 4.2: A policy base for a responsive SSAVE

A responsive SSAVE needed an information structure to pass information to the production structure, and this thesis is about its design and development.

The production of the design and development of the information structure requires further consideration of the policy model. The policy model should be unequivocal concerning a coherent set of policy targets for an information structure. In chapter 5 a reconstruction will be given of the design and development of the information structure on the basis of the policy targets. The Branch Commissions (Minister of Education) and Consultancy Groups (Minister of Agriculture) are the start of an information structure.

Attainment targets have functions for the three structures of responsive SSAVE (Figure 4.2). They are an essential basis for a QS that links the structures together.

In the next sections, the policy base is the framework for the development of the policy model. The production structure where the learning takes place, should be the core of the model because the policy aimed to strengthen the position and increase the responsiveness of schools. The focus is on the micro aims in Figure 4.2. Information and steering structures are secondary to that primary aim.

4.2 The policy problem of SSAVE

'Why is the school-to-work transition the core of a new policy?' 'What is the problem for which this is a solution?' In this section an analysis is made pertaining to the relationship between the policy order and the problem arising from it.

4.2.1 The perception of the problem in VET

The over-all perception of the problem has been depicted with the views of the four governmental committees (§ 2.2.1). The Wagner Committee (1984) stressed tripartite responsibility for formulation of attainment targets. The Rauwenhoff Committee (1990) recommended giving as many responsibilities as possible to schools. The Biesheuvel Committee (1992) discussed the division of responsibilities between Ministries, and the Van Veen Committee (1993) concentrated on the responsibility for funding educational and training routes of VET for different target groups. This summary shows that the solution of the problem concentrates on recommendations to manage it.

The formulation of attainment targets as recommended by the Wagner Committee is not easy. Its implementation requires identification of contextual changes relevant to occupational profiles, translation of occupational profiles into educational profiles and their implementation by schools (O&W, 1986). This approach is called 'the royal road'. The aims and the initiatives to bring it about, have been criticised as being naive (Van Hoof and Dronkers, 1980; Brandsma, 1993). The thinking behind the policy problem is analysed in # 4.3.

4.2.2 The perception of the problem in SSAVE

Improving school-to-work transition was seen in SSAVE as improving subject-based objectives of programs and entrepreneurship of qualified school leavers. This view overlooked the changes in society (# 2.1) and the feeling of school leavers that, although their vocational skills were sufficiently developed, broader skills were needed to prepare for a changing context (Pierik, 1993).

Teachers still focused on short-term revision of textbooks at the end of the 1980s, and limited resources for this work were perceived as the core of the problem. As depicted in # 2.3, at the systems level it was difficult to organise projects with any impact (APS, 1984; Boomsluiter, 1986; Van der Steen, 1986).

A problem was that, because of continuous change in the context of SSAVE, the traditional educational objectives did not meet the requirements of the desired/expected qualifications. Schools did not include time for reflection and discussion in addition to traditional learning. The students were not encouraged to learn from their own experiences. Teachers demanded traditional textbooks that had limited value when teaching and learning in a practical context demands engagement and participation. The symptoms and possible causes observed are summarised in Table 4.2. Tentative pedagogical answers have been added.

Table 4.2: Structural problems in SSAVE due to contextual changes

symptoms	causes	tentative pedagogical answers to problems
Difficulties of teachers and others in keeping up to date.	Rapid innovation of products and technology.	Utilise practical context, e.g. manuals/tools/ICT.
Difficulties of students in linking principles to practice.	Changes in public demand for different combinations of values and technologies in products.	Learn, supported by theory and discussion, from own observation and experiences.
Problems of qualified school leavers in learning to meet the change of tasks in the workplace.	Production and innovation move on together due to rapid product innovation.	Learn to learn, train through reflection and discussion.
Difficulties of schools in responding to the permanent nature of change.	The focus on subject matter instead of product innovation.	Formulate competence based attainment targets.

For example, to keep a textbook about crop protection up to date would require annual editions because of the annual approval and prohibition of herbicides and pesticides. It is better that students learn to use the professional crop protection guides. A similar approach may apply to new values and transferability - attainment targets describe required competence and not the actual values and transfer potential.

The four tentative solutions can be interpreted as psychologically based measures to improve the school-to-work transition as described by Borkhuis (1976) together with the recommendation to start the SSAVE-B project (1978 – 1986, see § 2.3.3).

The conclusion of # 4.2 is that a responsive SSAVE should analyse contextual changes (Achtenhagen, 1994; 1998, pp. 135-141) and focus on competencies that meet them (Ellström, 1998, pp. 42-44). As illustrated in Table 4.2, with tentative pedagogical answers to the problems, the ability to identify the problem is present in SSAVE. The perception of the problem is in line with theoretical views. The fragmented approach to contextual changes (# 2.5) is the weak point. That is why a proposal is needed for a coherent systems approach to the changes. To develop such a proposal, the cause and effects of the problem are analysed in # 4.3.

4.3 A transformation model to illustrate the problem

A cause and effect analysis of the problem should be the basis for a model policy (Hoogerwerf, 1992). Causes and effects of occupational change do not fit 1:1 (§ 3.2.2). That is why cause and effects of occupational change are structured in a new transformation model to illustrate the problem in SSAVE.

4.3.1 Employment market and competence

It is a misunderstanding to take the employment market as the place where occupational changes first show themselves. Creation and elimination of jobs within companies exceeds the dynamics of demand and supply on the employment market. In American industry a turnover of 1 to 10 functions per annum has been registered (Davis, Haltiwanger & Schuh, 1996).

'How would job creation work?' Upgrading, downgrading and regrading are processes connected with job creation (Spenner, 1985). Thus, workers need to maintain and develop their competency continuously through life long learning. To develop competencies, workers participate in the process of change within companies and grow into new jobs. Many workers are able to change jobs and to perform satisfactorily in new positions within companies (Annex 4.1). Problems may arise when the qualitative and quantitative need for qualified workers is not developed within companies.

School leavers may not find jobs and be unemployed for several reasons. For example the slowness of supply and demand on the employment market, a temporary influx in the employment market, or the mismatch between the skills required of school leavers and the requirements of companies. Problems arise when school leavers are unemployed for too long a period (youth unemployment) because of a combination of structural unemployment, friction unemployment, or discrimination against social minorities. The causes of youth unemployment are not clear; they are difficult to separate, and the employment market reacts unpredictably because of strategic behaviour of employees and employers (Brandsma, 1993).

VET can attempt to solve the problems on the employment market that are related to competence. VET might offer short courses to adults to ease friction problems and VET can anticipate long-term problems with regard to qualitative and quantitative regional needs (Annex 4.1).

Identification of new competence should focus on occupational change in companies (Ellström, 1997; 1998, pp. 48-49; Spenner, 1985) and not the complicated, superficial and quantitative dynamics of the employment market. In the light of dynamic change of context, however, the social cycle of occupational development is not carried through fast enough. Overcoming slow reaction of the employment market, and providing a basis for schools to modify their programs, requires an information structure identifying contextual changes and formulating appropriate attainment targets. The

information structure should compensate for a slow-moving social process - to bridge the gap between product and competence.

4.3.2 Links between work and learning

'How can the gap between product and competence be bridged?' 'What type of competence should be described in qualifications?' We start with an analysis of links between work and learning.

'Training for change requires new forms of learning. Traditional learning is connected with memorising facts, practising skills and appropriation of attitudes. These traditional opinions about learning comprise several built-in assumptions and limitations -

- acquiring knowledge and learning skills are separated;
- likewise attitudes are kept separate from knowledge;
- human memory is regarded as a kind of stockroom;
- the student is thought of as an object of external influence;
- learning is fragmented' (Engeström, 1987; 1994, p. 11).

'The usual way of dividing learning into three 'sectors' (knowledge, skills and attitudes) strengthens these misconceptions. In reality, learning is a mental and practical activity of the student, which is much more complicated than mere 'reception' and 'storing'. The student literally constructs a pictu-re of the world and forms explanatory models of its different phenomena' (Engeström, 1994, p. 12). This fits in with the development in SSAVE towards competence based learning based on constructivism (§ 2.3.3).

'There is more than one type of learning. Traditional school instruction may be regarded as an example of first order learning - students try to give correct response. While this type of first order learning goes on, a less obvious but much broader process of second order learning takes place in the school. The students acquire general patterns of behaviour and thinking typi-cal to the school context. They learn how to act and think like students, both overall and in specific subjects. This may be called the 'hidden curriculum'.

'In second order learning, the focus is switched on to finding out how correct solutions can be produced when they are not readily available for copying. Much of second order learning takes place through trial and error. Another form of second order learning is problem solving. Here the learner pauses in order to reflect upon the problem and formulates a hypothetical explanation of the principles behind successful solutions. The learner then tests the hypothesis and modifies according to the results. In other words, the learner constructs a theory of the phenomena under study' (Engeström, 1994, pp. 15-17). Second order learning facilitates achievement of transfer-ability. Transferable key qualifications (§ 2.1.2), transferable skills (§ 2.3.2) and transferability (§ 2.4.3) are relevant for a responsive SSAVE.

'In third order learning, the learner questions the validity of tasks and problems posed by the context and begins to transform the context itself. In

the school, this kind of 'expansive learning' would mean that students and teachers analyse critically the practices of schooling and begin to transform their own practice. Obviously in such learning processes, internalisation of given culture steps to the background, while externalisation of novel cultural practices gains priority' (Engeström, 1994, p. 17).

Expansive learning is a prerequisite in all three phases of learning in knowledge intensive networks (§ 2.1.2). The principles of learning above compare with instrumental, strategic, and communicative activity, and discourse (Koningsveld & Mertens, 1992) and are applicable in all contexts, i.e. in the knowledge-creating company (Nonaka and Takeuchi, 1995).

Work and learning may be seen as the physical and mental dimensions of one activity. As a parallel of this concept product and competence may be seen as the physical and mental dimension of one outcome. The four identities have a meaning of their own in a system and also reinforce one another in transformation processes (Figure 4.3).

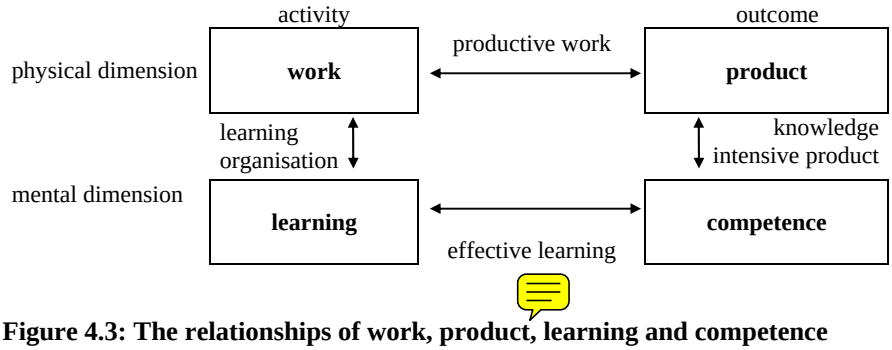

Figure 4.3: The relationships of work, product, learning and competence

The links are aspects of daily life. Productive work indicates a meaningful relationship between working and the required product. Effective learning points to a meaningful relationship between learning and competence.

The combination of working and learning may be the core of a learning organisation (Perkins & Salomon, 1989) and of learning in working life (Engeström, 1994). Brown & Duguid (1991) and Orr (1990) state that working, learning and innovation are closely related forms of human activity which are conventionally thought to be in conflict with each other. 'Our argument is simply that for working, learning and innovation to thrive collectively depends on linking these three in theory and in practice, more closely, more realistically, and more reflectively than is generally the case at present' (Brown & Duguid 1991, p. 55).

Linking product and competence may yield a quality outcome that might be referred to as a knowledge intensive product. Jacobs (1996) uses eleven layers of knowledge to describe less tangible aspects of a product.

When working and learning are not well linked, the work is routine without reflection and conclusion; the learning process is primarily 'off-the-job' - with little or no reference to the work situation. The weak link between working and learning is criticised in many fields. 'The gap between academic and vocational education cannot be discussed without taking the structure of the economic system and its sub systems and elements into account' (Achtenhagen, 1998, p. 138). 'The most powerful reform strategy for corporate training is probably one that eliminates the separation between job training and production' (Berryman & Bailey, 1992). 'Decontextualised learning processes transfer facts but not values' (Dewey & Dewey, 1915).

Linking working and learning is a way to give meaning to content; this is extremely important when one deals with plants and animals. The link, however, may be difficult to organise (Brandsma & Nijhof, 1998, pp. 5-8). The model of Figure 4.3 may help to explain the problems that have been observed in SSAVE. The system described in the model is stable when 'formal qualifications' are acquired and up-dated through association with a production process where working and learning are connected. The traditional 'Guilds' and the learning relation between father and son on the farm answered to this ideal, and also the learning organisation is a modern representation of such a context. In educational systems, however, working and learning are often separated.

A traditional system of VET will remain stable provided -

- VET adopts occupational images as an input;
- the occupational images selected are relatively stable.

This was common in SSAVE between 1950 and 1980. Occupational images may become outdated because of technological developments or simply no longer practised as described in # 2.1. When working practice and learning competencies related to practice run out of phase, a gap develops between what is required and the formal qualification.

Through focusing on subject matter rather than required skills, SSAVE may have increased the gap between work and competence in the 1980s.

Advocates of a subject-based approach assume that students will connect principles to practice. But most times students do not do this because, for example, of the separation of knowledge from practice - 'cognition system separation' (Van Parreren, 1982; Brown & Duguid, 1991). Transfer takes place in specific learning processes. Most people need to acquire this knowledge systematically and need the support of a teaching organisation. These people are potentially the employees who are not able to adapt and perform satisfactorily in new work situations. They are likely to enter the employment market in search of a job that fits with their outdated competencies.

Advocates of a skills based approach take the contemporary practice as the best starting point for learning and competence. This approach will definitely enhance the connection of principles and technical knowledge to the work situation. The view that contemporary practice is the best educational objective however, loses some impact when rapid product innovation and changes in production methods continuously require new skills.

Three sequential forms of learning are important now (§ 2.1.2) -

- to enter and participate in the working process;
- to become and remain a professional;
- to innovate and improve the working process.

Contrary to these three phases of learning is the focus on specific occupational areas. The potentially narrow subject matter, and to a small extent, relatively few competency based objectives, may not be sufficient determinants for educational objectives. Such a focus may increase the mismatch between required and formal qualification and hinder the school-to-work transition. The mismatch becomes permanent when learning lacks a real practical context and when the level of transferability remains low (Moerkamp, 1999).

Transferability is the ability to use prior learning in new situations and to transform current competence into new to meet changes in career. As a pedagogical aim it is more than the sum of subject matter and required skills. The aim of transferability is that someone with a qualification has also learned to reflect and to look for the principles and systems behind situations. The ability to reflect should enable problem solving in new situations.

These considerations played an important role in the educational change of SSAVE. The SSAVE-B project (1978-1986) and the S-SSAVE experiment (1984-1987) focused on the integration of subjects. Required skills[29] as an objective were extensively introduced in SSAVE in early 1988 (Lavi, 1988).

The core of the problem of SSAVE is change in the workplace. Change in the work situation can be shown as change in the relationships of work, product, learning and competence. SSAVE should focus on transferability rather than on required skills and subject matter, which was the traditional response.

4.4 A policy for a responsive SSAVE

Responsive SSAVE needs a concept in which the relationships between work, product, learning and competence can be integrated in content and pedagogy. ‘What are the aims for such a concept?’ ‘Do they focus on causes

[29] SSAVE referred at required skills as ‘practical directedness’.

or consequences?' Time limits, preconditions and evaluation criteria to achieve the aims need to be taken into consideration.

4.4.1 Focus on causes or consequences?

The technological innovation of products and production is the cause of the gap between required and formal qualifications (Carnevale, Gainer & Meltzer, 1990). Changes in the context of SSAVE (# 2.1 and 2.2) point towards a state of change being the norm.

The cause, changes in products and methods of production, and the effect, change in the skills required, are self-determined and desirable. Realistic and valid policy for a responsive SSAVE cannot aim to alter this situation. It needs to focus on occupational changes or signs of possible change coming from industry and commerce.

SSAVE needs to respond to occupational changes. In a SSAVE based on formal subjects, rapid innovation might lead to a gap between content required at work and the content taught in subjects. In a competency focussed VET, the effect may be that trained skills are outdated. This mismatch alienates students and reduces motivation.

The policy should be that SSAVE meets the demand for new skills and technical knowledge but with transferability built in. Transferability linked to required skills might provide an ability to respond, which may combat the degrading effects of contextual changes on qualifications. 'Be ready for now and later' is the essence of this approach. It reflects the double aim that VET should contribute to 'economic recovery and innovation' (O&W, 1988b).

A responsive SSAVE needs to combat the side effects of innovation with responsive capability - a concept with transferability as a feature of the required skills. This has consequences for objectives, pedagogy and programs.

4.4.2 Preconditions, time limits and evaluation criteria

From the projects and experiments in SSAVE and the innovation and implementation theory (Fullan, 1991; Hall, 1993), preconditions can be inferred for the development of the policy. The innovation needs a critical size of educational institution, stimulation and reinforcement in the system; involvement of teams of sufficient size and expertise to ensure continuity and avoid being overlooked; time to give a real chance of success; liberal regulation to allow flexibility; and the co-ordination of objectives, regulation and pedagogy. The goals should be clear, in line with the policy, formulated well in advance and compulsory for all schools.

Process preconditions

What are the preconditions for adding transferability to the required skills that add up to a responsive capability? We may consider the questions that need to be answered for teaching skills and transfer potential in addition.

Skills make someone employable in an area of work, they must be taught therefore, in a practical situation. As a precondition, it must be ensured that a work-based program contains competency based action structures so that it contributes to the training in required skills. Competency based objectives of the work-based program will ease first entry into work (Onstenk, 1997).

A second precondition should ensure the achievement of transfer potential. Gielen (1995) incorporated the preconditions for transfer in a model based on proposals of Baldwin and Ford (1988). Her model refers to course design and student characteristics. In course design, attention should be given to behavioural performance to promote transfer potential in the trainees. Several contexts should be provided during training to further transfer potential. The presence of identical elements in tasks assigned in both learning and working promote transferability. Diversity in learning and working decreases contextual influences, and contributes to transferability.

The achievement of transferability depends on student characteristics too. General ability and higher order skills enhance transferability. Self-confidence encourages greater use of skills, motivation to transfer, and learning and performance. Learning style is related to prior learning and influences actual learning. Prior subject knowledge is a prerequisite of instruction to achieve transferability (Perkins & Solomon, 1989).

To achieve a responsive capability, competency based objectives in the work-based program and transfer potential in the school-based program are not sufficient. A program should link both aspects to achieve a responsive capability in the trainees. The ideal is that a 'process of decontextualisation in the school-based program must be based on programmed experience in a variety of practical contexts' (Nijhof & Streumer, 1994b, p. 137). In a QS, in order to organise the link between a school- and work-based program, the required responsive capability of qualified school leavers should be an integral part of the competence based attainment targets.

The conclusion with respect to learning process preconditions is that the achievement of a responsive capability requires training for the required skills and transfer potential. Four preconditions of SSAVE safeguard this objective -

- competency based action structures and
- promotion of transfer potential at micro level;
- a linking concept between the two at meso level;
- at macro level the description of competence based attainment targets should include reference to transfer capabilities.

These preconditions are not new. Competency based objectives, although poorly defined, are common for SSAVE. In SSAVE transfer potential was called entrepreneurship. A project group on learning through participation (LTP) designed a taxonomy for entrepreneurship in SSAVE (Table 2.2) with

elements of near, further and far transfer. LTP itself is an example of a linking concept between school and work based learning (§ 2.3.2; IPC, 1978). In 1988, however, SSAVE included subject examination programs at macro level and SSAVE had no coherent and systemic way of developing competence based objectives.

Time limits

'How much time is available and how long would it take to design and develop the preconditions mentioned above?' A time-scale given by the Minister of Agriculture in May 1989 required having the QS available by February 1990 (LNV, 1989b). The decisions of the Minister of Agriculture arising from that scenario are discussed below.

Policy administrators linked available time with process criteria. Process criteria were derived from the SSAVE-B projects where teachers failed to transfer details of the program for the changes in education from one school to the other, and where transfer of basic information about the required transition was extremely difficult to obtain. The SSAVE-B project and the S-SSAVE experiment made clear that -

- many production cycles would enable the organisation of a learning, knowledge creating, process (Annex 2.1);
- experience of teachers gained from the experiment on S-SSAVE and the projects on SSAVE-B and LTP should be utilised in that process;
- as many teachers as possible should be involved in the transition to create learning opportunities for everyone to find out how a responsive SSAVE would be;
- the development of the QS (a product) should be carried through in advance of decisions about the information structure (a method).

The strict planning schedule in the new legislation was used to create a sense of urgency, to apply the principles above and to develop a high rate of production (Table 4.3).

Table 4.3: Legal documents describing the QS

Title	Date	Reference
DDC '89: Discussion paper on diplomas and certificates	June 1989	LNV, 1989d
Advice DC '90: First advice diplomas and certificates	February 1990	LNV, 1990a
Preliminary review of diplomas and certificates '90, issue I	June 1990	LNV, 1990b
PR DC '90: preliminary review of diplomas and certificates	December 1990	LNV, 1990e
Review DC '92: review of diplomas and certificates 1992	February 1992	LNV, 1992
Additions to the review of diplomas and certificates 1992	February 1993	LNV, 1993a
Review DC '94: review of diplomas and certificates 1994	January 1994	LNV, 1994
Additions to the review of diplomas and certificates 1994	January 1995	LNV, 1995a
Review DC '96: review of diplomas and certificates 1996	January 1996	LNV, 1996

In December 1989 the QS was designed. In one year, a prototype of the QS had been developed, and from August 1990 it was ready to be tried out

in three IAE's. Two years later, from August 1992, the QS for SSAVE became compulsory for all IAE's. Design and development of the information structure took until 1994. The creation of the information structure and the QS are described in chapters 5 and 6 respectively.

The complexity of educational change, and necessity for long term policy support for the change at the macro level of the system, makes systems change very vulnerable.

'The soundness of change decisions, the communication of subjective and objective dimensions of change, the dilemma of feasible and desirable change, the relation between existing realities and the feasibility of any change, the way change creates doubt about purposes and self-concept, and the validation of change' (Fullan, 1991, pp. 43-45) are points that should be taken in account. Many of these points cannot be solved with information supply and require time for learning - working and producing, implementing and reflecting. To develop SSAVE it was most import that the Minister of Education pushed the change forward; that created external validation. He needed several cycles of legislation to develop a format for the QS for SVE; that created time. Thus, vital requirements for deep change as described by Fullan were provided by contextual coincidences and utilised for SSAVE.

The QS for SSAVE needs to be interpreted also at the meso level. The concept of linking school- and work-based programs needed to be developed and applied. The QS is a new way of organising schools. A traditional timetable differs from a unit schedule. The expectation was that the transition would take some years of trial and error.

Linking school- and work- based programs, for example, as proposed by learning through participation (LTP), requires objectives shared between school managers, teachers and instructors in commerce & industry. A shared view on objectives is the basis on which an iterative process can be designed and developed. Such a process is difficult and may take many years.

The work with competency based objectives and transfer potential at the micro level requires teachers with a high degree of professional perception. The new QS changes the work of teachers from a subject based, retrospective orientation towards a forward looking competence based learning; from explaining facts towards providing learning experiences (Table 3.6). The creation of a new professional identity would take considerable time; slow progress had been observed before in SSAVE-B (APS, 1984) and S-SSAVE (Van der Steen, 1986).

Possible first steps for these developments had been suggested in a brochure of the Ministry of Agriculture (LNV, 1990f). The focus could be on planning the work-based program, linking specific work and school tasks, integration of specific subject matter, support for the work-based program, further integration of subject matter, and the design of a fully integrated project planned by the school. Given the context of independent attainment

targets and available pedagogy, development of competency-based programs is likely to be the first thing to be done because of a tradition in SSAVE.

Most difficult is the development of the transfer potential in the school-based program. It requires a shift towards thinking in terms of functional hierarchies (Table 3.6) on top of disciplinary hierarchies; although taken up in SSAVE, it takes many cycles of search and persuasion.

The conclusion with respect to time limits is that the policy cycle creates a necessary sense of urgency and importance. The policy requires preconditions for a responsive SSAVE that could not be established in one policy cycle (marked by 4-year general elections).

Evaluation criteria

Evaluation criteria were not explicitly formulated at the time. The indicators in the model for a responsive SSAVE are transfer potential of qualifications, flexibility of schools and transferability of qualified school leavers (Figure 3.2 and 3.7). Indicators for evaluation are described and used in chapters 7 and 8.

Conclusion

In this section the policy has been explored and structured with the help of three principles. The preconditions are assigned to the different levels of SSAVE with the framework for a responsive SSAVE (# 4.1). Contextual changes are taken as a starting point (chapter 2 and 3, and # 4.2). A transformation model is used to formulate causes and effects of contextual changes (# 4.3). Then the policy is formulated, and preconditions and time limits are added. The reconstruction results in one major policy aim - a flexible capability of students with the complementary elements of required skills and transferability.

In 1988 the aim of a responsive SSAVE and the preconditions for the implementation of the policy order were vague notions. The reconstruction of a model for a responsive SSAVE helped to allocate important new responsibilities to the macro, meso and micro levels (Figure 4.2).

The new precondition was the QS at macro level. Time pressure for a QS was very high; schools would need it within 2 years to work efficiently on the preconditions at meso and micro levels. The design, development and implementation of the change would be very demanding on teachers. Under these conditions, the Minister of Agriculture decided to develop the QS first, followed by provision to maintain and improve the structure later.

4.5 Firm goals for the improvement of SSAVE

The preconditions to achieve the policy aims are competency based objectives and transfer potential at the micro level, a linking concept between the two at the meso level, and the qualification and information structure at the macro level of the educational system. Hoogerwerf (1992) recommends the

formulation of firm goals for achievement of the preconditions in the next phase of policy design.

4.5.1 The type and location of the developments

Education is a public institution for the benefit of individuals. It is a public facility based on information transfer, financial incentives, and Regulations. Educational change as far as national policy is concerned, is an alternation of the existing conventions. Thus the development to establish a responsive SSAVE will be a change of the public facility, information transfer, financial incentives and/or Regulations.

Developments in education are generally at school level. The primary aim is to create equal opportunities for every individual. The government policy with respect to initiatives has changed in the 90s from controlling the educational process into installing preconditions for schools, and monitoring outcomes and quality.

4.5.2 A set of coherent initiatives

'What are the initiatives in the form of information transfer and financial incentives and/or Regulations that can be applied to achieve the preconditions for a responsive SSAVE?'

Progressive practical stages and guiding observation in the work-based program may make the curriculum competency-based. Integration of subjects and programmed reflection in the school-based program may enhance promotion of transfer potential. These four aspects at the micro level are common in SSAVE (# 2.3), and may be supported by competence-based objectives at the macro level of the system.

In addition the defined outcomes should encourage the meso level to link school- and work-based programs. One possibility is LTP (§ 2.3.2). In a recent study Mulder (1997) suggests how to improve the relation between the school- and work-based programs with a model for 'cognitive apprenticeship' (Collins, Brown & Newman, 1989). Mulder states that the complexity of the ideal practical learning situation is adjusted through the content of the series of assigned tasks, teacher initiatives and practical context.

A QS at the macro level should provide a coherent set of competence based objectives. The QS for SSAVE has the function of a defined outcome for the system. The development of the QS requires the establishment of an information structure. At the macro level the outcomes need to be linked with financial incentives and Regulations in a steering structure. Change in the steering structure to meet these requirements is a final initiative.

These initiatives are the consequence of preconditions as discussed in § 4.3.2, 4.4.1 and 4.4.2. The preconditions are the consequence of the policy and the transformation model of product, work, learning and competence (Figure 4.3). The initiatives apply at micro, meso and macro level of a

responsive SSAVE. The first five initiatives in Figure 4.4 are a responsibility of the production structure of SSAVE, the IAE's. The last two are concerned with macro level of SSAVE.

policy aims	preconditions	Initiatives	responsibility
required skills	competency based action structures	1. progressive practical stages & 2. guided practical observation	at micro
+	(i.e. LTP)	3. programmed linkage	meso, and
transferability	promoting transfer potential	4. integration of subjects & 5. programmed reflection	micro level of the production structure
=	(i.e. outcome funding)	6. systems linkage	at macro level of the steering structure
employability	competence based objectives	7. qualification structure	at macro level of the information structure

Figure 4.4: Initiatives to achieve employability within a responsive SSAVE

The theory behind the policy is that initiatives for a responsive SSAVE should encourage a flexible organisation of schools and learning processes at meso and micro level to achieve required skills linked to transferability and employability of school leavers. A QS at macro level is to compensate for the slow process of occupational development and to maintain coherence of the system.

The policy theory fits with proposals for steering a responsive SSAVE (Figure 3.7) and with current educational views on change in SSAVE. The main difference with the past is the intention at the macro level to develop and monitor a QS, to establish an information structure and to change the steering structure.

4.5.3 The expected effects of the initiatives

Initiatives mentioned in Figure 4.4 are not new to SSAVE. Many have been tested in projects or experiments (# 2.3). In the past, the initiatives were only suggested (SSAVE-B) or implemented without sufficient reference to the critical size of school (S-SSAVE). Projects and experiments were not sustainable because of their small scale, a lack of legislative backing, and lack of commitment (Table 4.4).

The hypothesis was that the new policy would work out positively because of the systems approach i.e. that observations in SSAVE and in theory (# 2.4), that objectives, regulation, pedagogy and organisation are strongly related at micro, meso and macro levels (Figure 3.7).

The philosophy behind the reconstructed policy is a coherent set of initiatives that revitalises and links earlier innovations so that these can reinforce one another within the new institution, the IAE. The idea is that

objectives, experiences and products from the projects and experiments can be utilised. Schools have expertise derived from past experience.

Table 4.4: Application of initiatives in SSAVE in the recent past

initiatives	applied before
work based initiatives:	competency based objectives in SSAVE-B and -A (Lavi, 1988a)
progressive practical stages	practical stages (O&W & SoZaW, 1977, 1981) enforcement AS in mid 1980s (O&W, 1988c)
guided practical observation	SSAVE-B (Cox & Geerligs, 1982a & 1982b)
programmed linkage:	LTP in SSAVE-B (Van de Lagemaat et al, 1985)
school based initiatives:	
integration of subjects	SSAVE-B (APS, 1984), S-SSAVE (Van der Steen, 1986)
programmed reflection	LTP in SSAVE-B (Van de Lagemaat et al, 1985)
qualification structure:	S-SSVE (O&W, 1978; ARVO, 1988b)
QS with decontextualised	proposed (Nijhof & Streumer, 1994b)
action structures	S-SSAVE (Van der Steen, 1986)

Schools should organise and manage a new production structure with students working on modules. This is expected to have several advantages. The coherence and relevance of blocks, units and full qualifications will reinforce the motivation of students. Linking experience and reflection will lead to both required skills and transferability. An up- and down streaming of units in a QS may assist in the qualification of early school leavers and movement between pathways.

4.5.4 One firm base between moving targets

The management and teachers of IAE's were facing enormous change. At one and the same time the system was changing, schools were merging and teachers' legal status was changing. Targets were not set once and for all (§ 3.3.2) and continued to evolve in time. 'How can a firm base be provided in a context of moving targets?'

The new objectives for SSAVE are not just new; they are different. Future objectives are based on qualifications and not on disciplines. Teachers and the management should design school- and work-based programs to achieve required skills and transferability. This is a very complex and long-lasting exercise (§ 4.3.2). The role of teachers is changing fundamentally.

This is a really profound change. The process is expected to take many years before all participants feel the potential of the QS. It will take possibly twenty years before the possibilities are fully utilised. On account of the length of the process and the depth of change, the differences in view and practice between schools and individuals were expected to be considerable for some time.

That is why in 1990, the traditional structure of SSAVE was maintained as much as possible (Table 2.1 and § 6.1.2). This does not mean that the old structure was ideal, but - as described in § 2.4.2 - the new competence-based

attainment targets could be applied regardless of the structure of education. This meant that there was no need for a fundamental change in structure.

Dutch secondary education provided the example for this decision. Following changes affecting the structure of the entire Dutch secondary education in 1965, attempts for a further reduction in the complexity of the system failed again and again. New proposals were turned down and experiments were not feasible. In 1986 a proposal was made to adapt the content and to write core objectives for a common curriculum SE (BE, Basic Education for all 12- to 14-year olds). The new objectives were implemented within the existing structure of different pathways of secondary education (WRR, 1986). This approach was felt to be a breakthrough after a long lasting debate on introducing a middle school.

Changes in structure would follow new content of SSAVE. A national example on BE was utilised in SSAVE.

4.6 Survey of alternative technologies

'What is the best QS for SSAVE?' 'What are best practices for a responsive SSAVE and what can be learned from structures and approaches abroad?'

Sources for ideas were the modularization experiment for SSAVE, the experiment on S-SSAVE, the Scottish National Certificate for VET, the French modularised system for agricultural VET, and the German dual system, which are all in operation. These experiments and systems were analysed and useful parts selected to apply in the responsive system (chapter 5).

The format of a QS relates to structure, taxonomy and content. The structure has for example to do with the pathways and levels in the system. A taxonomy gives hierarchical order to the content, which itself is about attainment targets. Content in attainment targets should express required skill and transfer potential.

4.6.1 The S-SSAVE experiment

The objective and experiment on S-SSAVE (§ 2.3.3) resemble the aims for competency-based objectives, programmed links of school- and work-based program, to QS. The achievement of the aims had consequences for the structure and taxonomy of content. The S-SSAVE experiment was given as an example for change of SSAVE (ARVO, 1988b) and became the forerunner of the 2 year educational route of the IAE.

Structure

The S-SSAVE experiment was a try-out of an educational provision for students who had attended at least 10 years of full-time compulsory education, or reached the age of 16 years but did not qualify for entry to SSVE or lacked motivation for entry. The course was to provide the unemployed, unqualified and often unmotivated youngster with a triple qualification -

- for all students a general social qualification;

- for as many students as possible a vocational qualification;
- for the able students an entry qualification to SSVE.

S-SSAVE is a 2-year course, with the option of an extra entry year and also provision for early qualification in case the full qualification is attained within two years. There are no timetables and no subjects. The work-based program was 180 days duration. The school-based program has a standard structure - a basic program of 6 weeks, a vocational program specific to a particular occupation and a general social program compulsory for all courses.

Taxonomy

Programs were developed for 16 different courses, all at level 2 of the EU-levels (Table 4.1). The level was termed an 'Entry level', as it was regarded as the minimum qualification required for work in, for example, pig farming or flower arrangement. For each course there was a Program Review (Table 4.5) - a kind of educational profile.

Table 4.5: The model Program Review for S-SSAVE courses

Program Review for S-SSAVE course		
	vocational program and general social program	**themes:** 1. action structure x 2. action structure y 3. action structure z, etc.
status	**Program Unit (PU)**	**themes in program**
compulsory	Study object a	1, 3, 6
compulsory	Study object b	1, 3, 5
choice	Study object c, etc.	1, 2

The content of the Program Review was organised in Program Units (PU's). Any PU completed satisfactorily would carry a certificate. Some PU's were compulsory and others were optional.

For each PU, themes were supplied, which referred to a coherent set of action structures. This is a new element and can be seen as a forerunner of decontextualised educational objectives. Also a number of possible study subjects were mentioned. Themes and subjects together are the educational content of a PU.

Content

The description of educational content by means of themes and study objects is the same as attainment targets aimed at in the new QS for SSAVE.

An example from the Animal husbandry program review - the themes are feeding, caring, housing, breeding, milking, operating, managing, marketing, and so on. Study objects are dairy cattle I, dairy cattle II, calves and heifers, grassland and roughage, beef animals, sheep, service institutions. The combination of themes and study objects describes the content (LPC, 1989).

For an individual student's educational program, the teacher chooses a combination of study objects and themes. Tasks for school- and work-based learning are programmed. The program review is the legal reference for the amount of work required and content in the PU's.

The format of educational content in S-SSAVE meets many of the requirements for a responsive SSAVE. The choice of study study objects provides competency-based study. Themes are described as decontextualised action structures and- attainment levels. Program review, PU's and themes, however, are competence-based units of different size.

4.6.2 The modularization experiment for SSAVE

In the period 1988-1994, two schools worked on the modularization of SSAVE. The objective (§ 3.3.1) and experiment (§ 5.1.2) focus on the feasibility of the aims of flexible organisation and linking of school- and work-based programs by means of LTP and modularization.

Structure

The project applied to the 2-, 3- and 4-year courses in the educational route of SSAVE. Schools planned step by step the modularization of the program. The relationship between school- and work-based programs was to be formalised. A course would consist of 50-60 modules. The time for a module would depend on the pathway; students with more ability would spend less time on a module than students with less ability. For the same unit, the time allocated to a module would be 80 hours for the 2-year course, and 60 and 40 hours respectively for the 3- and 4-year course[30]. A module should have a constant qualification volume. Students would choose between modules provided by the school, and this would widen their choice considerably (Van den Broek, 1988).

Taxonomy

In a Discussion paper on Diplomas and Certificates (LNV, 1989d, § 5.2.1) for the development of the QS, outline proposals were used as the starting points for this project. In the experiment, so called educational profiles, units and attainment targets were used. Principles like commonality of full qualifications, integration of subject matter and use of electives and free time were discussed and tried.

Content

Attainment targets were applied as described in the Review Diplomas and Certificates.

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[30] A school year is approximately 1600 hours (40 weeks of 40 hours) so 40 hours per module in a 40-module school year. When 60 or 80 hours are allowed for less able students for the same educational content, then 26, 67 and 20 modules can be given in the school year (§ 6.1.4).

Modularization and LTP are powerful tools for responsive SSAVE; their application changes everything in the school. Thinking about the change takes a great deal of time and effort. The sentence 'When I drive in my second hand car, forget about the extra mortgage and close my eyes, I still get a whiff of my first automobile' (Bosch, 1994, p. 41) describes the conflicting ideals and the erosion of energy. An important outcome from the experiment was the realisation that modules must have a constant volume of content but may have a varying volume of time.

4.6.3 The Scottish National Certificate

The Scottish national certificate aims to meet the economic, social and governmental pressures for flexible VET. Flexibility is enhanced by one modularised catalogue for all VET. The National Certificate (NC) program from the second half of the 1980s, aimed to improve the flexibility of initial VET at levels comparable to Dutch SSAVE.

Structure

The NC replaced with 2,500 units called modules, all non-advanced VET courses. The NC has an agricultural education sector. The unit is the entire pathway. The hierarchy between units in strings (for those with a fixed sequence) was the only difference in levels in 1986. For timetabling purposes the standard unit is 40 hours.

Taxonomy

Nelson (1992) assigned NC-units to the NCVQ-levels[31] 1, 2 and 3, and only a few combinations of NC-units to NCVQ-level 4.

The unit descriptor (Table 4.6) is a mixture of a module and a unit; it serves to regularise the provision steering structure, the attuning of programs, and the organisation of learning. All the unit descriptors have the same layout and the same components.

In designing the National Certificate in 1986, the assumption was made that certificates showing a credit for an attained unit would meet the needs of employers, parents, students and teachers. This later became the Record of Education and Training (Scotvec, 1990), that has been introduced after contacts with employers who asked for a clearer statement of defined outcome. The document records the outcomes in education and training throughout an employee's career and may be seen as a kind of 'educational profile'. It also records 'Group course awards' where an individual has attained the modules required by a particular industry or other organisation.

Content

The objectives of the units in the National Certificate are -

- self-confidence, self-reliance and independence;

[31] NCVQ-levels are comparable with the UE-levels (Table 4.1).

- understanding of how to gain access to advice or information;
- knowledge and skills for future retraining (Scotvec, 1988).

The number of learning outcomes is 3-6 for a unit of 40 hours.

Table 4.6: The Scotvec unit descriptor (Scotvec, 1989 & 1990)

Reference number	This ensures that the correct module descriptor is being used.
Title	This gives a clear idea of what the module is about. It is the module title that appears on the student's certificate.
Purpose	This gives a clear guide to the general changes in the learner, which are to be brought about. An explanation is given of the uses for which the module was designed and the ways in which it can best be used in an educational or training programme. The target group for the module is also specified here.
Preferred entry level	This shows the level of previous achievement or experience without which it is likely that a student will have difficulty in successfully completing the module.
Learning Outcomes Performance Criteria	These specify clearly the key competencies that are to be accredited and to describe how satisfactory performance can be recognised.
Content/context	These give an indication to tutors of the range of contexts within which a module could be offered and the subject matter that would assist in the achievement of the Learning Outcomes.
Learning and teaching approaches	These suggest learning strategies that enable the Learning Outcomes to be achieved in student-centred, participating and practical ways.
Assessment procedures	These indicate the way in which the Learning Outcomes must be assessed and give a description of the level of performance which must be reached if the Performance Criteria are to be met.

The approach of modules and attainment targets in the 1998 Scottish development, could be followed to a large extent. The profile of the levels was considered to be too low for recognition by industry and for occupational choice.

The system fails to produce units, leads to fragmented curricula, does not attract socially weak target groups and may not have the same prestige value as a recognised qualification (Raffe, 1994). That is to say, a QS should be more than a description of outcomes.

4.6.4 Modularization in French agricultural education

Modularization and certification were designed to make French agricultural VET more flexible (Boisanté & Jouve, 1989). The Certificate d'Aptitude Professionel Agricole (CAPA), the Brevet d'Etudes Professionelles Agricoles (BEPA) and the Brevet de Technicien Agricole (BTA) cover the qualifications in the educational route of the Dutch SSAVE.

Structure

From general education, students enter from age 14 to CAPA, 15 to BEPA, and 16 to BTA. The courses take two years each and follow on in a line hierarchy.

The BTA-program is directed at three sectors - agricultural production, food processing, and distribution and commerce with 19, 5 and 6 full

qualifications respectively. An innovative program for BTA, started in 1985, has two goals - 1) the introduction of modules and 2) the establishment of diplomas which are partially based on continuous assessment during the course (*Loi n^{o} 84-579 du 9 juilet 1984*).

Taxonomy

The full qualifications of CAPA, BEPA and BTA compare with the levels 2, 3 and 4 respectively, of the EU-levels. In the BEPA course, each full qualification holds four components (out of 2190-2500 available hours) - six general units on languages, physics, social studies and mathematics (900 hours); three or four branch specific units in a specific professional field in one of three sectors such as biology, physics, economic and social studies (400 hours); five vocational units chosen from a national register (500-580 hours); and practical performance (350-500 hours). Units are separated and are described with a unit descriptor (Table 4.7).

Table 4.7: Key components of a DGER unit (DGER, 1989a, 1989b)

Module: general, Branch specific, or vocational	hours in subjects: biology : ... economy : ... etc.	hours in practice: production of .. : ... maintenance of ...: ...
GENERAL OBJECTIVE:		
OBJECTIVES	CONTENTS	PRACTICAL TASKS
1. Describe the exterior of an animal, identify and describe the main topics of anatomy 2. etc.	- skeleton, important parts of the body, limbs - remarks	- observation of animals, indicating of the parts in relation to the skeleton - remarks
Pedagogical recommendations	Examination requirements	

Content

The students' workload in units is specified in hours of subject matter and practical work. The unit descriptor for the BTA courses describes in an integrated way, objectives, and theoretical and practical tasks. The number of objectives varies from 2-8 for each 40 hours. The title 'contents' describes study subjects. Contents and practical tasks are described with 1-5 descriptions for each objective.

A survey provided the insight that the French approach supplies the needed complement to modularization which was missing in Scotland (LNV, 1989g). The prestige value of full qualifications is strong. The impression of visits to Lycée Agricoles was that most teaching remained as subject based lectures, possibly reinforced by subject time in the unit descriptor.

4.6.5 The German dual system

The German Dual system has the reputation of producing a competent work force and is the main supplier for the employment market (Van Lieshout,

1997). The Dual system has an agricultural sector and it was investigated in 1989 for comparison with the training route of SSAVE.

Structure

After completing their years of compulsory secondary education, the majority of young people in the Federal Republic of Germany enter the dual system of vocational training, a combination of work-based training and attendance at a part-time vocational school. The Federal Vocational Training Act *(§ 25 from the Berufsbildungsgesetz)* and Crafts Code *(§ 25 from the Handwerksordnung)* require the Federal Government to describe -

- the occupational image *(Berufsbild)*;
- the course duration of two to three years;
- occupational skills and knowledge *(Ausbildungsberufsbild)*;
- an outline teaching timetable for required skills and knowledge *(Rahmenlehrplan)*;
- the regulations for examination *(Prüfungsordnung)*.

Taxonomy

The regulatory mechanisms in Germany exclude a strong vertical differentiation of qualification levels such as can be found in other vocational training systems, e.g. in United Kingdom or the Netherlands (Reuling, 1994).
The *Rahmenlehrplan* describes a full qualification. The level of detail in the descriptions in the *Rahmenlehrplan* is approximately one sentence for a student's weekly workload (the range is one sentence for four weeks to two sentences for one week).

The key components for a *Rahmenlehrplan* are - the general overview of objectives from the *Ausbildungsberufsbild*, the precise description of objectives and the assignment of course weeks in the 1st, 2nd and 3rd year of the course (Table 4.8).

Table 4.8: Key components of the Rahmenlehrplan (BELF, 1991 and 1995)

	Ausbildungsberufsbild	From: arable farming	Weeks in the course		
No	Global description	required skills and knowledge	1st y	2nd y	3rd y
1	...	...	6		
2.	Technology and organisation of work, production and marketing in the enterprise				
2.1	Purpose and maintenance of machinery, tools and equipment	a) the selection, preparing for work and operation of equipment and use of material b) care and maintenance of machinery, tools and buildings	2		
2.2	...	...	2		

Content

The *Ausbildungsberufsbild* should describe requirements under not more than 5-7 headings, and when there are no subdivisions more headings are allowed (BBW, 1991).

The description of the required skills and knowledge and the duration of the course in the *Rahmenlehrplan,* are precise /specific descriptions of assigned tasks.

There is a broad range of pathways officially sanctioned for training under the dual system; young people can choose from among 380 different training occupations covering almost all sectors of the economy.

The Dual system has a strong work-based component. It makes the system dependent on available work places and is a good tool to solve allocation problems. The economic situation, however, determines for a generation the utilisation of qualifications (when economy changes one may not have the qualifications required in the work situation) (Van Lieshout, 1997).

The description of qualifications and organisation of the work-based component is based on rigid 1:1 relationships between occupations and qualifications. The practical consequence may be a personnel supply problem for new functions (it is not possible to find qualified employees in the employment market) and a qualification problem for new industries (people in service may not have the required qualifications). A dual system may be strong on required skills but is likely to fall short on transferability.

Conclusion on alternative technologies

The study of Dutch and foreign approaches of VET yielded alternative critical elements to meet the requirements of a responsive SSAVE.

The SSAVE requirements are an educational and a training route, several diploma levels (EG-TLS), modularization, clear educational profiles and unit descriptors, integration of subject matter and description of content with structured action structures (chapter 3, Table 4.2, Table 4.3). Consistency of these elements in structure, taxonomy and content is necessary for a clear systems approach.

The conclusion (Table 4.9) is that none of the available alternatives meet all the requirements. The unit descriptor was copied from Scotvec, but the Scottish unit lacks levels of awards. The French educational profile was an important example of defining full qualifications, but the reference to subjects rather than action structures was not acceptable. The French multilevel structure supported similar ideas in SSAVE. The German approach of occupations transformed into educational profiles and separate regulation of examinations was copied. The Dual system with one level was regarded as too rigid, it did not fit with the total Dutch structure and was not

competence-based in the school-based program. The S-SSAVE experiment provided a useful approach through attainment targets.

Table 4.9: Available critical elements from other systems in 1989

	structure	Taxonomy	content
S-SSAVE experiment[1]	educational route: **yes** training route: **no** diploma level: **1** modularization: **yes**	educational profile: **yes,** well developed unit descriptor: **yes,** well developed PU	integration: **yes** action structures: **yes**
Modularization experiment in SSAVE[1]	educational route: **yes** (training route: **yes**) diploma levels: **3** modularization: **yes,** with time differentiation to target groups;	educational profile: **yes** intended, no example unit descriptor: **yes** intended, no example	integration: **intended** action structures: **intended**
Scottish national certificate	educational route: **yes** (training route: **yes**) diploma levels: **no** modularization: **yes,** 40 hours	educational profile: **no** unit descriptor: **yes** extensive	integration: **yes** action structures: **no**
French modularization in agricultural education	educational route: **yes** (training route: **yes**) diploma levels: **3** modularization: **yes,** variable	educational profile: **yes,** standard structure unit descriptor: **yes** with large, variable units	integration: **yes**, with reference to weekly hours action structures: **no**
German Dual system	(educational route: **yes**) training route: **yes** diploma level: **1** modularization: **no,** time table	educational profile: **yes,** Ausbildungsberufsbild unit descriptor: **no,** Rahmenlehrplan	integration: **yes**, subjects in school-based program and description of skills in work-based program

[1] the experiments do not apply to the whole system of agricultural education.

Tools and components were available to achieve the aims of the policy. A design should be made with the S-SSAVE experiment providing the framework. Strong principles and provisions from other national and European approaches needed to be incorporated in the framework.

4.7 Firm targets

The first target is to develop a QS for a responsive SSAVE; second, the establishment of an information structure to feed and maintain the QS. With reference to requirements listed in Figure 4.2 and requirements generated in this chapter the critical success factors of the QS and the information structure are analysed below.

4.7.1 Targets for the QS

The QS is concerned with structure, taxonomy and content of educational objectives, and communicating the educational objectives at macro, meso and micro levels of SSAVE. A ‘defined outcome’ serves to communicate the socio-economic process of occupational development, the function of SSAVE in the knowledge network, the merger of schools and the legal

position of teachers. The firm targets with respect to QS are set against this background as follows.

The QS should communicate a defined outcome to

- link the information structure, the steering structure and the production structure;

the structure should -

- show through full qualifications the areas of study;
- accommodate educational and training routes;
- match tasks to schools to abilities of target groups;
- facilitate funding by reference to time allocation for programs;
- stimulate flexible up- and down streaming within the system;

the taxonomy should -

- be based on clear attainment levels and study subjects;
- start from the levels of the EU-levels;
- provide a hierarchy of full qualifications and units;
- describe educational profiles and unit descriptors;
- provide qualification for early school leavers;
- offer a tripartite qualification for working, learning and social life;
- provide entry to all target groups;
- have distinct content, program and attainments;

the content should -

- describe competence-based attainment targets;
- describe transfer potential;
- allow freedom of teaching method and choice of subjects by means of decontextualised action structures.

4.7.2 Targets for the information structure

First, the policy targets for the information structure are summarised. Then the issues the information structure deals with as listed in Figure 4.2 are placed in an information model.

The targets for the information structure

The information structure (Figure 3.3; 3.7 and 4.2) should develop three of the four areas identified in the information model -

- the transformation of occupational profiles into task profiles requires a standard procedure for qualifications required in jobs, and tasks, into formal qualifications for occupations and functions;
- the translation of functional action structures into educational action structures, and incorporating them into units and, thereby, into full qualifications;

- The unit content of full qualifications. The result is the description of the content of full qualifications within a model educational profile, through units with unit descriptors and attainment targets;

the schools are responsible for

- transformation of educational action structures into the study tasks of a curriculum.

The information structure provides a draft for the three identified areas for the definition of outcomes for SSAVE. The draft is the starting point for the steering structure to decide on educational provision, assignment of tasks to schools, funding and quality control. The decision of the minister results in a Review Diplomas and Certificates which is the starting point for schools. The management in schools decides on the composition of modularised programs. Teachers will develop and apply global and firm study tasks assessments.

The information model

The Dutch model for the innovation of curricula in the 1980s was based on the idea that occupational profiles give the best possible information about desirable attainment targets and that occupational profiles are transformed into educational profiles to serve as attainment targets. The description of occupational profiles (the identification problem), the translation into educational profiles (the translation problem), and the achievement of outcomes in education (the participation problem) are seen as a common problem of industry, schools and government (O&W, 1986).

The Dutch model presupposes exclusive relations between courses and occupations, predictive value of employment market information, stability of required qualifications in businesses, superiority of technological qualifications and superiority of qualifications gained in schools. The approach is based on planning and control rather than change and flexibility. Van Hoof and Dronkers (1980) call it a naive model. The available methods[32] for identification and translation have weak points and are not able to refute convincingly criticism of the naivety of the model (Brandsma, 1993). It is observed that occupational profiles in agriculture can yield very one-sided views on contextual demand (Annex 5.2) and there should be a deliberate policy of using multiple sources and methods. That is why the approach to contextual change and articulation of external demand have been adapted.

The first phase for the interpretation of contextual change, is a model for the development of educational profiles as described by Van Rienen (1983) and modified by Nijhof (1984, 1997), Brandsma (1993), Moerkamp &

[32] The two methods compared by Brandsma, are curriculum conferences (§ 6.1.1) and the occupational analysis in the Mantelproject (§ 6.1.3).

Onstenk (1991), and Nieuwenhuis (1993). The model provides most of the macro descriptors for the transformation of contextual change into a curriculum.

The second phase is the transformation, in four steps, of required qualification into attainment targets as summarised in Table 3.5. This approach to the relationship between contextual change and the concept of competence-based education provided a coherent set of definitions, relationships and detailed responses to act as micro descriptors and curriculum organisers.

The third phase brings in policy aims (Figure 4.4). One component, the competency-based objectives can be achieved through input via the task profile. Transferability, the other policy aim, can be added via the study profile.

The different approaches are combined in an information model (Figure 4.5). The line of thinking is as follows.

	macro descriptors	micro descriptors	curriculum organisers	civil effects
	occupational profile	operational action structures	required qualification	job & task
	social profile study profile task profile	operational action structures	formal qualification	occupation & function
occupational image	qualification profile	taxonomy for titles	full qualification & unit	diploma & certificate
	model educational profile	interfaces & educational action structures	educational profile & unit descriptor; block & attainment target	
	competence-based curriculum	central acts	modularised program & (model) module & concrete study task	

Figure 4.5: Information model for competence-based education

Jobs and tasks indicate occupations and functions. This information is described through operational action structures and leads to a task profile.

The combination of information from task profiles, study profiles and social profiles may yield a qualification profile for a triple qualification. The educational objectives in qualification profiles are described through units and full qualifications. The civil effect of – the award for a full qualification is a Diploma and for a unit a Certificate.

Full qualifications are built up from Units with model educational profiles. Units, which have Blocks within a unit descriptor, are grouped into Blocks with 5 Attainment targets for timetabling purposes. Students are awarded with a credit when they attain a Block.

The QS is the staring point for the development of curricula. The educational profile provides the global information for a modularised program; a modularised program consists of modules.

The information model is a formal reconstruction of transformations leading to the definition of outcomes for SSAVE. The model is not meant to plan and control processes, but to identify products to be communicated between information and steering bodies, and production structure. This is in line with the requirements for steering, managing and organising a responsive system (De Sitter, 1994).

Once a system for a competence-based SSAVE is established and implemented, further development, processing and modifying the information will be one and the same process. In a responsive system, the dynamics of the context, the interference in time, places and situations will invite, time and again, reconsideration of the inputs, processes and outputs of the continuous learning process as laid down in this information model.

The information structure should articulate operational action structures as a consequence of contextual change and transform these action structures into educational action structures in the form of attainment targets, classified with model educational profiles and unit descriptors. The information structure should help to facilitate processes of national and regional policy development to be effective.

4.8 Conclusions about the policy on change of SSAVE

The policy design encompasses the order, aims, policy theory, proposed developments and instruments to implement them. At the end of this chapter the conclusions are summarised and the consequences explored.

4.8.1 The policy model for SSAVE

A policy ought to be based on analysis of cause and effect and should conclude with proposals that effect the means of reaching policy aims. The set of aims, goals, means and preconditions for developments are summarised in the policy model (Figure 4.6).

The systems means – competence-based clearly defined outcomes – support the aims of the system - transferability of qualified school leavers. The QS contains clearly defined outcomes. The QS cannot function on its own and needs the support of several developments running in parallel, for example the merging of schools, lump sum funding, dualisation of pathways, an open legal status of teachers and a quality control system. The parallel developments are established to increase the freedom of schools for strategy and flexibility.

The QS describes and classifies competence-based attainment targets that form the basis for a high level of transferability of qualified school leavers.

The QS needs to be used for steering and should enhance tuning of programs to specific needs.

The QS has an information and communicating function at meso and micro level (the task organisation). The school should have the flexibility to follow the dynamics of occupational development in the region, to offer pathways and qualifications that fit target groups, and to apply forms of competence-based learning.

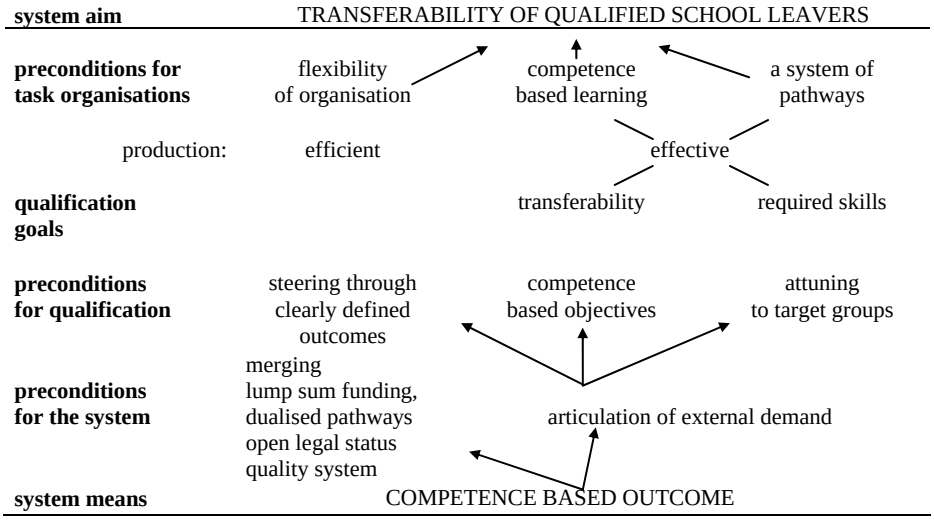

Figure 4.6: Policy model for a responsive system of SSAVE

In 1989, educational change was one of five developments, together with new legislation, merger of schools, lump sum funding and management. The flow chart on educational change (Figure 4.7) in the Discussion Paper on Diplomas and Certificates (LNV, 1989d; § 5.2.1) - a conceptual view at the start of the design of the new QS - is quite different from the reconstructed policy model. The flow chart has no cause/effect analysis and no aims/preconditions/means hypothesis; it is just about means of achieving the desired endpoints.

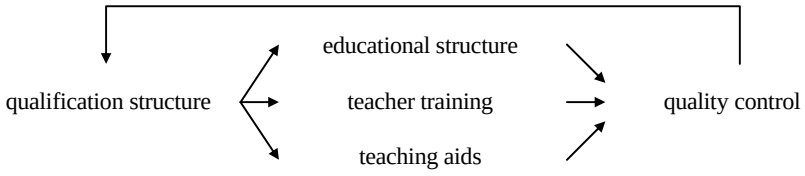

Figure 4.7: Flow chart for educational development (LNV, 1989d, p. 1)

The flow chart is about change of the system, but not about a systems change. The flow chart shows what the Minister of Agriculture wants to

achieve in the system and it is not about the creation of preconditions for development of responsive SSAVE.

There is a principle difference between the two models. The original flow chart shows how sections fit together and has a degree of engineering. The reconstructed policy model represents a new view on aims and steering of SSAVE and, in general, for VE. It provides criteria in the form of preconditions no matter what further contextual changes occur. This comment means also that at the start of the development of the new QS for SSAVE considerable steering information was hidden or absent.

In 1989, much emphasis was laid on competence-based learning and problem solving. It is likely that this emphasis provided a starting point for the description of attainment targets. For example the change of an attainment target into a how-question (§ 6.3.3).

It is now believed that the change from subject-based SSAVE into competence-based SSAVE is likely to be a free-standing development more or less self-governing. Therefore, given the QS, the question is not whether schools participate; the question is how do schools participate.

4.8.2 Final conclusions

The policy order from 1988 aims to improve the contribution of VET to economic recovery and innovation and the school-to-work transition. The policy order has been interpreted and a policy model is the result. ‘What are the consequences of the model?’

The essence of the preconditions for change is the provision of a clear definition of outcomes (Figure 4.6). A new classification is needed to interpret the permanent nature and high speed of occupational change. Attainment targets need to be made competence-based.

Competence-based objectives need to be the basis for all pathways and target groups. They are meaningful in their application and are valid irrespective of institution, or how they have been achieved. Looked at the other way, no pathway or target group can exclude incorporating qualifying objectives.

The competence-based objectives are described using attainment targets in a QS. The QS provides definitions of outcomes to the system and leaves the accreditation for prior learning to the schools. Outcomes are the basis for qualification of students. Responsive SSAVE needs non-distorted, non-self-referential educational goals and no implicit process criteria and preconditions, but clear outcomes that go along with a flexible organisation.

The QS, as proposed by Wagner (1984), described by the ARVO (1989a), introduced by Nijhof and Streumer (1994b) and laid down in legislation, is thought to be a realistic and negotiable goal.

The description and reconstruction of the policy on the design of a responsive SSAVE, answered vital 'why' questions in a sequence of aims/goals, preconditions, and methods. The next chapters are a reconstruction of the 'how' and 'what' of design and development. The issues are

- the institutionalisation of functions for the information structure
- the structure, taxonomy and content of the QS.

The problem is to achieve a consistent outcome, while keeping within the policy of creating a social basis for fundamental change, and to prepare the system for implementation of new tasks.

5. Designing the Information Structure for SSAVE

An information structure and a QS are the means of creating a responsive SSAVE (§ 3.5.1, § 4.1.7 & # 4.7). This chapter is about the information structure and chapter 6 is about the QS. The absence of models for the design and development of the two elements is the problem (# 2.4 & # 4.6).

This chapter focuses on a description and analysis of observed transactions to create an information structure for a responsive SSAVE (Figure 5.1).

description matrix			**judgement matrix**	
intents	**observations**		**standards**	**judgements**
articulated demand	policy plan	**antecedents**	-	-
shared responsibility	information structure	**transactions**	-	-
transfer potential of national objectives; flexibility of organisation	qualification structure	**outcomes**	qualifications with transfer potential; efficient & effective pathways	T T

Figure 5.1: The research area (shaded)

The structure of the chapter and aspects of knowledge creation will be introduced below. Then a summary is given of the requirements for the information structure.

Structure of the chapter

To structure the chapter and because of the absence of a model for design and development, a succession of four short cycles has been chosen to describe the build up of knowledge and the improvement of the product. Reconstruction of these phases shows a pre-change phase, a process phase, a project phase and institutionalisation of new functions. In the phases the design of the new information structure becomes more distinct step by step.

In the pre-change phase the problem is not defined and initiatives are not co-ordinated from a systems point of view. In the process phase the problem is defined and the objectives become visible. In the project phase the objectives are defined, a product is made and the methods and procedures become clear. At institutionalisation the new functions are assigned to organisation. At the end of each phase the progress on these points will be evaluated.

Aspects of knowledge creation

Each of the four phases has some cycles of knowledge creation. Two dimensions, sociological and epistemological, are important in describing knowledge creation (Nonaka & Takeuchi, 1995). The sociological dimension is about the ‘who’ aspect of knowledge - a person, a group or a system may

'carry' knowledge. In a strict sense, knowledge is created only by individuals and in one way or another knowledge may be transferred and crystallised as part of an information network.

The epistemological dimension is about the nature of human knowledge. Knowledge may be 'tacit', context-specific and therefore hard to formalise and communicate. Knowledge may be 'explicit', classified and transmissible with systematic language (Nonaka & Takeuchi, 1995). The sociological[33] and the epistemological dimensions[2] help to describe gathering of knowledge and also the development of the information structure.

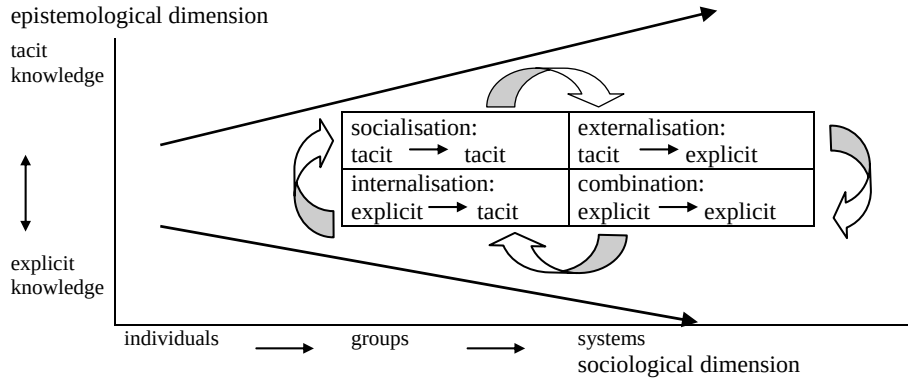

Figure 5.2: Modes of knowledge creation (Nonaka & Takeuchi, 1995, pp. 57-73)

The epistemological dimension is determined by four modes for transmitting information. Socialisation is a process of sharing experiences and therefore creation of tacit knowledge such as shared mental models and technical skills. Externalisation is a process of articulating tacit knowledge into explicit concepts. Combination is a process of systematising concepts into a knowledge system; it includes combining different bodies of explicit knowledge. Internalisation is a process of embodying explicit knowledge into tacit knowledge, for example learning by doing. In the sociological dimension, the four modes may take account of the knowledge, not only of individuals, but also of groups and systems (Nonaka & Takeuchi, 1995). The sociological and epistemological dimensions develop simultaneously, in a sequence of phases (Figure 5.2).

Requirements on the information structure

[33] Nonaka & Takeuchi (1995) use the term 'ontological' dimension to highlight the 'process that 'organisationally' amplifies the knowledge created by individuals and crystallises it as a part of the knowledge network of the organisation'; in this sense it is (against a background of properties of existence) the sociological dimension that matters.

At the start of the information build-up the requirements of the new information structure were unknown. They are now available from -

- reconstruction's of policy plan (§ 4.7.2);
- experiences in SSAVE (# 2.3) and theory (# 2.4);
- the model of a responsive SSAVE (chapter 3);
- requirements of the new QS (# 4.7.1).

The policy aims to establish three processes -

- translation of contextual changes into articulated demand;
- transformation of demand into clear qualifications;
- break down of qualifications into operational attainment targets.

The information structure should -

- be independent of institutional structures;
- be supported by commerce and industry, schools and government;
- have influence within the educational system;
- improve the school-to-work transition;
- respond to the permanent nature of contextual change.

The information structure should yield a QS with a -

- structure - linking levels and pathways, improving up- and down streaming, and providing a basis for funding;
- taxonomy - providing a hierarchy of competencies, triple qualification and entry to all target groups;
- content - describing competencies and transfer potential allowing for electives.

The aims of the four phases, the modes in the knowledge creation and the requirements on information structure (and QS) provide criteria to evaluate the process.

5.1 Pre-change phase: exploring an undefined problem

In the first phase, SSAVE displayed initiatives, uncoordinated at the systems level, to deal with contextual changes and changes in VET. A reconstruction showed that SSAVE headed towards one provider of all pathways, a coherent concept for qualification and competence based learning. Two more initiatives are described to conclude the pre-change phase.

5.1.1 Occupational analysis provides new information

In response to the Wagner recommendations (§ 2.2.1) and the change of the law governing SE (Table 2.1), Dutch VET started projects for analysis of occupational development to produce occupational profiles. The Minister of Agriculture decided in 1986 to fund a similar project for SSAVE (Beroepen-Analyse in de Agrarische Sector - BAAS). The Agricultural industry did not fund this research in spite of Wagners' explaining the advantages to the industry. The results of BAAS were expected to contribute to the quality, development and change in courses and their assignment to schools.

BAAS's surveys were based on the Mantelproject method and meant to obtain data about jobs (Westerhuis, 1987). The operational levels and task areas of occupational activities were collected and identified with representatives from commerce and industry. In the survey the importance and frequency of activities are recorded, and possible future developments are identified within the branch of industry under consideration. The occupational profiles produced by BAAS were based on statistical cluster analysis and are summarised in Annex 5.1.

BAAS started its work well ahead of preparations for a QS.

The policy administrators in the ministry of agriculture were at the time not aware of the criticism on occupational profiles (§ 2.3.2 & 4.3.2), but as SSAVE is a component of a larger information network and for intuitive reasons, many other sources were available and used, together with the occupational profile (see § 5.2.2). The occupational profiles provided a contribution to the taxonomy of qualifications (§ 6.2.1) and definition of content (# 6.3) in SSAVE. Occupational development and analysis of processes were combined to interpret occupational development (Annex 5.2). The use of multiple sources is an example of collecting information from task profiles, social profiles and study profiles for new educational content (see Figure 4.8).

The two processes described above can be seen as new modes of knowledge creation in SSAVE. Occupational analysis is one process and a form of externalisation - BAAS turned tacit knowledge on occupational developments into facts. A second process and a form of combination are the use of occupational profiles and process analysis for educational objectives by policy administrators. Factual information from several sources is transformed and classified into new facts. The two modes described here were not connected in 1988 and not yet an integrated part of a knowledge system, and of policy development and regional policy in a system of responsive SSAVE (Figure 3.8).

5.1.2 An initiative to modularise two schools

Many schools in SSAVE considered modularization to improve the educational performance. After the conference on modularization for SSAVE (§ 3.3.2), everyone was aware of the risks involved in the project and the required effort. More than a year elapsed before a project started with two schools. The schools, the educational support institutions and the Minister of Agriculture agreed about a project definition in December 1988 (Van den Broek, 1988).

The three identified and assigned vital functions. Targets for structure, taxonomy and content were set, by and large as in the summary in § 4.7.1. Qualifications would be described with action structures and based on occupational profiles. The units would have a constant volume but variable time to accommodate target groups with different abilities. In co-operation

with the Core Committees, the Minister of Agriculture would provide a taxonomy of units. The concept of the new QS was to be available in spring of 1989.

The schools were to plan systematically the modularization of the school program. At the start, the project would cater for at least the SSAVE-B route. The schools would construct modules and offer them in a flexible way throughout the school year. A course would consist of 50-60 modules (Van den Broek, 1988).

The support institutions would organise specific teacher training and technical support for the project schools. Competence based learning would be applied to link the school- and work-based program. Self-reliance of students was to be an important educational objective and they should be responsible for their own learning. Students would have electives, whenever the resources of the school made this possible. The student would contract for each unit. Units are to be completed with exemptive assessments.

In the period 1988-1994, the schools worked on the principle of modularization in SSAVE. In August 1990 when the QS was conditionally approved, the two schools decided to take an extra year for the development and organisation of the modular system. Experience gained by the project schools was used by the educational support institutions to inform other IAE's. Processes in the schools, i.e. for new teaching methods and school organisation, took more time than expected. Views on the form and organisation of assessments differed because of different teaching methods. Recording of students' progress required automation (Bosch, 1994).

There is a dialogue between steering and production structures to improve the flexibility of organisation. One may recognise the start of a body of knowledge around a component for responsive system for SSAVE.

5.1.3 Initiatives and functions in the pre-change phase

The new occupational analysis to articulate external demand and the modularization of the curriculum in schools as described above are aspects of systems change and initiatives that become vital functions of a responsive SSAVE. What has been learned in this phase?

After the Minister of Education, the Minister of Agriculture carried out occupational analysis. The aim however was of reactive nature; it was to understand the occupational dynamics in order to restore the 1:1 relationship between occupation and a qualification. With a new perspective occupational analysis became one of the inputs to the QS. The work on modularization of programs in SSAVE is a proactive activity of schools, to improve the organisation and teaching methods. The aim as yet was not to provide in a flexible way for all target groups. Modularization was not yet seen as a systems approach to establish flexibility in schools.

Although these developments fit the model for responsive change, it does not mean that there was already an organised systemic change towards a responsive SSAVE. At this stage of the process the ministry of agriculture was the only common factor in all the new areas of activity. Knowledge creation is evident in the processes, but not at the systems level.

The initiatives were instrumental rather than structural; problems at the system level were not investigated. At this stage, the relationships between the problems were not recognised and there was no systems approach to them[34]. Gathering information for a responsive SSAVE was fragmented.

In the pre-change phase, feelings rather than conclusions govern discussions. Threats and opportunities, destruction and creation are perceived differently. This crucial phase of gathering information requires a climate encouraging exchange of tacit knowledge about vulnerable new ideas.

5.2 Process phase: the setting of targets

This section describes the process phase in which the problem of a responsive SSAVE is identified and defined. The start of the QS development was in spring 1989, when schools in the modularization project needed a structure for the taxonomy of units. A design of a QS for whole SSAVE was made quickly (Discussion Paper Diplomas and Certificates; LNV, 1989d). Then a draft of the QS was developed (Advice Diplomas and Certificates; LNV, 1990a). The process phase will focus on the formulation of the problem and the dissemination of the perception of the problem.

5.2.1 A Working Group on the Discussion Paper DC

Immediately after the start of the modularization project in December 1988, the Minister of Agriculture appointed a Working Group to design a structure for the taxonomy of units.

Modularization of the educational route would have consequences for many in SSAVE, so a broad network needed to be established. For that reason, the Minister of Agriculture invited two directors of national apprenticeship schemes to join in. A director of agricultural teacher training and in-service teacher training (STOAS) and a senior advisor from a national educational advisory centre (educational support based on the new concept) were given seats in the Working Group. At that time the educational route had no national representatives; many schools were state schools. Two inspectors from the ministry of agriculture led the Working Group. In December 1988, the group discussed a proposal from the ministry, based on the requirements in § 5.1.2, and produced an outline for the QS.

A new political element was the termination of a billion-dollar investment support scheme for industry in January 1989. The state reinvested part

[34] There were more initiatives than described here. A summary of aims has been listed in Annex 1.2 and examples were described in # 2.3.

of the money in the development of apprenticeship schemes. The field of SSAVE decided to develop advanced courses. Therefore, the new QS would need to classify qualifications at all levels for the apprenticeship scheme. The Working Group presented an outline for the structure, taxonomy and content for the advanced courses at the start of the project in March 1989. The outline was the draft for the Discussion Paper Diplomas and Certificates in June 1989.

The development of IAE's and the progress of national legislation for SSVE reinforced the need for an educational concept for the whole IAE. In May 1989, the Minister of Agriculture clarified in a letter to the field of agricultural education (LNV, 1989b) that the result of the Working Group would recommend a national QS for SSAVE.

The draft of the QS was given a public airing on several occasions. It was presented for the first time at a conference for Core Committees in January 1989 (LNV, 1989a). In the conference the Minister of Agriculture proposed that members of all Core Committees would join in a national project to write down objectives. At this stage, the Working Group released fortnightly drafts for negotiation in a variety of meetings with teachers, competent authorities, trade unions, industry, and policy administrators. These drafts were copied extensively. Over a dozen versions were circulated in the field of agricultural education. At this stage the Working Group made a set of 35 multiple choice questions as an introduction to the policy questions.

One agricultural school applied to try out the draft in an SSAVE-B experiment in 1989-1990, and the Minister of Agriculture agreed the application. An initiator from this school was to utilise the experiences from the project in later years as an executive of IAE's. In 1990 he made 'Qualification Planner', a game to simulate choosing a group of modules for a student, which was used as an introduction on many occasions.

Organisational approach

'The organisation of the QS in SSAVE is technocratic and top-down driven' (Hövels, Nieuwenhuis, Kraayvanger & Le Rütte, 1995, p. 29). This fact is partly inevitable (Van den Berg & Vandenberghe, 1984 and 1995), but at the same time a risk when attempting to bring about changes in teachers. Why was a top-down and technocratic approach chosen and what was done to motivate teachers to accept the changes?

The top-down initiative is motivated by experiences from the SSAVE-B project and the S-SSAVE experiment. Two points were decisive. First, initiatives at micro and meso levels fail when the steering at macro level does not encourage change at micro level. A systems change needed to be made and that is in the first place a responsibility at macro level (APVO-2, 1987a, p. 62 & 71).

Secondly, it appeared to be difficult to transfer tacit knowledge about teaching of qualifications. Explanations and negotiations would not work. Instead of negotiations, conditions should make a desired educational change attractive; a classified system of qualification at macro level, a QS is such a condition.

Explanation and account of the change at macro level, however, would not be sufficient to bring about the desired changes at micro level for a responsive SSAVE (§ 4.2.2). On top of traditional meetings, people at all levels and from all institutions needed to be involved in discussion. This was difficult to organise. The secretaries of educational committees from commerce and industry for example were not prepared to join in the organisation of curriculum conferences. At the same time everyone wanted (to be asked) to participate in everything. The members of the Working Group had difficulty in moving from traditional roles.

The inspectors in the ministry of agriculture organised meetings with experts to make technological progress and with representatives in the field of education and industry to discuss the desirable change. The conclusion is that in this stage push with external information outweighed the socialisation process. Relevant questions were difficult to formulate and to address without a really responsive system. Not only the initiators in the ministry, but also those in the field of education and industry suffered from the lack of a model or even a concept of a responsive system.

The tradition in SSAVE that 'teachers render service to teachers' was used to start a new knowledge creation process. As part of the philosophy, teachers participated in increasing numbers in the subsequent development phases. Transformation in the repeated phases and participation in the process gave to many the opportunities to develop ideas at their own pace. In that way the network enlarged, the knowledge increased, and the QS could be developed. In retrospect the conclusion is that each phase developed the epistemological and sociological dimensions of a responsive SSAVE.

Advice from ARVO

The Advisory Council for Secondary Education (ARVO[35]) advised on the development of IAE's and the QS (Remmers & Van der Pluijm, 1991, p. 30). The members of ARVO used to be sparring partners for the policy makers in the ministry of agriculture. A tempting concept was to make one system for curriculum development, educational change and examination programs for Dutch further education (APVO-2, 1986, p. 20), and apply it to junior and senior secondary agricultural education (JSAVE and SSAVE); but this idea could not be contemplated in 1986.

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[35] The structure of the ARVO changed quite often over ten years, the predecessor was APVO-2 and the successor ARO.

ARVO (1989a, p. 5) recommended a new QS to deal with the growing numbers of unqualified school leavers, the loss of time and motivation of students at changing streams or courses, and the rapid change in occupations. The new QS was to be based on units instead of school subjects. The content of units was to refer to precise skills in a practical context and not solely to technical knowledge. Education, and commerce and industry were to come together to discuss the desired qualifications. Units for up- and down-streaming should have the approval of Higher Agricultural Education (HEA).

One of the most striking recommendations of ARVO (1989a, p. 19) on the new QS was that 'Assessments should not focus on reproduction of knowledge and abilities, but instead, stress the application of these to real problems.'

With the issue on the 26th of June 1989 of the Discussion paper on Diplomas and Certificates (Discussion paper DC; LNV, 1989d), the Minister of Agriculture focussed on a QS. This was a solution centred, rather than a problem centred focus. A theory and policy basis as reconstructed in chapter 3 and 4 was not available, and consequently no policy theory was given in the Discussion Paper DC.

The proposal was not intended to be decisive. For the validation of the concept the Minister of Agriculture called a number of conferences. Another concession was that the new QS should enable modularised or subject matter organised curricula.

In retrospect the conclusion is that the escapes were about optimising the solution and not about alternative definitions of problems or other solutions. The different systems in surrounding European states (# 4.6), which could have provided as many options for example, were not discussed in the field of education before the release of Discussion paper DC.

A poor excuse for the naive presentation was pressure of time. The risks of hasty educational change and modularization were known and had been discussed in a conference (§ 3.3.1; Lavi 1987d). A good reason was based on experiences with educational change for example in S-SSAVE and SSAVE-B that the required change was difficult to transfer. A second good reason was the powerful and consistent series of ARVO advice. So in retrospect, the Discussion paper on DC focused the gathering of information on the ultimate outcome of SSAVE.

With the Discussion paper on DC, preconditions for the process such as qualifications, modularization and competence based learning in all pathways of SSAVE were given. This is exactly what should have happened according to theory (chapter 2), model (chapter 3), policy design (chapter 4) and process design (Nonaka & Takeuchi, 1995).

In reality, however, theory, steering model, policy design and knowledge creation were not clear concepts and were not explained. What was explained was that in the tradition of SSAVE, all would get the opportunity

to participate (LNV, 1989b). The field of agricultural education understood that frequent meetings and thorough support, as for example in the SSAVE-B project, for procedures and pedagogy, dragged on, rather than speeded up the desired development.

Nevertheless, the consequence was a shock - this time the focus was on firm, competence based educational objectives, the work to be done in short phases, in every phase at systems level new ideas would be collected from everyone and wound up with a selection of 'bright boys and girls'.

In retrospect the Minister of Agriculture, the field of SSAVE and educational science (Hövels et al, 1995) concluded that at this stage of the process the development of the sociological dimension of the new QS was insufficient.

More available time, however, could have opened the door for repeated and fruitless negotiation of old positions. The approach of the Minister of Agriculture was risky, but possibly the best at the time.

5.2.2 Working Groups and Consultancy Groups

As a first step, the Discussion Paper DC presented the design for a new QS. Validation and development of the design were the next step (LNV, 1989b). In the summer of 1989, the Minister of Agriculture appointed two Working Groups with experts and six Consultancy Groups with stakeholders to work on the two aspects. In spring 1990, the result was presented in the Advice on Diplomas and Certificates 1990 (Advice DC '90; LNV, 1990a).

'What did this do to spread awareness of the new QS and for the design of the information structure?'

Group of 30 & Group of 4

The groups had to validate and develop the design for the QS. Development meant collecting and transforming content (Table 3.8).

Group of 30 organised seven curriculum conferences, discussed the structure and taxonomy, and collected information for new objectives in the Advice DC '90. The 30 spent one day a week and most were SSAVE teachers experienced in the Core Committees.

The complement, two experienced teachers and two university trained education experts in the full time Group of 4, prepared and processed the work of the Group of 30.

From July 1989 till March 1990, the Group of 4 and the Group of 30 were guided by a Project Group (mainly members of the Working Group on the Discussion Paper DC). A representative of the Minister of Agriculture chaired the Project Group. The Discussion Paper DC and a process plan (LNV, 1989e) were starting points.

Group of 4 and a representative of the Minister of Agriculture consulted, regularly every three months, four specialist organisations to receive a

multiform feed back. The organisations were a division on curriculum development (University of Twente), the Agricultural Education Division of the ministry, a division on agricultural education (Wageningen Agricultural University), and a test-developing unit (CITO). Content and focus of the feed back differed. The Wageningen University representatives highlighted the need to preserve the format of attainments and the unique value of SSAVE. The University of Twente focused on teaching technology and systemic change. The Agricultural Education Division in the ministry of agriculture had difficulty with the change of educational administration and asked for justification. CITO tried to avoid differences in approach and aims between SSAVE and SSVE.

The organisation of the feed back with experts - in fact externalisation of experiences and combination of explicit knowledge - was, together with the curriculum conferences, the validation of the design.

Group of 30 and 4 started with the organisation of seven curriculum conferences. After that, the work focused on collection of content for the Advice DC '90. The content was generated from all sorts of sources and this heterogeneous content was partly generalised and transformed into attainment targets (§ 5.2.3). The Minister of Agriculture was determined to publish an issue of the QS before the end of February 1990 for use in project schools in August 1990.

Group of 4 and Group of 30 were not satisfied with the intermediate results and heavily criticised the pressure on the process (Group of 30, 1990). The collection of objectives was not completed and the transformation of objectives had only just started. Nevertheless, the process needed a new phase of development to add implementation criteria to the process.

Dissatisfaction with the process and imperfections in the advice did not detract from the fact that the Groups completed a development phase and produced the first detailed QS.

Consultancy Groups and curriculum conferences

Formal validation of the work of Groups of 4 and 30 was organised through feed back from Consultancy Groups. This was an opportunity to contribute to the development of a responsive SSAVE.

The Minister of Education established BOOB's (bodies for Branch Consultation between Education and Industry). For his sector, the Minister of Agriculture appointed Consultancy Groups in analogy of BOOB's. The aims of the Consultancy Groups changed over a short period. In the announcement at the end of '86, Consultancy Groups were supposed to construct and confirm educational profiles. Educational profiles in traditional subject based education, were to provide a basis for educational programs designed by schools and for examination programs concluded by the Minister of Agriculture.

Then, in March '88, the aim of Consultancy Groups was for representatives from education, industry and the ministry to discuss information about task, study and social profiles, and approve the construction of educational profiles and attainment targets. In the autumn of '89, the six Consultancy Groups that covered the new divisions of SSAVE had been installed and a curriculum conference was the first major event. The Consultancy Groups developed expertise and validation power from there on.

The ARVO (1989b, p. 4 & 6) advised Consultancy Groups to discuss the BAAS' occupational analysis and to organise curriculum conferences with Core Committees. The work of the Consultancy Groups[36] has been a matter of trial and error. The curriculum conference for example, should be a group deliberation process in which the content of an educational profile is identified and justified. The input is an information document that describes either the occupation or the curriculum domain that is being discussed. In a discussion that is ruled by rational argumentation and based on the information document, the conference participants have to reach consensus about the educational profile (Frey, 1983; Brandsma & Nijhof, 1989).

The first curriculum conference was held to validate the design of the QS, the procedures to be followed by the minister, and experts to be invited for curriculum conferences on content (LNV, 1989b). Interest groups wished to send large delegations. Such large groups would change the curriculum conferences from expert meetings into information sessions and promotion of interests. It was impossible to limit participation. Necessary deepening of ideas was under threat. To overcome the complication, Group of 4 and Group of 30 organised a couple of weeks before each of the conferences a preparatory meeting with experts to prioritise issues and check the content of conference documents.

The conference concluded that in the future more responsibility for articulation of demand should be given to industry and field of education. The field of education questioned the expertise invited for the specific conferences. The proposed new structure and levels of SSAVE, however, received broad support. The time allocated to compulsory units in courses had little support (industry wanted a larger compulsory component and schools desired more freedom). The decision about the relation between competence based units and subject matter as such was moved to the specific curriculum conferences.

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[36] In the course of time organisation changed. The first two years the Consultancy Groups were chaired by a representative from the Minister of Agriculture, from 1991 onwards a representative from the agricultural industry chaired the quarterly meetings. Consultancy Groups ended their activities after the publication of the Advice DC '94 in spring of 1995. Then the sector commissions of LOBAS took over their function.

The participation for the six specific curriculum conferences was moderate and the conferences passed on important content to the Advice DC '90. Some of the results are summarised in Annex 5.3.

The second activity of the Consultancy Groups was discussing the Advice DC '90 and suggesting change of structure, taxonomy and content. These were used in the Inspectors' Review described below.

Validation by the Educational Council (EdCo)

Between 1919 and 1997[37], the EdCo provided independent validation on all educational legislation, to be sent by the minister to the parliament.

The EdCo also studied the Discussion paper DC '89 and recommended sharper definitions for the QS and suggested new definitions. In 1990, the council advised that no educational experiments based on the first Advice DC '90 should be started. Then, in January '91 the EdCo reported that the Advice DC '92 made considerable changes and improvements on the first Advice DC '90. On the same occasion it repeated the need to link funding for schools to the new qualification system. It advised developing learning aids specifically for target groups with similar attainment targets. It demanded the establishment of a level 1 full qualification; stressed the need to link programs for certain target groups. It also supported the development of joint units for the JSAVE full qualification as the basis of the QS, with differentiation of compulsory course weeks in IPC's.

In 1993, the EdCo was clear about most of the new full qualifications. It criticised the division on 'horse breeding'; the similarity with other animal husbandry was too obvious. It drew attention to the need for a well-regulated assessment system. The EdCo welcomed the increase in the number of electives in the educational profiles of the training route.

In 1994, the EdCo warned against frequent changes in the QS, especially when these changes are through failure to plan ahead. Changes put pressures on teaching and school administration.

Further advice about the Advice DC '90

But the EdCo was not the only agency that validated the 1st Advice DC '90, prepared by experts and Consultancy Groups. The Advice was also sent to the representative bodies from schools and industry, to the three national bodies for agricultural apprenticeship schemes, Core Committees and other interested parties in the field of agricultural education. The advice in different stages has been summarised in Table 5.2.

Fifty-three responses on the 1st Advice DC were received before June 1990 from the field of SSAVE and from commerce and industry. The reactions added to the body of knowledge, demanded enlightenment of the

[37] From January 1997 onward the EdCo and the ARO (§ 5.2.1) were combined.

design and added to the grave criticism by Group of 4 and Group 30 mentioned before.

Table 5.2: Advice on design and development of the QS

advice from: ARVO			EdCo and curriculum conferences	four specialist bodies	EdCo, Inspection, schools, industry, SALVO[38], etc.
phases:					
design	input: advice	process: Working Group	result in July 1989: Discussion Paper DC		
development			input:	process:	result in:
1st cycle			Discussion Paper DC	Group 30 & 4; Consultancy Groups	February 1990 1st Advice DC
2nd cycle			1st Advice DC	Inspectors Review	June/December 1990 Preliminary Review DC

In the Advice DC '90, units with similar content were common, while other units had titles but were still empty. For some areas even titles were not developed. The collection of objectives was not completed. The objectives were descriptions of tasks of any kind and not yet descriptions of action structures. The time allocated to modules was not synchronised.

The Inspectors' Review

The issue of the 1st Advice was a momentum in several rounds of curriculum development and validation. The extensive criticism from schools, and commerce and industry on the 1st Advice took many forms. Many remarks were based on misunderstanding and the bulk were negotiation points about subject areas. Many teachers wanted to maintain the academic subject matter and commerce and industry desired a label for their specific branch. The Minister of Agriculture decided in this phase to focus on two issues - clarification of the concept of the new QS and agreement on the subject areas of full qualifications and units.

Two inspectors, with the support of specialists, teachers and the authority of the Minister of Agriculture, reviewed the Advice. They achieved a reduction in the number of full qualifications and further integration of subjects in units. An account of the changes was made as clear as possible to all interested parties. In June 1990, a first Preliminary Review of Diplomas and Certificates (PReview DC'90) was issued and in December 1990 the second (LNV, 1990b and 1990e).

The Minister of Agriculture kept the momentum by allowing three schools to start applying the QS. This revitalised the process of educational development in SSAVE and provided practical experience for further development.

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[38] The SALVO (between 1985 and 1992) was a meeting of the Minister of Agriculture with representatives from industry, the competent authority of schools, teacher unions, educational advisory, apprenticeship schemes, and teacher training.

Conclusion

In the process phase, the focus was initially on a design phase and then on two development phases (Table 5.2). The first phase of development was spent on collection and arrangement of content - required competencies from multiple sources. The second phase was solving delicate matters concerning reduction of numbers of full qualifications and integration of subject matter into units.

Consultancy Groups were established to validate the development work. Teachers of academic subjects complained that they had no Consultancy Group of their own. This problem may be typical in the transition from subject based to competence based education. At macro level teachers in general subjects want a Consultancy Group, at meso level they want subject units, and at micro level the vocational teacher tends to forget about transfer potential when interpreting an attainment target. This issue was hard to explain and discuss and it was left to teachers to learn from experience how competence based education works. This criticism does not detract from the success of Consultancy Groups who developed their functions in the course of time (§ 5.3.1) and became an important component in the new information structure.

Experts were allotted central positions in the process phase and Group of 30 & 4, in the development, and Consultancy Groups in validation. This can be regarded as a precursor of new roles. The desire of so many to attend the general curriculum conference illustrates the old roles in agriculture where everyone negotiated everything - corporate custom as described in § 2.1.3. The new responsibilities are

1) that information supply is a matter for experts, and
2) that the decision to fund is a policy matter of the minister.

In preparing an Advice, the expertise and opinions of teachers are utilised through consultation, but they do not decide on objectives. It came as a shock to teachers. It was also something of a shock for industry because of a lack of communication on their new role in providing expertise for tasks.

5.2.3 Utilising multiple sources for qualifications

At the end of the process phase two technical problems were evident in the production of objectives; first there was the utilisation of objectives from multiple sources and secondly, transforming them into attainment targets. The transformation of objectives into attainment targets has been discussed in § 3.2.4 (Table 3.5). The utilisation of multiple sources is discussed in this paragraph.

The desire to formulate broad qualifications and to utilise multiple sources has been discussed before. Occupational profiles may be one-sided. A 1:1 relationship between occupation and qualification hardly exists; not only occupational competencies, but also competence for learning and social life

matter (Brandsma, 1993; Nijhof & Streumer, 1994b). Occupational analysis does not identify strategic issues for the future; strategic planning of manpower demand in businesses is to create an orientation point for personnel (Diekmeijer, 1997, p. 3 & 8; Hoogovens, 1998). How should all the information, brought together by a Group of 30 and other contributors, be handled?

Holleman (1993) designed an exemplar that will not be discussed here, to take account of a variety of information that could be utilised. He made a matrix with four types of description (global and specific assigned tasks and requirements for learning and recording of learning) for five types of tasks (Table 5.3). Ultimate tasks at work, target tasks of courses, study tasks for students, assessment tasks for examination and initial tasks at entry.

Table 5.3: Exemplar for information sources for a QS (Holleman, 1993)

	general/global descriptions of assigned tasks	precise/specific descriptions of assigned tasks	descriptions of requirements for assigned tasks	descriptions of records of assigned tasks
Ultimate tasks	occupational profiles; functional activities; desired qualifications	actual competence; activities in elementary processes	formal competencies descriptions	competence required by the job
Target tasks	study programs	general action structures; subject matters	school programs study books	plan of work
Study tasks	study literature; study /practice manuals	private study instructions for action	time table; study schedule	records of student work
Assessment tasks	assessment programs assessment objectives	instruments and criteria of assessment	scheme of assessments	assessment results
Initial tasks	prescribed entry requirements: levels	prescribed entry requirements: subjects	admission and assessment of prior knowledge at entry	recorded entry qualification

The model gives an impression of the available sources. In retrospect, it is clear that BAAS provided new information about ultimate tasks. In the past the work of the Core Committees in SSAVE focussed on books (study tasks) and examination papers (assessment tasks). For the 1st Advice other information sources were also used as mentioned in Table 5.3.

In the 1st Advice DC, the information from different sources was hardly ever transformed as described in Table 3.5 as intended in this phase (LNV, 1989e). This failure may have been through shortage of time; but probably more to the fact that information needed to be collected, a taxonomy of units needed to arrange the information before there was sufficient material to transform new content into attainment targets. These elaborations were mainly developed in the project phase; in that phase the format of the curriculum in terms of full qualifications, units and attainment targets (Figure 4.8) was described.

In Table 5.4, the elements of the QS are placed under the headings of Holleman's exemplar. The tables are a theoretical means summarise the transformation of diverse information into full qualifications, units and attainment targets of the new information model (Figure 4.5). The actual steps of the transformation are described in Table 3.5.

Table 5.4: Legitimate tasks of the QS

	general/global descriptions of assigned tasks	precise/specific descriptions of assigned tasks	descriptions of requirements for assigned tasks	descriptions of records of assigned tasks
(new) legitimate tasks	taxonomy of full qualifications and units	attainment targets with algorithms and heuristics	context for school- and work-based programs	actual attained Diploma and Certificates

A practical point is Holleman's suggestion that developers start where a review has linked all the objectives they find, to the appropriate element. From there, they can develop the curriculum over several working cycles, in which all elements are described and, when necessary, changed. Several checks on consistency are available - construct validity of target tasks, performance validity of ultimate tasks, and instructional validity of study tasks.

It was learned that the steps suggested by Holleman, work. The development phases described in § 5.2.2, were two different iterative processes to improve the consistency of the content for SSAVE.

It was experienced that fundamental change, for example reducing the number of diplomas or integrating subjects, required an external authority to carry it through. This is important for responsiveness and for the design of an information structure; representatives from schools and from commerce and industry may avoid fundamental decisions and end in a prisoner's dilemma with undesirable compromises on main issues when a third party misses.

5.2.4 Initiatives and functions in the process phase

'Why was the process phase organised as described?' 'Why were experts asked to work on the content with strict time schedules?' 'Moreover, did the division of roles and responsibilities work?'

At the beginning of the process phase, there was a feeling of urgency. This feeling had proactive, reactive and responsive aspects. The proactive aspect was that the IAE's would soon need a QS to be able to organise pathways and levels. The reactive aspect was that the Minister of Agriculture had to act after of the Minister of Education, who prescribed deadlines in the legislation on SE and VT (Table 2.1) and established BOOB's for educational change in SSVE. The responsive aspect was that SSAVE wanted

to improve competence based objectives, required skills and effectiveness, and to utilise what had been learnt from S-SSAVE and SSAVE-B.

The feeling of urgency was put in perspective by experience of change in the past; in that, experiences from the projects are hard to transfer and therefore conditions for learning from them needed to be created. Expertise should be built up through several development phases with increasing numbers of participants. The good points of the existing system should be preserved. The learning process is enhanced through the support of external expertise from many sources. The change should have the dimension of a systems change. Finally, in the 1989 situation, change could only be brought about through the full support of the Minister of Agriculture.

In that situation ARVO advised, and the Minister of Agriculture agreed to establish a new QS for SSAVE. There was no model or technology for such a structure. The 'royal road' (O&W, 1986) which leaned heavily on occupational profiles was felt to be a linear route, not powerful enough to force a change in the system. Teachers should have important roles in producing feasible QS and teachers needed to be involved to engage them in a learning process as a basis for implementation. This was organised (Table 5.5).

Table 5.5: Sociological dimension in the process phase

process groups:	Working Group	Group of 30 & 4 and project management	Six Consultancy Groups
product:	Discussion paper DC	1st Advice DC	
process phase:			
- design	6 experts		
- development		40 teachers	90 representatives

Three phases of information gathering were completed in the process phase (Table 5.2). In each phase was planned that every individual and group involved, went, in own pace, through several cycles of knowledge-transforming modes (Figure 5.2). Concrete socialisation, externalisation, combination and internalisation were demanded. The final document of a phase is a product of combination. The continued action on basis of such a document is a form of internalisation. The sharing of experiences on basis of new starting points is socialisation. The articulation of these shared experiences in the form of concrete steps is a form of externalisation. And so on. The work on exemplary modules (5.3.2) was organised in weekly cycles. This is how every phase worked on the epistemological dimension of knowledge development.

The major attainment in the design phase was the publication of a Discussion paper DC, which put the focus on competence-based objectives and translation of these into curriculum. The first development phase was the context for informing teachers and others of the design of the QS by the

Group of 30 & 4, and the objective in this phase was the externalisation and combination of content (Figure 5.2). The second phase, by the inspectors, was the externalisation and the combination of the taxonomy of full qualifications and units with help of educational profiles and unit descriptors.

Thus, at the end of the process phase about 50 people understood the design and what consequences it might have. The same 50 knew about the development of objectives, units and attainment targets and the application of educational profiles and unit descriptors.

These attainments are the first step in developing expertise and a fund of knowledge regarding a systems change. The next step in the design should be about learning aids, in a system that ought to be based on modules. In this process many teachers need to be involved. The primary aim of the work would be a process of informing teachers and other educationists, of application in modules of units and attainment targets, and of educational profiles and unit descriptors.

The work on learning aids would be a test on the instruct validity of the QS - can teachers work with it? -, and also a next phase in the sociological dimension of the knowledge creation process. The involvement of many teachers in this process would enlarge the fund of knowledge about the systems change.

With the work on the QS the core of the problem had been identified. The approach described above was the one that worked. In retrospect it can be explained why. Attempts to organise the change through other channels had failed. The SSAVE-B project is an example of a failed, solely bottom-up, process. In addition, in 1989 alternatives were tried. The ministry of agriculture asked industry to organise curriculum conferences; the secretaries of the educational committees declined. An alternative was to utilise SALVO for a traditional corporate approach (§ 2.1.1), but in 1989, the teacher unions crippled SALVO with their actions for improved legal positions in IAE's. In this situation the Minister of Agriculture played his trump card. He led the process. At the time the field of education did not welcome this top down measure, but it was accepted.

5.3 Project phase: testing new methods

The aims in the Discussion Paper DC are the starting point in the project phase. The developments are in the Review DC '92 and '94, and in exemplar modules.

A reconstruction shows that, in this phase, the epistemological and sociological dimensions of gaining expertise were organised as follows. The improvement of the Review DC was put in the hands of a small group of teachers, the Attainment Target Desk. They went through development

cycles with the concrete point of externalisation of the explicit attainment targets, of taxonomy of units and of blocks.

The other project concerned 300 teachers working on exemplar modules with the Review DC as a starting point. The 300 teachers learned to work with the Review DC (internalisation) and give feed back on the usefulness of the Review DC (socialisation). In several working cycles, the teachers produced exemplar modules and established procedures for module development. Exemplar modules are a final curriculum element (Figure 4.7) needed before implementation of a new QS. The work on the Review DC and the module books was linked to the creation of a knowledge base.

5.3.1 The Attainment Target Desk

The laws on SE and on VT prescribe procedures for decisions on educational objectives. The development cycle (Table 5.2) for the Preliminary Review DC '90 was the first preliminary introduction of that procedure. The Minister of Agriculture decided on a Review DC every second year before 1 February to become operational before 1 August. An Advice on Diplomas and Certificates (Advice DC) was the basis for the Review DC and it needed to be available before 1 November to collect and process any comments about the Advice DC.

In the course of time the quality of the Advice DC needed to reach a high standard after which the decision of the Minister of Agriculture on the Review DC could become a formal safeguard. Also the extensive advice from the advisory group in the process phase (Table 5.2) needed to be streamlined. Consultancy Groups should have the power to supervise and approve the work of the Advice DC.

In the process phase the Minister of Agriculture commissioned the Attainment Target Desk on attainment targets to support the Consultancy Groups and develop attainment targets. The Attainment Target Desk acted between December 1990 and December 1993, and brought about the Advice DC '92 and '94. The task assigned to the Attainment Target Desk was to standardise attainment targets, units and blocks of the QS and to add new content as well. Six teachers worked 2-3 days a week for three years with this task; they became specialists in their kind.

Description of attainment targets

The educational objectives in Advice DC '90, and also the objectives added for the preparation of PReview DC '90 had a variety of formats. Also, the study load varied for each of the objectives.

Some objectives had been copied from occupational profiles. Others were taken from examination programs or from the contents of textbooks. Objectives came from policy papers and legislation, from interest groups and educationists, from curriculum conferences and information models (see

Table 5.2). Group of 30 & Group of 4 laid the basis for the content of Advice DC '90.

The Attainment Target Desk started to shape each objective as an action structure in which a verb describes a level of attainment and a noun describes a study subject. After that the Attainment Target Desk standardised the qualification volume for all attainment targets - five attainment targets per block). It took until Review DC' 94 before a first draft with this standard for the whole QS was published.

It had been the aim that Group of 4 would completed a substantial part of this work; in retrospect this was not a realistic aim.

Taxonomy of full qualifications and units

It is difficult to handle content, taxonomy of subject matter, and competency based information from different sources, compare target tasks and ultimate tasks (Holleman, 1993) and academic and vocational qualifications (Oates, 1998). As the work proceeded, the Attainment Target Desk encountered questions about the taxonomy as it had been dealt with in the process phase. Feed back from the work on exemplar modules (§ 5.3.2) and further development of the QS also required a change in the composition of full qualifications and units with educational profiles and unit descriptors (§ 6.2.1).

In this phase of development of the QS, it was realised that structure and taxonomy show the place of the attainment targets and affect the process of attainment target design. In other words - the design of a coherent QS requires adjusting between full qualifications, units and attainment targets. This tuning is subject to a complex learning process.

The conclusion is that a given structure and taxonomy are a useful first framework of reference for the specialists to describe content in the form of attainment targets, but later the structure and taxonomy themselves become subject to discussion. The process may be formulated in modes of learning. Composition of attainment targets is not only combination of explicit facts by specialists. The results need verification through internalisation and socialisation (Figure 5.2). This may happen by exposing the process to teachers so they can check the implications of the new objectives for education. Clients in commerce and industry, and in society, should check the clarity of the qualifications. The authors of occupational profiles should try a re-externalisation of the required qualification with reference to the new objectives. The points of view of the many user groups are needed when the classification of educational objectives is changed. This conclusion fits with the view of Achtenhagen (1994) that categories of content knowledge can be incompatible.

In reality rules of thumb were followed. The Attainment Target Desk collected and processed objectives, and a taxonomy when necessary. They invited all the organisations to contribute and give them the benefit of their

views. At the start, the Attainment Target Desk did not contact the organisations but prepared decisions for the Consultancy Groups. In the course of time, the Attainment Target Desk developed a routine procedure and Attainment Target Desk being aware of the preferences of the Consultancy Groups could clean up the agendas and focus Consultancy Groups' discussions on major issues. As a fortunate consequence, the Consultancy Groups kept to major issues - validation of full qualifications and units.

The build-up of this routine took time. All those who contributed to the design and development of attainment targets and those who worked on products based on attainment targets needed time to get used to the role of experts and the advisory role of the Consultancy Group. The slow growth towards unity of qualifications and methodologies has also been observed elsewhere (Oates, 1998).

Blocks

A block is the educational objective for the students program in a module. In the QS, a unit has 2-10 blocks. The Attainment Target Desk developed blocks with a verb and a noun in the title and five attainment targets.

The history of blocks is as follows. Group of 4 gathered educational objectives in 'related areas'. 'Related areas' were a means of discussing at a global level the content of units. When it became possible to define a related area in the process, it became a block. A block was added to one specific or, when appropriate, to several units.

The work on blocks by the Attainment Target Desk was connected to the work in a large project on exemplar modules. In the project, the tasks for working groups were assigned blocks - first within related areas with a varying number of objectives. The two projects used each other's products, and interchanged discovery and collection of new objectives for the Advice DC.

The production of qualifications implied the end of a traditional subject approach and a means of professional identification and legal status of teachers. The teachers, experienced in the S-SSAVE experiment were used to this new situation, those involved with the SSAVE-B project were also familiar with it. Others needed to discover this new context of their future work. As a consequence, the learning process on new content described in this paragraph was, at the same time, a reflection on pedagogy. This made communication diffuse and difficult. In the projects, the separation of competence based VET from current formal pedagogy was stressed by the Minister of Agriculture to prevent reversion by supporters of subject based teaching.

5.3.2 Development of exemplar modules

The implementation of the QS, before becoming compulsory for all schools, required practical testing. Thus the Minister of Agriculture encouraged the

development of exemplar modules and the introduction of the QS in the schools - in fact a schools' responsibility.

These two innovations were the next steps and new development phases - exemplar modules are final elements of curriculum based on units and attainment targets and implementation in schools is the actual presentation of modules to students.

Work on exemplar modules

The Minister of Agriculture was accustomed to organising development and publication of textbooks for courses of SSAVE. Development of exemplar modules based on the new QS was a logical step, in this tradition.

From August 1990 until August 1993, about 300 teachers worked one day a week in Zutphen on exemplar module development. Most teachers had worked for the Core Committees and had experience with the development of learning aids. It was new for SSAVE that groups of 3-4 teachers from different disciplines worked with a laptop on one exemplar module. In addition, it was new that they worked with a given objective. A group worked 6-8 weeks on a module. Twenty process supervisors checked the result of each day's work, and handed the comments back the next time. A team with representatives from the Minister of Agriculture, educational support and teacher training, managed the project.

The main educational task in the project was to transform attainment targets into assigned study tasks. The challenge was to design school and work based exercises for the organisation of learning.

The work started with an adapted method based on the development strategy of Dick & Carey (1985) and described for robotics (Reijmerink & Van den Berg, 1990) and introduced by Van den Berg (Van den Berg & Reijmerink, 1990). The first step in the method is the transformation of attainment targets into cognitive maps (Posner & Rudnitzky, 1986) and flow charts. Van den Berg advised making assessment items first, considering these to be firm educational objectives and working on the exemplar modules as a basis of instruments of assessment.

The project management changed her advice in two respects; first, production of instruments of assessment had not been given a central position, but development of objectives, exemplar modules and student assessment was organised in three parallel lines. People in the three lines exchanged techniques and experiences. Secondly, the development of cognitive maps and stream schemes was reduced to the formulation of one central outcome. The central outcome is the acquired ability of the student after completion and assessment - for example, milking a cow or arranging a Biedermeier style bouquet. For that central outcome, a variety of practical contexts were suggested and the exercises for reflection were described.

The motives for the change of the advice were that parallel processes are faster and easier to manage than sequential processes. Working to one central outcome made the techniques less complex and reduced the vast amount of information.

The project management on exemplar modules attached five educational criteria to the central outcome. First, modules should refer to complete experiences to underline the trans-disciplinary nature of qualifications. Complete experiences encourage competence-based learning. Secondly, students should be involved in realistic issues; they need to work actively on productive tasks. Thirdly, students need to perform tasks in practical situations to understand the complexity of the working environment. Fourthly, students are responsible for their own study program and for certain elements - for example for emancipator, third world and safety aspects of work. Finally, the individual diversity of learning (Kolb, 1985) means that modules should appeal to different learning styles. The five criteria were applied in the development of modules. In the project, task assignment, guidance to teachers and feed back were focused on these criteria (Piersma, 1992).

The work on exemplar modules contributed to the work on attainment targets by the Attainment Target Desk. The IAE's expected a product in the tradition of the Core Committees. They were disappointed when the modules turned out to be exemplar based on new principles. The schools were not ready to improve and adapt the exemplar modules according to the regional needs and the work-based program of the school.

'Experimental gardens' for the QS

In the autumn of 1989 the director of agricultural education wrote to the emerging IAE's about the new SE and VT legislation, the new lump sum funding, the qualification system and adjustment of educational structure (LNV, 1989c).

Adjustment and dualisation of the structure (Table 2.1) was introduced in August 1988 as a basis for future funding (Lavi, 1988b) and came into effect on 1 August 1990. IAE's had the opportunity to start together with educational programs based on the Preliminary Review DC '90 (LNV, 1990b). Three IAE's decided to do so; they were called experimental gardens. On 1 August 1991, nine more IAE's turned to the new QS and on 1 August 1992; the Review DC '92 became compulsory for all 21 IAE's.

The experimental gardens followed different educational policies; one school transformed the QS into subject based educational programs, one school modularised on competence based educational objectives and the third school had a mixed policy. Just after the start, the designers of the QS met representatives from the three schools; in later years, these meetings were organised by the Inspectorate. In August 1993 the Inspection published

a report about the educational development in the schools (Inspection LO, 1993). The most remarkable observation was that the school with the module-based qualification changed its management principles. The focus of the management was on the supply of information between the clusters of teachers working on units. The school working with subject-based programs worked with traditional line management; this school bore a heavy burden of administration.

The development of modules is an implementation strategy. It was done in a 3-year huge project with 300 teachers and by actual implementation in three IAE's. These two initiatives provided for two critical success factors.

The primary target of the project was that the teachers produced model modules books based on new principles. The systems effect was that each IAE had 10 QS-skilled program developers at their disposal. A very imported side product was the library of the project that has been used to develop school libraries.

The primary target of implementation in the schools was school development. The systems effect was the 'proof' that it was possible to implement the QS.

The idea that the initiatives should be planned in sequence is based on the false thought that concrete products can be passed through. To the contrary, the advantage of different parallel initiatives is that experiences from different contexts can be exchanged and utilised. In the project this exchange has not been formalised, because about 30 teachers from the implementation schools participated in the 300 teachers project.

5.3.3 Initiatives and functions in the project phase

On the basis of the Discussion paper DC (the concept), Group of 30 & 4 (experience) and the Preliminary Review DC '90 (the content), the Minister of Agriculture organised projects to improve the QS, to develop exemplar modules and to implement them in schools. What can be learned from the two projects?

In the project phase, the epistemological and sociological dimensions of knowledge creation for responsive SSAVE were pushed forward in the system. Production phases of development were intensified (Advice DC '92 & '94) and the implementation started with exemplar modules and experimental gardens.

Participants from the process phase managed the project phase (Figure 5.3). With their help more teachers could be involved and be given roles in the project phase. Every body and every product would need several working phases to reach a satisfactory standard.

In the project external expert knowledge was used. The development of attainment targets for the Advice DC '92 and '94 was supported by the

views of Van de Lagemaat (1986; Table 3.4). Reijmerink & Van den Berg (1990) advised on the development of exemplar modules and assessments.
In the project phase, experienced teachers interchanged opinions about the validity of the format of attainment targets, instructional validity of modules and evaluation validity of assessment tasks. This contributed to the consistency of the QS.

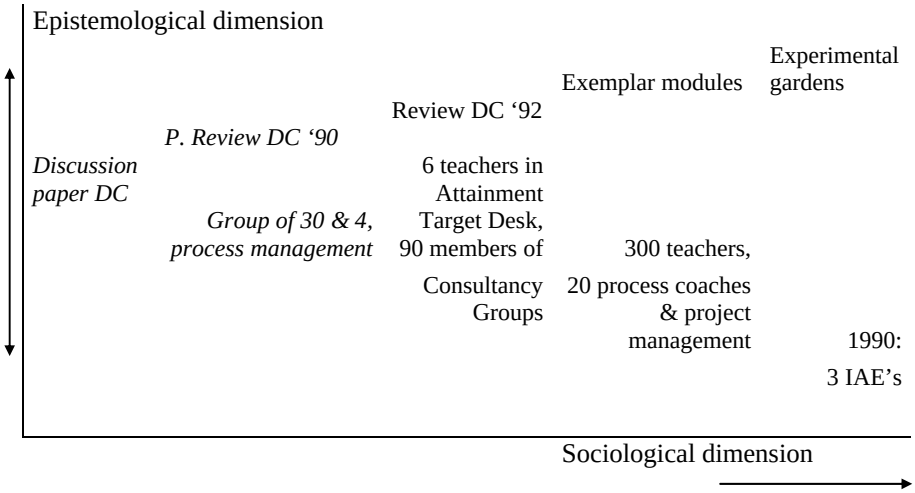

Figure 5.3: Knowledge creation in the *(process and)* project phase

One could feel a sort of systems consistency. Competence based learning for example, refers to a similarity in the ways teachers developed the model modules and the way students acquire knowledge. Forms of active work may enhance internalisation and the complete experiences in the work-based program may enhance socialisation processes in teachers and students. These activities are the complement of working with explicit knowledge in the school-based program (externalisation and combination, Figure 5.2).

A second example of competence based learning at the systems level is that the management of one experimental garden focused on information supply between clusters, which is a prerequisite for knowledge creation between teachers.

No empirical assessments were organised. At that stage, the reason was that this would have taken a great deal of time but more important was the expectation that answers would have been of little value (compare the difficulties in reporting from the project on LTP; Van de Lagemaat et al, 1985). Teachers who are convinced of the principles applied in the new QS support further development and those that are not convinced plead against. The attainment targets, units, modules and assessments were made for competence based education, which is a fundamental change from discipline

based education. The new material would be easy to handle for teachers with experience i.e. in S-SSAVE. The majority of teachers, however, would have to muddle through before they would be in a position to make a fair and valid judgement of the QS and the modules. The experience from S-SSAVE has been that students, who are used to subject-based education, take 3-5 months to adapt to the approach in S-SSAVE. For newly appointed teachers in S-SSAVE, it took 1-2 years before they could evaluate and develop the new approach.

In retrospect the policy that was followed was right. Empirical testing assumes, as a starting point, that an ideal product could be made and transferred to schools. This starting point would have ignored the complexity of processes at micro level (De Sitter, 1994) and the principle of knowledge creation (Nonaka & Takeuchi, 1995).

At the time precise knowledge about the process was not available, strong reactions and resistance were no surprise once the new QS became compulsory in 1992. The opposition was predictable - the dualised form of SSAVE-B had only been adopted by less than half the schools in SSAVE. In some schools the work with SSAVE-B and S-SSAVE students was looked down upon.

Involvement in development of competence based teaching materials, is itself a form of staff development for competence based teaching. The one is a condition for the other and the one is needed to bring the other forward. A knowledge creating process for a whole system, also called 'learning by doing'[39], was applied. As a consequence, the decision to take a firm step forward implied criticism on products and reliance on *in vitro* judgement of experienced teachers for the validity of 'best possible first products'.

This is not a research-development-dissemination an approach but a knowledge creating approach (Nonaka & Takeuchi, 1995). It is common in knowledge networks (§ 2.1.2) and has been applied in Dutch basic education in the 1960s (Van Gelder, 1964).

The result of the project on exemplar modules has several dimensions. The central fact is that 300 teachers met one day a week for three years. They discussed the new approach and the way it worked in the school. They experimented in their own situations, provided feed back, and then applied improved methods in the construction of learning aids. Secondly, they worked in multi-disciplinary groups on exemplar modules, as they would possibly work in schools in multi-disciplinary program-groups. Thirdly, the way the project was organised and the ultimate outcome were that preliminary exemplar modules were made for all units of the Advice DC.

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[39] 'Learning by doing' applies to pedagogy in classrooms (for example in primary SAVE, S-SSAVE and SSAVE-B), but also to the philosophy for design and development of the QS.

The process was fed by those involved in Group of 4, Group of 30 or teaching in S-SSAVE or SSAVE-B. The 300 in their turn spread the message in 21 IAE's. Consequently, the project was a means of indoctrinating the uninitiated with the principles and practices of the new system.

The co-ordination of the projects was a proactive investment of the Minister of Agriculture. It was not a reaction or response to demand by schools. From the expectations and experiences described above it can be appreciated that such a demand could have been along time coming, too long to support a systems change.

In the project phase, expertise was utilised to work on new content for SSAVE. In the same projects, methods to make occupational profiles, qualification profiles educational profiles and exemplar curricula were improved, and the links between them were strengthened. In other words, the project created the communication between the columns in the information model (Figure 4.8). This is in fact the articulation of relevant functions for the information structure of responsive SSAVE.

5.4 Institutionalisation: the establishment of functions

The final step towards a responsive SSAVE is the development and establishing of new functions in the system (# 4.8). This section describes the institutionalisation of functions after a description of new public roles.

5.4.1 The context of the new roles and functions

The final phase of designing a responsive SSAVE is the establishment of two new privatised bodies for information supply. This coincides with the privatisation of other functions of SSAVE.

The systems change of SSAVE would change quite a number of roles and functions. Schools obtain more freedom and independence to improve the school-to-work transition. The articulation of demand and the funding of education would be modified to ensure responsiveness of educational objectives. Change affects students, teachers, management and competent authority, through to parents, businesses and educational advisory services, and to central government. Success depends on an element of preconditioning for all participants in the system.

A set of critical functions determines the optimised preconditions. The functions are positioned in the model with inter-linked information, steering and production structures.

The new structure for responsive SSAVE is an information structure. The functions of the information structure are identification of contextual changes and utilisation of multiple sources for the development of the QS. A major aim of the new information structure is to ensure transfer potential of qualifications.

The vital new functions of the production structure are flexibility of organisation to match demand at meso level and transferability of school leavers for a dynamic employment market at micro level. The new functions in the production structure institutionalise aims in the SSAVE-B project and the S-SSAVE experiment.

The functions in the information and production structure were to be privatised to improve the responsiveness of the system. The word privatised is used to stress the political intention of non-initiative in the information and production structure (O&W, 1993a). A successful launching of privatisation in SSAVE requires effective establishment of the new functions, with a particular focus on functions in the information structure.

The privatisation will be illustrated through four examples, of which the latter two are the main components of the information structure.

5.4.2 Privatised functions

The legal basis for privatised functions and a QS changed twice between 1988 and 1995. The change of the law on senior education (SE) in 1990 and the new law on VET (VE) in 1992 were the main basis for the development of the QS. The two laws applied to SSAVE from different angles and the difference led to tension between full time education and the apprenticeship schemes. In retrospect, one might suppose that the IAE's, with affectionate links to the past, claimed the information and the production structure for full time education. The national bodies for the apprentice scheme claimed the same for their dual education.

Logically, the politically desired follow-up of the law on SE and VE, was the law on vocational education and training (VET) in 1995. This law for VET justified one QS for all SSAVE pathways. It provided explicit regulations on the QS, the funding and the quality control of an educational system based on attainment targets (OCW, 1995).

Privatised functions in the production structure

The change of 'competent authority' of schools (§ 2.2.2) is a form of privatisation. Two further examples of privatised functions in the production structure are the educational support service and the development of learning aids.

Independent educational support

The Minister of Agriculture was directly involved in the steering of educational support (§ 3.1.3) to agricultural schools. In 1988, this was the first managerial issue to cede from and give to the IAE's, the educational advisory centres and agricultural teacher training.

In November 1988, the Minister of Agriculture in a letter to the governors of provisions for educational support organisations (LNV, 1988) called for co-operation in providing support for the nascent IAE's.

Representatives of all relevant parties met from May 1989 onwards and took responsibility for the implementation of the QS in IAE's.

Development of learning aids
The Minister of Agriculture was previously responsible for the development of learning aids for SSAVE. Inspectors from the ministry chaired Core Committees (§ 2.3.3) and, latterly, held key positions in the Project on exemplar modules.

In September 1992 the Council of IAE's, the United IPC's and agricultural teacher training authorities reported to the Minister of Agriculture about an agreement for future production of learning aids. In April 1993, a publicly funded Curriculum Development Centre for SSAVE was established. The budget for the school year 1993-1994 was to be controlled locally (LNV, 1993c).

Privatised functions in the information structure
The two new functions in the information structure are research on contextual changes and the preparation of the Advice DC. These are tasks on signalling and transformation problems (O&W, 1986).

Research on occupational change
Until 1993, systematic research on agricultural occupational change was carried out by the BAAS (§ 5.1.1). In 1993, the BAAS merged into the STOAS Employment Market Research Centre. The Minister of Agriculture established the Employment Market Research Centre in 1992, to identify contextual changes relevant to SSAVE and thereby, the success of school leavers from SSAVE. Information on occupational profiles, and interpretations of social, study and task profiles is the factual input for the QS.

The preparation of the Advice DC
The transformation of contextual information into qualification profiles and exemplar educational profiles is the vital process in development and maintenance of the QS.

A provision was needed to continue the work of the Working Group on the Discussion Paper DC, Group of 30 & 4, the Attainment Target Desk attainment targets and the Consultancy Groups on the Advice DC. Well before the Attainment Target Desk stopped in December 1993, in August 1992 the Minister of Agriculture established at the request of SSAVE, a project group to prepare for the work on the QS.

The project group designed a National Body for Agricultural VET (LOBAS). LOBAS, the result of merging the three organisations of apprenticeship schemes on 1-1-1994, with a board with representatives from employer's organisations, trade unions and education. LOBAS was responsible for the Advice DC and for quality of enterprises that contribute to the work-

based program of schools. To produce the advice, LOBAS had an Education-Industry committee that took over the work of the Attainment Target Desk and six Sector Commissions that took over the work from the Consultancy Groups. LOBAS started work with the elaboration of the Supplementary Advice DC '94 in January 1994 to be issued before February 1995.

LOBAS combines in this form two important processes in the project phase - the generation of qualifications by experts and the validation of qualifications by concerned organisations.

In the institutional phase the knowledge development about the new information structure and its function within SSAVE matured and established. This development has been enhanced through the work on the QS in its process, project and institutional phase. The build-up of knowledge was used not only for technological but also for social development for a responsive SSAVE.

5.5 Concluding the information structure

This final section summarises and evaluates the design of the information structure. The overall question is about the aim of the policy needed to establish a new responsive information structure.

5.5.1. The new information structure

Do the two privatised functions in the information structure fit with the model for a responsive system of VET and the policy model for a responsive system of SSAVE?

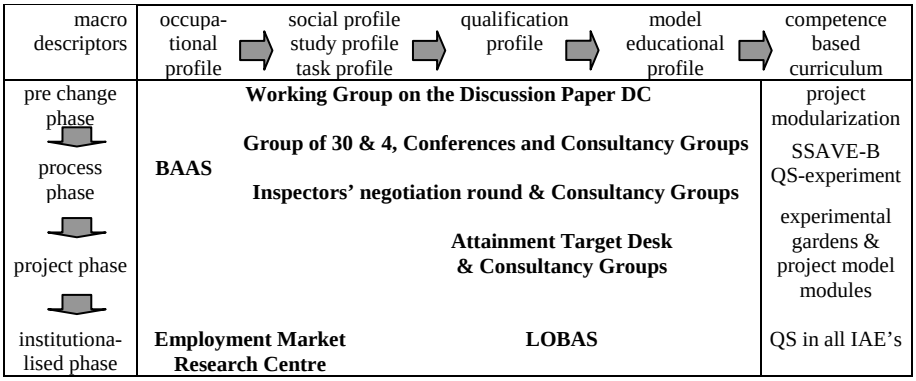

Figure 5.4: The development of an information structure for SSAVE.

To answer these questions, the institutional functions within SSAVE in the early 1990s are brought together in one flow chart. The 'royal road for development of educational profiles' and the phases of 'knowledge creation for information structure development' described in this chapter have been summarised respectively, on the horizontal and vertical co-ordinates of a

flow chart (Figure 5.4). An extra column (right) shows the implementation in the schools.

The conclusion of the work on the QS is an information structure for the provision of the QS. The provision rests with two organisations - the Employment Market research Centre and the LOBAS.

5.5.2. The new information body

The last thing to look at is the integration of the new information structure in the system structure of SSAVE as a whole. The new and the privatised organisations discussed in # 5.4 are added to the 'old' functions in the framework for responsive SSAVE as depicted in Figure 3.3 and governmental roles discussed in § 4.1.2. The result is a systems framework in which functions with vital significance for a responsive SSAVE have been given a clear position (Figure 5.5).

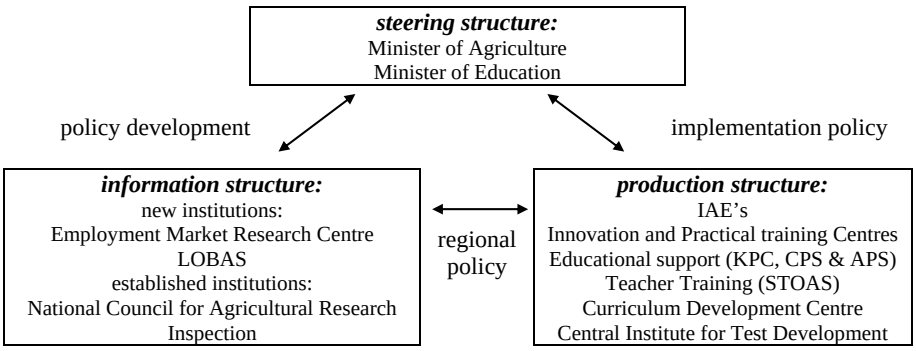

Figure 5.5: System structure of a responsive SSAVE

The articulation of external demand is the basis in the policy model. The articulation of external demand was originally presented as a triple problem (O&W, 1986) - the identification of signals relevant for occupational profiles, the translation of signals into educational profiles and the participation of teachers in the process of change.

The conclusion is that the identification and translation problems have been placed in the information structure and dealt with. Moreover, that the participation problem is partly solved in developing and understanding of the QS and information structure, as described in this chapter. In the process teachers played essential roles before the work was validated professionally and passed to the institutions. Many teachers in the field of SSAVE wrote articles during the sequence of operations s, mainly in the journal 'Agrarisch Onderwijs'. They were worried and often opposed the QS. At the end of 1994, the perception of what the QS and the QS should be became clear to many (Swinkels-Kuijlaars & van Wijlick, 1995).

The articles do not detract from the fact that about 10% of all teachers were actively involved in gaining information about the information structure and QS. Essential participants accepted the principles that were chosen to develop, classify and describe competence-based objectives.

Another conclusion is that the Employment Market Research Centre and LOBAS, which form together an information structure for responsive SSAVE, are placed in the information structure to articulate and transform external demand. The steering structure uses transformed external demand to steer IAE's, because of linking to blocks and modules, as responsive objectives matched to target groups.

The information structure and most other preconditions at the systems level in the policy model for a responsive SSAVE have been achieved. The integrated knowledge creating approach for design and development of the information structure and the QS have enhanced the establishment of new functions in the system. The information structure itself, although an entirely new function in SSAVE has become a corner-stone of the system.

5.5.3. Final conclusions

The sequence of initiatives for the development of the information and steering structures can be perceived as a knowledge creating process (Nonaka & Takeuchi, 1995). A form of knowledge management at systems levels was necessary to convey a message that would not come across with conventional communication. In that process the open mind and the organisation of feed back at policy, technological, and practical levels have probably been the most important navigation instruments.

At the time, the development was governed by experiences of the participants from projects on educational change in the process and signals from the process, rather than theoretical ideas. Or, as Gielen & Le Rütte (1998, p. 45) conclude, 'the starting role of the state in the initial phase is restructured into a conditioning and guiding role, and for the QS into an enacting role'.

In retrospect three processes at the system level have been decisive for the dynamics of the process. In the knowledge creating process the organisation of development phases was given priority above quality standards on content. The three phases were managed by time limits -

- in the process phase the aim was to focus on the core of the problem. The Discussion paper on DC marks the definition of the problem: a QS to change SSAVE.
- in the project phase the aim was to focus on vital functions of an information structure to make a QS. The Advice DC and the Preliminary Review DC chronicle the period in which methods and procedures were tried and improved to design an information and QS.

- in the institutional phase the focus was on the embedding of the functions in the system. Once the Review DC was made, the institutionalisation of the newly created functions came in at a decisive phase.

For all three phases the work on the QS has been the carrier in the search for answers. The management of the sociological dimension of gaining an understanding of the QS by teachers has also been the solution of the participation problem (O&W, 1986).

The interactions between the development of the epistemological and sociological dimensions of knowledge creation, the macro descriptors in the information model and the subsequent phases in the process are always complicated. The starting point has been that these very complex innovations cannot be explained, but need to be organised in sequence.

All the measures and initiatives do not guarantee a smooth process; on the contrary, a systems change is a huge struggle. Mutual respect is probably a most vital ingredient in that struggle.

The conclusion for future large-scale educational change may be that technological, social and political development should be dealt with together. At first sight this appears to be an impossible thing to do. But alternatives are worse - economical and technological development without follow-up, political decisions about idiosyncrasies and an obsolete qualification system.

The development of the information structure for SSAVE was a firm and essential start of an educational change in SSAVE. Further development needs time and support, and enough time and support should be given. It is important that further development is monitored from different viewpoints and by different interested parties. From that monitoring new priorities may be identified and consequently new initiatives in due course. A responsive system is capable of handling this situation.

6 Design and Development of the Qualification Structure (QS)

This chapter is about requirements, design, development and implementation of the new QS for a responsive SSAVE. In a responsive system, a QS serves multiple functions -

- providing information on the scheme to clients;
- guiding/controlling the provision;
- managing school programs;
- giving guidance to students.

The development of the QS results from creating a responsive SSAVE (Figure 6.1). The reconstruction in this chapter aims to test the responsiveness of the QS. The introduction provides the structure of the chapter, important definitions, and criteria on responsiveness.

description matrix			**judgement matrix**	
intents	**observations**		**standards**	**judgements**
articulated demand	policy plan	**antecedents**	-	-
shared responsibility	information structure	**transactions**	-	-
transfer potential of national objectives; flexibility of organisation	qualification structure (QS)	**outcomes**	qualifications with transfer potential; efficient & effective pathways	T T

Figure 6.1: The research area (shaded)

The structure of the chapter

The structure reflects the principle stages of an instructional design and development project (Romiszowski, 1981, p. 383); descriptions of -

- requirements;
- design;
- development;
- implementation.

Each stage has its own evaluation, approval and feed back provision. The architecture of the QS refers to structure, taxonomy and content. That is why these three topics re-appear in each of the four sections. The fifth and last section draws conclusions about outcomes, lessons to be learned and consequences of the conclusions.

The importance of credits, certificates and diplomas

Credits, certificates and diplomas are the awards connected with the qualifications of the QS - blocks, units and full qualifications. A credit is the minimum award and is granted for the attainment of a block. Certificates are

awarded on achieving a specified number of credits having successfully completed a specified group of blocks (a unit). Likewise to gain a diploma a greater number of blocks are specified, usually within certain unit groupings and options, leading to the required number of credits (Table 6.1). The QS has this structure for four levels of diplomas (§ 6.2.2).

Richardson et al (1995) recommend the terms unit, module and credit as physical representations of objective, program and award (§ 3.3.2). The concepts of unit, module and credit are combined in 'the driving licence'. The units A/E of the driving licence describe the attainment level and subjects being studied. Modules are offered through lessons in different types of program (pathways) depending on the abilities and preferences of student and instructor. The assessment yields a credit; there is no question of grading the credit.

Table 6.1: Aggregation levels of objectives, programs and awards

aggregation level of content	representation type of educational content		
	objective	program	award
1.	full qualification	course program	diploma
2.	unit	module group	certificate
3.	block	single module	credit
4.	attainment target	within a module	mark (internal)
5. very detailed		lesson	

The distinctions between objective, program and award are necessary for the division of roles in SSAVE. The information structure articulates external demand and advises on the attainment targets of a qualification referred to as blocks and units. The information structure specifies a unit of content consisting of the appropriate number of blocks. As a consequence, programs leading to the major awards consist of several modules.

> The standard measure for a block is the volume of content learned by a student at the EU-level-4 in the educational route over five days of a normal school-based program. This is also the standard time required for programming a module.

The schools are fully responsible for the development of the program. A single block program would consist of a single module and be time-tabled accordingly. A unit would require a course covering all the specified modules. A full qualification requiring several units has a program lasting two, three or four academic years to cover all the modules involved. Within each module there are five attainment targets designated by the information structure and for which the school awards marks. This is in effect the minimum level of objective, program and 'award'. The program and marking are, however, entirely an internal matter for the school.

The award of credits for modules achieved, certificates and diplomas are also the responsibility of the schools. These national qualifications, however,

carry the endorsement of the government. In the QS, therefore, the award of a full qualification can be built up from various levels of sub-award-blocks. The content of the different levels of sub-award and the interfaces between them are described in the QS. The division is not linear because each sub-award may well be an entity in itself with a currency of its own.

Criteria on responsiveness of the QS

The first section of this chapter is about (all) the requirements on the QS. The dominant aim, however is responsiveness of the system and from that aim specific criteria are derived to evaluate the design and development of the structure, taxonomy and content. In retrospect 8 criteria are applied to enhance responsiveness to contextual changes -

- deregulation to increase the degrees of freedom in schools;
- global subject areas to limit the differentiation of content;
- uniform levels to enhance (inter)national interchangeability;
- accessibility to qualify all target groups in initial pathways;
- broad competence to facilitate life long learning
- unit groupings and options to meet specific demand;
- commonality[40] of qualifications to deal with up- and down stream;
- decontextualisation[40] to deal with contextual changes and diversity, and description of transfer potential to learn transferability.

Responsiveness of the system applies to external and internal flexibility, to architecture and organisation. The responsiveness may be realised at the level of divisions (clusters of full qualifications for a branch), full qualifications, units, blocks or in attainment targets (Table 6.2).

Table 6.2: Criteria for responsiveness of a QS

policy aim	system	architecture QS	criteria
responsiveness	internal & external flexibility of architecture & organisation	divisions full qualifications units blocks attainment targets	deregulation global subject areas uniform levels accessibility broad competence unit groupings and options commonality of qualifications decontextualisation of content

The criteria above will be used to evaluate the responsiveness of the QS in the subsequent stages of development. The responsiveness of the QS is a prerequisite for a responsive system; it cannot prove that the schools are responsive.

[40] Commonality and decontextualisation are defined in the Glossary.

6.1 Requirements in the QS

The policy targets for a responsive SSAVE were summarised in § 4.7.1. They must be integrated in a coherent design of structure, taxonomy and content for a QS to be achieved.

6.1.1 Required structure of the QS

The QS structure provides a framework of content and of control. The instruments are divisions, diploma levels and time allocation.

To assist with choice of occupation, and to facilitate discussions on the required qualifications, the 'occupational divisions' of SSAVE should match occupational sectors of the employment market. The divisions may need a further break down to reflect the branch level of the employment market. The funding of SSAVE, for specific equipment and material can also be a reason for a corresponding division (O&W, 1988d; LNV, 1989d).

The QS should cover all required qualifications of the EU-levels 1 to 4. IAE's should offer VET to all 16-year-olds and students with 10 years basic education (§ 4.1.4). 'Students in a level 2 course who fail to attain a level 2 diploma, should get a level 1 diploma provided they have certificates with a total of 8 credits' (LNV, 1989d). These two requirements may not always match, i.e. when students with less ability demand a full qualification at level 2 where a branch does not need this qualification.

SSAVE should be clear about what the public may expect from the schools and the students for the funding received and time spent on courses. School results related to the provision are relatively new research issues; relevant structural aspects are the effectiveness of course time and its utilisation by students (Scheerens & Bosker, 1997).

Time allocation within pathways and efficiency of pathways are important aspects of the supply side of SSAVE. How students use the time may differ with their ability and motivation (§ 4.7.1). That is why a set of basic assumptions should be made concerning the efficiency of pathways and the way students with different ability and previous qualification use them.

The consequence of differently programmed pathways and of students' behaviour is that course duration does not reflect the students' attainments. The design should provide a competence based starting point for description of clearly defined outcomes.

6.1.2 Required taxonomy of full qualifications and units

A taxonomy should be designed to add a functional hierarchy to the structural framework (§ 6.1.1). The structure is the cupboard and the taxonomy of qualifications the labels for the shelves.

The taxonomy supplies a consistent approach to level and area of qualification, and of the transformation of attainment targets to blocks, to units, to full qualifications.

Divisions are a horizontal division of subjects in the QS. Levels provide a vertical taxonomy; the levels should be based on the EU-levels (Eraut, 1994). Dual names of qualifications should describe abilities by reference to the row and the column aspects of the qualifications; they refer to the attainment level and the subject area (§ 4.7.1).

Full qualifications should have a flexible composition to meet specific regional or individual demand. Educational profiles fulfil that requirement and indicate how full qualifications should be broken into common and specific units. Breaking down the curriculum is also necessary for a flexible organisation of teaching/learning, and to make up- and down streaming possible (§ 4.7.1).

Units - and underlying blocks and attainment targets - should represent a competence and stand on their own and they should have a value (level and subject area) independent of the full qualification and pathway. This creates a flexible hierarchy of levels of unit and depth in the QS. Verbs used may indicate the place of the unit in the hierarchy.

A QS needs to be accessible for the target groups admitted by schools (§ 4.1.4). Units at the base level of the QS - called basic units - should be within reach of all entrants. The design should provide norms for the entry[41] level based on the presumed pre-entry requirements for basic units.

A unit descriptor should describe the blocks in the unit and attainment targets inside the blocks. Units should have a volume that represents a real requirement for work, study or social life and that can be handled by school organisation and student target groups.

A taxonomy should support the definition of qualifications at help when looking for work, selecting a school, in curriculum development, functioning of the employment market and the organisation of commerce & industry. For qualified school leavers, qualifications should be interchangeable. Similar areas of competence should have similar names. The QS should limit undesirable repetition when students change pathways and allow for qualification of early school leavers.

Most points above touch external or internal flexibility. The clarity can improve the school-to-work transition and contribute to the flexibility of organisation.

6.1.3 Requirements on content

As contextual change is the norm, educational objectives in the form of attainment targets need to facilitate responsiveness. The attainment target should be based on translating actual requirements for work, social life and study into action structures with a ‘triple or broad qualification’ (§ 4.7.1) and

[41] Entry levels for units should not be confused with the admission requirements for IAE’s with differentiation for the 2-, 3- and 4-year courses of the educational route.

the learning of competence - in a form chosen by schools - on problem solving (Soden, 1994). Decontextualised action structures (Van de Lagemaat, 1986; Nijhof & Streumer, 1994b) can support these targets manifold. Decontextualised action structures describe competence and are possibly 1) less vulnerable to contextual changes, 2) allowing exemplary choice by schools, 3) expressions of transfer potential and 4) more effective to communicate change than subject matter.

6.1.4 Additional requirements on educational objectives

Three more requirements are important - triple qualification throughout the QS, a minimum qualification for all school leavers (§ 4.1.4), and transferability derived from competence based learning (§ 2.3.3).

SSAVE aims at triple qualification within attainment targets. It needs also a structured form at unit and full qualification levels.

The entry qualification, (at an undefined level; Crince Le Roy, 1993) is necessary for successful entry into work. Dutch policy aims at an entry qualification for everyone. SSAVE needs to create a QS that provides opportunities to attain a minimum entry qualification.

S-SSAVE linked school- and work-based programs to bring about competence-based learning. The policy is to establish such links in all pathways of SSAVE.

The requirements above and specifically the criteria in Table 6.2 will be used to judge about the design and the development of the QS below.

6.2 Design of the QS

The Minister of Agriculture in the Discussion Paper DC (LNV, 1989d) outlined his proposals for the design of the QS. Not all the requirements described in # 6.1, however, were worked out in the design; the subject areas of full qualifications and the content were primarily outcomes of subsequent development.

6.2.1 Design of the structure

The design of the structure is expanded below. Much attention is paid to time allocation and time utilisation. This point is important for the control of a flexible organisation.

The design of new divisions in an old sector

SSAVE is one of 4 established sectors in Dutch VET - engineering, agriculture and natural environment (SSAVE), commercial education, and health care services. In 1990, the name for SSAVE changed from ‘Agriculture’ to ‘Agriculture and natural environment’. The new sector name reflects the change in rural context (§ 2.1.1).

In 1990, the assignment of courses to schools was relaxed to make school organisation more flexible. Before 1990 the agricultural schools applied for

each course. Unique courses were assigned to a single school, for example fruit growing, other courses to a small number of schools, for example arboriculture, and common courses to all schools.

The design for the new law on SE shifted the assignment from the level of single courses to courses classified by three types of employment division - core division courses (assigned to all schools), specific division courses, (assigned to a few selected schools) and branch division courses, (assigned to one school)[42]. The specific and branch divisions were assigned for efficiency reasons (O&W, 1988b).

The ministry of agriculture increased the number of divisions in 1990 from four to eight to maintain control of division at macro level. The new divisions reflect the main points of rural development - the end of mixed farming, processing of agricultural products (Food technology, Floristry and Animal care), new functions of the rural area (Horse management, Green-keeping and Environmental control) (Figure 6.2).

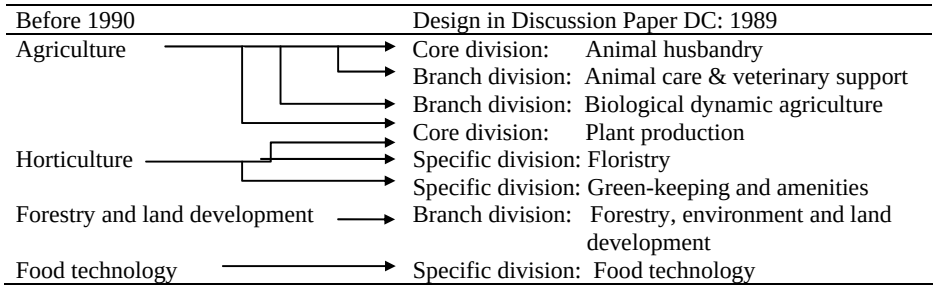

Figure 6.2: Core, specific and branch divisions in SSAVE.

The number of divisions increased - this means an undesirable decrease of degrees of freedom in schools. At the same time, however, the assignment of tasks to schools changed from the level of full qualifications to the level of divisions. The net result is an increase of external flexibility.

The design of pathways

The policy is an open SSAVE for target groups of different age and ability, whether working or not. SSAVE should award qualifications and also fulfil social and pedagogic functions. This combination causes a conflict between (and within) objectives and means. Are pathways to be designed at levels where students demand education but the market offers few opportunities? How are we to solve this, and attain the ideal of independent courses and qualifications, teaching and assessment, and thereby, independent of pathways (Achtenhagen, 1994).

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[42] In some cases a school could not admit more than a fixed number of students in an assigned branch division (for example Animal care and veterinary support).

For social reasons, it was intended to introduce the EU-levels 1 to 4 in separate pathways, in education and training routes, in part time and shorts courses for all the new divisions. For economic reasons the objectives were to be based on articulating the needs of the employment market and transforming them into qualifications.

In 1989, four levels were proposed. The relevant competence based content was simply assumed for all pathways requested. However, commerce & industry rejected level 1 and 2 although teachers from JSAVE and parents asked for these levels.

The Minister of Agriculture proposed to recognise levels 1 and 2 for pedagogic and social reasons, but did not change the criterion of employment market relevance for level 1. It took until the end of the 1990s before this conflict of objectives was made explicit; it is still not solved. As a result of the search for employment market reference, however, teachers in the process of change were unable to share the common self-referential change (Vanderstraeten, 1993).

Thus in retrospect one may question the logical basis of attempting from the outset to establish all pathways and derive content for all those pathways from employment market demands. Those supporting occupational profile clung blindly to a powerful principle. The unintentional consequence was that educational change focused unreservedly on external competence based demand.

Other design problems arose over differential funding of pathways. Differentiation implies that in one way or another properties of pathways are connected with funding. The design in the Discussion Paper DC made the link at the level of the structure and connected funding with efficient utilisation of time. This is one of the reasons why time allocation is made such an important issue in the design of the QS-structure. The QS is independent of pathways as far taxonomy and content are concerned, but for valid reasons not for structure.

The alternative is that at macro level every student is given the same facility and the same time to attain a qualification (this is a different chance), and that the school has the responsibility for accommodating different target groups without prescribed pathways. This may favour or harm individual schools because of regional diversity; it may hollow the social function of schools when funded for outcome.

Another alternative is the differentiated assignment of drawing rights to students and match their different ability; this approach harbours new differentiation, distribution and control problems.

External flexibility towards required competence is in conflict with external flexibility towards social demand. The QS itself is responsive as it can facilitate the outcome of any conclusion in this conflict.

Differential funding of pathways decreases the degrees of freedom of schools; however, at the same time it increases the possibilities of schools to respond to a large supply of poorly motivated or talented students.

The concept of normalisation and dualisation

The complex set of pathways of SSAVE dating from before 1990 were to be normalised and all pathways made available for all divisions. The clarity and efficiency of the system should improve; the educational route should have a considerable work-based program; the system should have little overlap and be easy to fund.

In the design proposed in the Discussion Paper DC, all divisions were given level 2, 3 and 4[43] courses. Day release courses are educational routes (SE-legislation, Table 2.1) and the main pathways of SSAVE with 2-, 3- and 4-year courses. SALVO regarded level 1 as an insufficient full qualification, but advised that there should be a diploma at level 1 for early school leavers. In addition, the law obliges schools to organise orienting and linking programs leading to these courses for 16+ students without an entry qualification.

Apprenticeship schemes are training routes (VT legislation, Table 2.1) with an assistant, a basic level and two advanced levels. The QS for SSAVE has a basic course of 2 years at level 2 and two advanced courses of 2 years each at level 3 and 4. Based on the law on VT, there is also a part time level 3 educational route and there are various short courses as training routes for (parts of) units (see the headers of Table 6.3).

Table 6.3: Normative allocation of days in SSAVE (Discussion Paper DC)

pathways:		educational routes				training routes	
		day release			part time	app. scheme	short
levels:	1	2	3	4	3	2, 3 & 4	courses
total course time:		400	600	800	160	400-240	
of which:							
work-based training		100	200	200	PM	320-160	PM
school-based training		300	400	600	160	80	1-20
of which: core		120	160	240	80	64	1-20
limited choice		60	80	120	40	16	-
free choice		60	80	120	40	-	-
free time		60	80	120	-	-	-

To dualise the educational route, a work-based program of 100 days was assigned to the 2-year courses and one of 200 days to each of the 3- and 4-years courses. The apprenticeship schemes maintained their one-day school-based programs. This design is uniform for all the divisions of SSAVE (see the rows in the middle of Table 6.3).

[43] EU-levels (§ 4.1.6) are discussed in § 6.2.2.

The new pathways, brought into one institution, increased the potential in- and external flexibility of SSAVE. EU-levels increased the international interchangeability of full qualifications. The introduction of work-based programs in all pathways facilitates pedagogy to attain transferability.

The concept of time allocation within pathways

Norms for the efficiency of pathways and of students with different ability were based on practical experience and estimations. The rationale starts with points of departure for time allocation for compulsory and optional curriculum, then the estimation of time needed in pathways and by students are added, and finally conclusions on the qualification volume of objectives and the effective time in modules are reached.

Time allocation within pathways is a choice between national uniformity and regional regulating capacity. In the Discussion Paper DC the Minister of Agriculture proposed a division of the school-based program into four components - a core (40%), a limited choice element, a free choice element and free time (all three 20%). In the general curriculum conference, commerce & industry demanded a larger core and the schools wanted more freedom (LNV, 1989h).

The objectives in the QS should describe content for 80% (but not the free time). Free time allows room for the IAE to program educational aims in relation to the identity of the school. Free time does not apply to training routes, because of their predominantly occupational objectives. The available free time is presented in the bottom line of Table 6.3.

Part time education for adults takes 160 days of school based training over 2 or 3 years. The part time course has no free time component because pedagogic aspects of learning are considered to be less important for adults.

For the training routes the Discussion Paper DC proposed a division of school-based training into two - a core program (80%) and a limited choice program (20%). A small free choice component was proposed for the higher levels. The relatively large volume of the core program in a training route is designed to attain a comparable study load to the core of the educational route, in spite of the small number of days available. In this way diplomas in the educational and training routes were made interchangeable with respect to the vocational qualification. The core program of all pathways consists of prescribed units; the limited choice program was intended to allow a choice of units from a limited number of options; the free choice program allows choice of units from the whole of the QS.

To quantify the relative positions[44], a further assumption is that a student works a 40-week year, and a week of 5 days of 8 hours per day. Thus a school year has 200 school days. The course time in 2-, 3- and 4-year courses multiplies to 400, 600 and 800 days. In the educational route 100, 200 and 200 days (approximately 25%) are allocated to work based training in the 2-, 3- and 4-year courses respectively. In the apprenticeship schemes, 1 day a week is allocated to school based training and 2-4 days a week (67-80 %) to work-based learning (as summarised in the top lines of Table 6.3).

As part of the work based training, a number of days to be spent at practical training colleges were prescribed in the design. The 5 to 20 days allocated differ between levels and divisions. The differences are based on the volume of training in a division that needs to be done at an IPC in a safer or more efficient way by specialists than an IAE can do it.

The points of departure above did detract from freedom in IAE's and responsiveness. The data, however, e.g. in Table 6.3 are normative for outcome definition and a basis for design and not a Regulation for schools. Schools, used to regulation, took time to utilise the new degrees of freedom.

Design of time utilisation in programs

What can be expected from the time spent in VET? Time taken in pathways will vary with course length and the ratio of time for school and the work based programs. A differentiated normative set of assumptions on effectiveness of pathways has to be drawn up.

The Discussion Paper DC, advised by ARVO (1990, p. 5), proposed blocks with a standard 'qualification volume' and a variable time assignment, depending on the time needed by different target groups. The block describes the objective of a module. The standard measure for one module is based on the time needed in the school-based program[45]. Less talented students will need more time. Time in one module for a level-4 student compares with a full week of work at school and at a business. These 40 hours compare with one traditional period on the timetable for a school year of 40 weeks[46].

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[44] In SSAVE, students had a school year with 42 (now 40) weeks, which included 6 weeks work placement. The state funded 30 lessons of 50 minutes a week (Annex 2.2). Thus, the net classroom time is 25 hours a week. The study load was 1700 (now 1600) hours per annum (Discussion Paper DC), so 40 hours per week. Thus students are supposed to spend on average 15 study hours outside school.

[45] This is student time for the school-based program, not class room time (§ 6.1.3).

[46] 40 periods of 50 minutes, minus time for examination and extra curricular activities in school time and plus time for homework, may result in a gross student time of 40 hours and a net classroom time of 20 hours.

Work-based training is taken to mean an integrated part of the time utilisation in the school-based program. There are teaching and administrative reasons for this approach.

The background for the teaching reason is the range of practical experience of students and the regional facilities for work based training. The school needs to compensate for this, for example with attendance at IPC's for specific qualifications and tailor-made use of work-based training.

The administrative reasons have to do with the linking study load and funding. The idea in 1990 was that schools would be paid for eventual outcomes within a couple of years. To provide opportunities for control the expected outcome was fully assigned to the most expensive component that the government had to pay for. This would encourage schools to maximise the use of other, cheaper means to achieve attainments, for example exemptions, IPC-weeks and work-based programs. Another administrative reason was the difficulty of granting qualifying capacity (or exemption) to the wide range of work-based training.

Based on these starting points, a differentiation of normal study loads to modules has been applied to each level pathway (Table 6.4). A student who meets the entry requirements for the level-4 course is assumed to study twice as fast as someone does without entry qualifications in a level-2 course.

Table 6.4: Design of normal study hours per module in Discussion paper DC

pathway:	educational route		training route	
Full qualification	day release	part time	apprenticeship	short course
EU-level 2	80		40	20
EU-level 3	60	20	40	20
EU-level 4	40		40	20

The efficiency of students in a school-based program in the training route is estimated to be comparable with the level 2 in the educational route, and the training route may be twice as efficient as the educational route on account of the large component of work based training. That is why less time is estimated (Table 6.4). The difference in efficiency of a large (4 days) or small (2 day) work based component for the educational process, is ignored because of the lack of variation of tasks in the occupation (Nieuwenhuis, 1991; De Vries, 1988). Part time education and short courses are assumed to be twice as efficient as the full time level 4 course due to the extensive practical experience and the motivation of the adult learner (age >21 years).

Units in responsive SSAVE consist of 2–10 blocks[47] with variable time. The proposals, a guess based on experience, was to be improved and further differentiated during the development of the QS.

The design of qualification volume of full qualifications

The number of modules in a course equals the time assigned to the school-based program divided by the time needed for one module.

The quotient for level 4 in a 4-year course for example is calculated as follows. The available time for a student in a 4-year course in the core, limited choice and free choice program of the school-based program is 240+120+120 = 480 days (Table 6.2), these are 480 * 8 = 3.840 hours. The study hours per module are 40 at level 4 (Table 6.3). Thus, the 4-year course has 3840/40 = 96 modules. The 96 modules were rounded up to 100 (Table 6.5). Thus, the actual study hours per module for a level-4 student are 38.4 precisely.

Table 6.5: Block per full qualification in the Review DC '96

pathway:	educational route		training route	
full qualification	day release	Part time	apprenticeship	short course
EU-level 2	25		12	-[a]
EU-level 3	45	45	12[b]	
EU-level 4	100		12[b]	

[a] Short courses tend to offer well-chosen combinations of attainment targets, single blocks or units - it is not likely that a full qualification is attained.

[b] In the apprenticeship scheme, the full qualifications are stacked, the result is a total of (12 + 12 =) 24 at level 3 and (24 + 12=) 36 at level 4.

The number of modules in a course equals the number of blocks in a qualification. The qualification volume is expressed in blocks.

The design of effective time in modules

The module has a study load of 40 hours for a student. What does this mean for the teacher? What is the effective time within modules?

The Discussion Paper proposed that 80% of the students' school based time in the educational route should be given to nationally determined attainment targets; this is 87.5% in the training route. This is the gross time for prescribed units. Of the gross time, it was suggested to spend 85% directly on learning and 15% for introduction, orientation, assessments and remediation of failed students.

This means that a level 4 student with an educational profile of 100 modules of actually 38.4 hours still has 32.6 hours after a subtraction of

[47] During the design and development of the QS a volume of qualification (in this study a block) and a corresponding volume of program (in this study a module) were called respectively module and module book.

15%. Thus after subtraction of time for private study, the real classroom time may be about 20 hours (this is comparable with one period of 50 minutes on a timetable, see footnotes 4 and 9). These notions are important for the design of school-based programs and exemplar modules.

In Discussion Paper DC, schools were advised to add 75% of the work-based training and compulsory weeks at IPC's to the compulsory or limited choice units, to appropriate parts of the program. For a level 4 student it means, for example, that 75 % of the 200 days for the work-based program are linked with the programs of a selection of the 100 modules. The remaining 50 days could be used for other purposes or left free.

The starting points about the linkage of study-time and qualification are necessary to design and develop clear outcomes and a QS that enables schools to be responsive. It is unlikely that schools design this themselves (# 8.4). The time differentiation makes units more accessible for target groups. A core and choice within full qualifications provide unit groupings and options.

Realistic numbers of blocks per full qualification have been estimated. This is central to controlling a responsive system because it enables objectives to be linked to means. More important is that 'a number of blocks' is a tangible qualification. The volumes of qualification are relevant for clients and for school organisation (and not the time spent on them in school or elsewhere).

6.2.2 Design of the taxonomy of full qualifications and units

The design of the taxonomy is shaped in this paragraph. The focus is on levels of full qualifications, commonality of qualifications, the educational profile and the unit descriptor. Uniform levels ease external flexibility. Commonality is a prerequisite to improve internal flexibility. The educational profile and unit descriptors are interfaces to break qualifications into units, blocks and attainment targets. The interfaces are the traffic policemen on the crossroads of competence.

The design of levels and subject areas of full qualifications

Discussion Paper DC proposed a QS with 4 levels based on the EU-levels (Table 4.1). The original EU-levels were made to classify full qualifications from different European countries and the descriptions of levels support that specific function. Thus adaptations were made. Numbers 1-4 were changed to express an operational level[48]. Descriptions were changed to present a general competence -

- the full qualification at level 1 is named: Entrant.

[48] The names of the operational levels of full qualifications are not verbs but nouns that refer to an attainment level; this is not in line with a principle of the QS to use verbs for the levels of attainment and nouns for the subject areas.

The Entrant qualifies for routines of practical work at operative level of the production process, working under direct supervision.

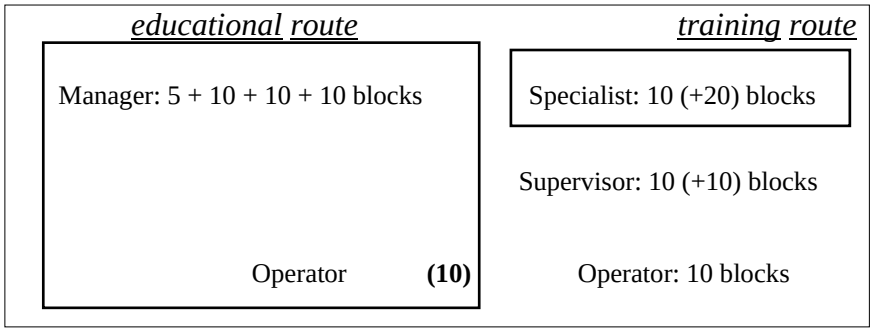
- the full qualification at level 2 is named: Operator.
  The Operator qualifies for craft level work in the production process, done in collaboration with others.
- the full qualification at level 3 is named: Supervisor.
  The Supervisor qualifies for carrying out professional tasks and assessment of practical work and/or other responsibilities, such as the allocation of tasks, the planning of work and management.
- the full qualification at level 4 is: Manager or Specialist.
  The Manager/Specialist has responsibility for planning and/or administration and/or management in a professional and independent way. He has abilities can quickly acquire high levels of ability.
  The qualification of the Manager is a broadening of the branch directed training at Supervisor-levels; broad in all senses of 'whole division', 'long term scope' and 'background knowledge'. The qualification of the Specialist is a deepening in a specific branch.

The combination of a title for a level and an occupational division (or a cluster of branches) forms the attainment level and the subject area for a full qualification and also the name of the diploma (Annex 6.1). The names and descriptions express mainly occupational competence. The diploma names underline that different pathways leading to a full qualification are interchangeable as far as occupational aspects of qualifications are concerned. The training route does not qualify for higher education on account of the small profile (Table 6.2).

The design of commonality in full qualifications

The programmed appearance of common units in full qualifications is termed commonality. The commonality of is a significant measure to improve the opportunities for efficient up- and down streaming in the IAE; it has eased horizontal streaming between different pathways and vertical steaming between different levels.

The vertical streaming within a division was improved in two ways. The first principle was that the 15 core blocks at the Operator level are a component of the 25 core blocks at the Supervisor level, and the 25 at Supervisor level are a component of the 35 at Manager/Specialist level (Figure 6.3). The principle cuts down the loss of time when someone switches levels within the division. It also increases the possibilities of an early leaver from a Manager course to leave as qualified Supervisor or Operator (see Annex 6.2 and 6.5).



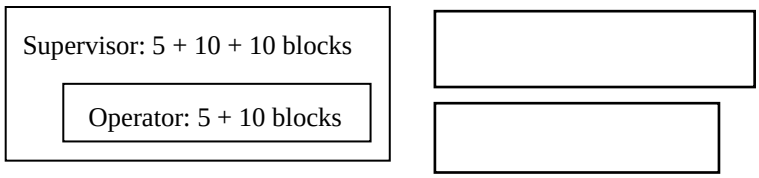


Figure 6.3: Common blocks within divisions (Discussion Paper DC).

Every division having one Operator qualification also enhances the efficiency of vertical streaming. As shown above, the Operator qualification is present within all higher level full qualifications of the division. A positive side effect is that early leavers may achieve a 'division-broad' vocational qualification at level 2. The horizontal streaming within divisions has been improved with a volume of 10-30 core units. Within a division, the Operator qualifications in the educational and training route have 10 blocks in common, the Supervisor 20 blocks and the Manager/Specialist 30 blocks. The clusters of 10 within divisions are occupational units.

The common unit, compulsory in the educational route of all divisions of 5 blocks, is covering general abilities. The common unit results in horizontal commonality between educational routes of divisions, and consequently vertical commonality at all levels of Supervisor and Manager qualifications in the educational route. An example of horizontal commonality is the presence of two units on foreign languages, 6 blocks, in the core of all Manager qualifications.

The concept of concentric and linear structure of commonality

The three pathways in the educational route are forms of external differentiation and that is why vertical commonality has a concentric structure. In the training route, first entries are not streamed and that is why commonality has a linear structure in the training route (Figure 6.3). There is a historical and social background to this structural difference.

The historical reason is that before 1990 the apprenticeship schemes started with courses at the present level 2. Later on, advanced courses, complementary to the basic course were added. The linear structure in the training route of the QS is a continuation of the original structure.

The educational route started in 1890 (and 1958) at the present level 4. To meet the demand of farmers with less motivated or academically talented successors, the present level 3 was introduced in 1964. Social and governmental pressure to provide entry qualifications to everyone led to the introduction of level 2 in 1984. The common belief was that the higher levels in the educational routes would more or less take in the lower levels.

The concentric structure is an expression of that idea. The QS increased the internal flexibility of the old structures.

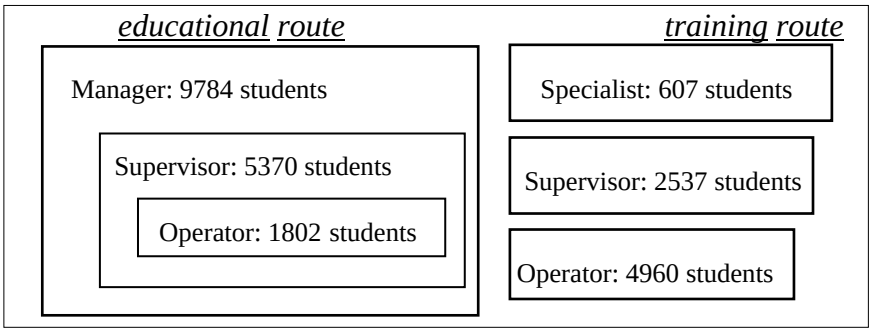


Figure 6.4: Registered students in SSAVE in 1994 – 1995 (LNVc, 1995)

The full qualification in the training route is the choice of young workers in part-time compulsory education (16-18 in the Netherlands), which prefer, in line with their abilities, practical work to studying off-the-job. Students enter the training route at the Operator level, about 50% of them continue after two years with a course at Supervisor level (Figure 6.4). As a consequence of this social function the system is designed to facilitate up grading for late developers (or entrants).

The social function of the educational route is different. The public aim is to provide SSVE at the highest possible level. Academically inclined students, motivated by broader opportunities, choose the educational route. The students aim at the highest levels, their entry qualifications allow. This resulted in a system with an external assessment of students' abilities at three levels. The differentiation has improved efficiency considerably (Figure 8.2).

Commonality makes the QS a coherent and internal flexible system. It links 'working and learning' and 'learning and working'. Communality does not add regulations; it is logic in a requirement. In addition to the horizontal links, the concentric structure gave the low-level full qualifications a position in competence based pedagogy. As side effect the less able, which were regarded as educational outcasts, work for a respected full qualification.
Commonality clashes with Taylorism and differentiation of tasks. It supports flexible approaches of competence and makes common elements of qualification clear.

The design of the model educational profile
The model educational profile provides a framework with minimum requirements for the educational profiles of students.

The model sets the units required for work, study or social life in the full qualifications of the educational and the training routes. It is made up with units for core, limited choice and free choice to a normative total number of blocks, with a division as summarised in Table 6.3. The consequences of the choices become apparent in a quantitative sense, i.e. for a Supervisor in the division of Food Technology (Figure 6.5).

The Discussion Paper DC provided examples of model educational profiles for all levels and divisions; these examples have the structure shown in Figure 6.5. The content of the profile is designed on the basis of available information i.e. from occupational profiles and job analysis. Model profiles and units carry a four-character code for division, full qualification, position within the full qualification, and the year of design or latest revision (e.g. d = Food technology, e = Supervisor, z = model profile and a = Advice DC 1990).

units in full qualifications				chapter/code/version: 6 deza 1	
Diploma: SUPERVISOR in FOOD TECHNOLOGY					
the educational route			the training route		
code	Unit	blocks	code	unit	blocks
core units Supervisor:		25	**core units Supervisor**		20
	core units Operational	15		core units Operational	10
deaa	Caring product monitor	3	deaa	Caring product monitor	3
deba	Processing product technology	5	deba	Processing product technology	5
deca	Preparation for product techn.	2	deca	Preparation for-work product techn.	2
limited choice units (minimum)		10	**limited choice units (minimum)**		4
deda	Packing	3	dc.a	Managing production	3
defa	Monitoring production	4	plba	Operating measuring and regulating	2
deha	Water – provision/application	3	plca	Operating control equipment	3
dc.a	Managing Production	3	plea	Planning process control	2
qfaa	Planning environ. control	2			
plba	Operating measuring and reg.	2			
pbba	Applying economy	3			
mbba	Applying Dutch	3			
m.ba	Using … (modern language)	3			
free choice units (minimum)		10			
total (minimum)		**45**	**total (minimum)**		**24**

Figure 6.5: Model educational profile of the Supervisor in Food Technology

Table 6.6 gives the proposals for the division over all in Discussion Paper DC. The model educational profiles of the educational and training routes differ for the same full qualification, because of different objectives and time available (Table 6.3).

Table 6.6: Blocks in model educational profiles (Discussion Paper DC)

	Educational route (concentric build-up)			
	(Entrant)	Operator	Supervisor	Manager
Core		15	25	50
Limited choice	8	5	10	25
Free choice		5	10	25

	Training route (accumulated blocks)		
	Operator	Supervisor	Specialist
Core	10	20	30
Limited choice	2	4	6

The proposed compulsory part, the core, is 50 % of the minimum required volume in the educational route and 83 % in the training route. This compulsory part, embodies the principle of commonality, of unit grouping and options, and meets the EU-levels. Thus conditions for interchangeability of full qualifications at the international and national level, and efficient up- and down streaming within the school are created in a single measure.

While up- and down streaming is a form of internal flexibility, the external flexibility, a response to specific demand, is enhanced by different levels and subject areas in full qualifications, and within full qualifications with limited and free choice units. The model educational profile is an important tool where internal and external flexibility are built in.

The sequence of Tables 6.3 to 6.6 might give a false impression of a linear process. In reality the conclusion in Table 6.6 was the focus point of negotiation in the Working Group and later on between schools, commerce & industry and government (see # 5.2).

The design of the unit descriptor

The design of the unit descriptor is not straightforward. The main discussion is on what should be included and what left out. A precise description of learning would cover

1) the students' entry qualifications,
2) the main outcome,
3) operations to achieve the outcome,
4) the task environment and
5) performance criteria (Romiszowski, 1981; Holleman, 1993).

In 1989, Discussion Paper DC copied the recommendations above and the Scottish module descriptor (§ 4.6.3).

As concluded earlier, the QS for SSAVE should not suggest the context of teaching/learning (§ 3.3.1) but should acknowledge the competence of the schools in this respect (§ 4.1.6). This means that these elements needed to be added by schools themselves or in models for schools by educational support institutions.

For this reason the Minister of Agriculture followed the proposal of the Minister of Education (O&W, 1990a, 1990b & 1992). In 1989, after the curriculum conferences, he decided that a unit descriptor should prescribe only legitimate assigned tasks in the form of attainment targets. This meant that the unit descriptor should focus on clearly defined outcomes only (Figure

6.6) and that the points 3) operations to achieve the task, 4) the task environment and 5) performance criteria would not be included in the descriptor.

A unit has a double name; this is also the name of the certificate. The content of the unit is stated through a comprehensive action structure for the whole unit. Then the duration of the study is given in terms of the number of blocks and entry level is indicated.

A unit is divided into blocks; each block has a title and five attainment targets. The criterion of five attainment targets was added by the Project management for Group of 30 & Group of 4 (§ 5.2.2) in late 1989. The title of a block indicates the competence expressed by the five attainment targets. Therefore a verb and a noun are used to show attainment level and subject area. The unit Creating soft landscape features, for example consists of 5 blocks - Laying out small features, Carrying out earth works, Handling materials, Planting, and Delivering and aftercare.

Review Diplomas and Certificates '96	chapter/code: 7 keb4
CREATING SOFT LANDSCAPE FEATURES	3. / 5.
Co-ordinating and executing garden lay-out	B. Executing earth works 1. / 5.
5 blocks	C. Handling materials (machinery operation)
ENTRY LEVEL: kea4	1. / 5.
ATTAINMENT TARGETS: A. Measuring landscape features The student: 1. can indicate, based on a technical or design plan, the overall lay-out in the terrain and is able to read the technical or design plan for this purpose; 2. can introduce in efficient fashion markers in a plan, ...	D. Planting 1. / 5. E. Delivering and aftercare 1. / 4. 5. can collect and file the job record with help of forms and can make a subsequent calculation; can cost a feature with the client and the employer, based on job records and subsequent calculation.

Figure 6.6: Example of a unit descriptor (Review DC '96)

The attainment level and subject area of a full qualification, are scaled down to units, blocks, and attainment targets. Attainment targets are the core of the descriptor; they are the learning outcomes of the unit.

Discussion Paper DC does not prescribe the size of a unit. However, in the examples of educational profiles, the units differ in size in the different levels of the core of full qualifications (Table 6.7).

Table 6.7: Blocks in units of the core (Discussion Paper DC)

Level:	Operator	Supervisor	Manager

Blocks in the common core:	3, 3, 4	10	10

The reasons for having units of different size are -

- the volume of a qualification differs, or
- an actual qualification may be split when a unit is too large,
  - to fit in the span of control of students (i.e. the Operator) or
  - to organise up- and down streaming or
  - when there is too much overlap between units (more than 5-10 equal attainment targets between two or more units are brought together into a single unit).

6.2.3 Design of the content

Discussion Paper DC quoted the definition of attainment target from legislation (§ 4.1.1). A few examples of attainment targets were given. They had a standard phrasing 'the student ought something to act on in a context'. After the curriculum conferences in 1989 this phrasing was changed into 'the student can act to achieve something in a context'. The disadvantage of the first phrasing is that the subject area is prior to the attainment. To support competence-based learning the second phrasing is better. The problem with the second phrasing is that students may not really act in a practical context. That is why the attainment target should not be a *functional* action structure but an *educational* action structure (Van de Lagemaat 1986).

6.2.4 Design of additional provisions

This paragraph analyses how the QS deals with the difficult issue of basic skills and broad or triple qualification.

Nijhof & Mulder (1986) define basic skills as 'the broad knowledge, skills and attitudes of qualified school leavers which have transfer value in related occupational fields and which are essential for the performance of various tasks'. In addition to this assign to basic skills 'the cognitive, communicative and group process skills which have transfer value and are necessary if the future worker is to be able to learn to learn and to build more than one career'. This definition stresses 'transfer qualities', the ability to learn. Perkins & Salomon (1989) mention three skills - self-regulation, self-monitoring and self-control. UNESCO (1996) summarises 'to know, to do, living together and to be'.

The definition of Nijhof & Remmers (1989) stresses that the basis for skills may be learned in school and that actual skills are learned continuously on the work floor (Moerkamp, 1999). That is why attainment targets need to express required skills and transfer potential. This set of requirements fit the definition of qualification in § 3.2.3. The assumption is that the description of requirements at work, in social life and for learning in the form of decon-textualised action structures will result in triple qualification in attainment targets. Triple qualification embodied in attainment targets will result in a

description of triple qualification at all taxonomy levels in the QS. In this way, the educational and training routes lead to broad qualifications.

The triple qualification common to the educational and training routes will be termed a standard full qualification. As the triple qualification is provided by both the educational and training routes, it follows that the educational route must produce something more and that extra will be termed a deepened full qualification (Table 6.8).

The deepening of the standard common core for the educational and training route is achieved through extra occupation supporting units and general units in the core, plus limited and free choice units (Table 6.6). The result is more abstraction, broader views and better transferability. The manager qualifies for entry in higher education.

The present training route offers no extra general qualifying objectives, but does have a different extra component - the applied unit in work-place experience (§ 6.3.2).

Table 6.8: Deepened and standard full qualifications in the Review DC '96

level of qualification:		standard full qualification		deepened full qualification	
Pathway:		educational route	training route	educational route	training route
1	Entrant		3	3	
2	Operator		8	8	
3	Supervisor		22	28	
4	Manager			23	
	Specialist		15[a]		
4	Specialist		1[b]		

[a] The Specialist in SSAVE is not a Specialists' but a standard Managers' full qualification
[b] Specialist Flower arrangement is the only real specialist full qualification

The Manager and the Specialist full qualifications at level 4 are the result of the SE and VT legislation. Is this an unwanted inheritance or an attainment from the past?

The two core programs are much the same, so the deepened full qualification for Manager and the standard broad full qualification for Specialist do not need different names. However, there is one exception. The Specialist Flower arranger has a unique set of specialised core units and is therefore a Specialist that deserves its own name. The deepening of craftsmanship may be perceived as a specialist's full qualification in a training route (Table 6.8).

Conclusion

The structure and taxonomy provide a time allocation and content to be placed in a functional hierarchy. The basic philosophy is that in a responsive system an attainment target becomes clear with a tangible indication of content, an allocation of time and a place in a functional hierarchy.

The attainment level and subject area, a two word title repeated at every level of educational objective gives an illusion of infinity to the QS. This characteristic allows users to be consistent when discussing the QS outcomes at any level in overall terms or in detail; this is extremely important for communication between macro, meso and micro levels of a scattered system of SSAVE.

The design provides a basis to meet general requirements summarised in # 6.1. Criteria on responsiveness (Table 6.2) were applied i.e. commonality, and unit groupings and options or a basis was laid, i.e. decontextualisation.

6.3 Development of the QS

This section elaborates the improvements and additions to the architecture of the QS described in # 6.2, and how it was used. Important new topics in this section are the subject areas of full qualifications, the units, and the construction of attainment targets. The project phase described in # 5.3 was important in this stage.

6.3.1 Development of the structure of the QS

The development of the structure is analysed in this paragraph. The principles did not change and the focus is on improvements and optimisation.

The adaptation of occupational divisions

One division split, two merged, and one was developed (Figure 6.7).

Design: 1990	Review DC '96
1. Animal husbandry	1. Animal husbandry
6. Animal care & veterinary support →	6. Animal care & veterinary support
	9. Horse keeping
7. Biological dynamic agriculture	7. Biological dynamic agriculture
2. Plant breeding	2. Plant production
3. Floristry	3. Floristry
4. Green-keeping and amenities →	4. Green-keeping
8. Forestry, environment and land development	8. Environmental control
5. Food technology	5. Food technology

Figure 6.7: Development of occupational divisions of SSAVE.

The definition of horse keeping was prepared by small working groups and concluded in a curriculum conference. The merging of Forestry and land development with Green-keeping (1994) and the development of Environmental control (1996) was an integrated process supported by occupational analysis and curriculum conferences (Annex 5.1).

The design and development of new divisions looks like a simple and insignificant change of labels in retrospect, but at the actual time the change met strong resistance both in the Ministry and the education service.

Increase of divisions means a decrease of responsiveness - it means more regulation and less global subject areas. The positive observation is the fact that divisions can change.

The development of time utilisation by target groups

Teachers in SSAVE knew from experience that adult courses achieved similar educational objectives more quickly than courses in SSAVE-A, SSAVE-B and S-SSAVE. The proposals - estimations - in Discussion Paper DC were not accurate enough and were improved.

One change, initiated by the organising bodies for the agricultural apprenticeship scheme, was the ladder in the use of time in the training route in 1990. The estimated pace in the design was too fast for students at level 2 and too slow for those at level 4. It is interesting to observe that students improve in their ability to study; possibly through selection, older age or learning experience (Table, 6.9). Another change was made in 1995 and the study volume of a block for level 3 was decreased from 60 into 55 hours. Teachers saw that the students could do more and initiated this change.

Table 6.9: Study hours per module for target groups in Review DC '96

pathway:	educational route		training route	
full qualification:	day release	part time	apprenticeship	short course
Entrant	125		75	
Operator	80		50 (40)	20
Supervisor	55 (60)	25	40	20
Manager/Specialist	40		30 (40)	20

The accuracy of the time allocation in the design is surprising. This accuracy, however, should be put in perspective, because 'one gets qualification for the time one offers' in education.

The development of the qualification volume

The number of blocks per full qualification changed due to improved estimation of efficiency of pathways and target groups (Table 6.10).

Table 6.10: Blocks per full qualification in the Review DC '96

pathway:	educational route		training route	
full qualification:	day release	part time	apprenticeship	short course
Entrant	4		4	
Operator	20 [a] (25)		12	- [c]
Supervisor	50 (45)	50	15 [b] (12)	
Manager/Specialist	100		20 [b] (12)	

[a] Five units were set apart for linkage and bridging

[b] In the apprenticeship scheme, the full qualifications are stacked, the result being a total of (12 + 15 =) 27 at level 3 and (27 + 20=) 47 at level 4.

[c] Short courses intend to provide well-chosen combinations of attainment targets, single blocks or units (it is not likely that a full qualification is awarded).

The estimation and verification of efficiency of pathways and time utilisation by target groups is essential information about outcomes and returns on investments one may expect.

Effective time in blocks and attainment targets

The qualification volume of all blocks is the same. A block has five attainment targets. An attainment target is 2 days work for a level 2 student, 1 day for a level 4 student and 0.5 day for adults in an advanced course. Actual classroom time is half the allotted time (§ 6.2.1). The intention was to provide tangible objectives, attainable by a student with a limited organising ability.

In retrospect the assumptions for time allocation were of great help in the development of the QS. The time allocation clarified the proportion of teachers' tasks in the schools. Time allocation is likely to be a means for school organisation and curriculum development. A disadvantage of time allocation in Discussion Paper DC was a possible literal interpretation in schools; then there is a risk that creativity will be stifled, if it begins to look like more regulation.

Structure may reinforce deregulation, global study areas and taxonomy-requirements within the QS architecture.

6.3.2 Development of a taxonomy of qualifications

Development of subject areas of full qualifications, and levels and subject areas of units are the main topics. Collection of content is a prerequisite. Taxonomy and content (§ 6.3.3.) are the core of a QS.

Development of subject areas of full qualifications

The choice of subject areas is relevant for the adaptability of objectives, the flexibility of organisation and the transferability of school leavers. Two measures are reconstructed and analysed below.

The first measure was to clarify the functional difference between levels for full qualifications with criteria for subject areas.

After discussion and negotiation with specialists and representatives from commerce & industry, it was decided to express the Supervisor subject areas by relating them to branches within occupational divisions. For example in the division Green-keeping, the branches Supervisor of small greens and Supervisor of large greens were identified. This approach honours the demand to deepen the occupational transfer at level 3, as expressed in occupational profiles and described in the EU-levels. Separation into branches also offers the branch teachers opportunities to maintain their

specialist professional skills. The approach is clearly understood because of the recognisable branch names.

For Manager level, a separation of subject areas into broadly applicable tasks was agreed - not a division in branches, but of broad ability - management, trade, environment, technology, applicable to the occupational division or broader -. This is a response to demands in occupational profiles to transfer knowledge and abilities broader than just the occupational techniques. Division at level 4 into broad applicable full qualifications defines the work of the general subject teachers. In Review DC '96, the division of Plant production is divided into three full qualifications - Plant production and management, Plant production and trade, and Plant production and environment.

The second measure was to reduce the number of full qualifications. Fewer full qualifications would make the system clearer, make qualifications broader and enhance the flexibility of school leavers on the employment market. The reduction would lessen the needless fragmentation of programs and increase the flexibility and effectiveness of schools. A QS with fewer full qualifications is preferable, because the smaller IAE's would find it hard to offer a wide range of courses.

With the support of the curriculum conferences every division was granted one Operator full qualification. This eases up- and down streaming. Table 6.11 shows the impact for the primary, respectively Operator level in the training route.

Table 6.11: Totals of full qualifications in 1988 and in 1996.

	old system: 1988	Review DC '96
educational route	S-SSAVE: 9	Operator: 8
	SSAVE-B: 15	Supervisor: 28
	SSAVE-A: 15 (total 39)	Manager: 23 (total 59)
training route	assistant 12	Entrant: 3
	primary 36	Operator: 8
	secondary: 4	Supervisor: 22
	tertiary: 2 (total 54)	Specialist: 15 (total 48)
total of different full qualifications	93	107

The QS successfully designed global study areas at EU-level 2; at the other levels the responsiveness of the system decreased due to fragmentation of full qualifications (in the educational route the number full qualifications increased with 20 from 39 to 59). This poor performance is only partly compensated by communality of full qualifications in the educational and training route (Of 107 full qualifications have 2 * 48 = 96 full qualification the same standard full qualification - Table 6.8. The total of different study areas is still 64, which large number is due to increased fragmentation at level 3 and 4 in the educational route).

Two problems of bringing full qualifications together, a technological and a policy problem are analysed below.

The first, technological, problem is the reduction of occupational profiles into educational profiles. The occupational analysis of the cutflowers branch, pot and bed plants for example, had 9 occupational profiles. During the design of the QS one of the nine task areas of the occupational profile was accepted without change into a subject area for a full qualification (Supervisor pot plants); and three occupational profiles were used in preparing other full qualifications. The design obtained the support of the Plant production curriculum conference. It retrospect, however, may be concluded that also the Supervisor pot plants should not have been recognised (in spite of different logistics, the similarities with flower growing in greenhouses do prevail).

Task areas are very diverse and variable because of personal history, attitudes and abilities of the individual; Annex 5.2 illustrates that occupational profiles are less convincing than they appear. Interpretation of occupational profiles, and the maintenance of a QS requires a strong body with technological expertise.

The second, political, problem is that representatives from branches look at differences in context and not at action structures; carrying a flag for the branch is still the thing that counts. Splitting of subjects makes the subject area clear and narrow. Detailed subject areas have pros and cons -

- they are better recognised by industry, teachers and students;
- they enlarge the numbers of units to be made and maintained and the numbers of students needed to meet requirements of scale;
- they may not contribute to transferability (§ 3.1.2);
- they may focus on required skills rather than flexibility.

Some branches are very hard (or not) to convince of the necessity of reducing numbers of full qualifications at negotiating a compromise. During the process phase (for PReview DC ‘90 and Review DC ‘92) the authority of the Ministry was used to bring about the change. The aim of two inspectors between March and December of 1990 (§ 5.2.2) was to reach local solutions; many with tailor made arrangements and others by a gentle push.

One example is the Supervisor fruit growing. The representatives from commerce & industry and one school wanted a branch division. Within the Ministry, the department of agricultural education and the department of agronomy co-operated closely. They explained that all IAE’s were to develop courses in the Plant production division to respond in a flexible way to local demand, and attract students by becoming centres of excellence in their own field.

Another example is the Operator animal husbandry. A strong minority of schools and industry wanted three full qualifications - for cattle, pigs and

poultry. Three full qualifications would limit the flexibility of the Operator in the employment market, it would cut the flexibility of up- and down streaming in the schools and it would increase long term organisational problems in the schools (most schools would offer cattle or pigs). The deadlock took several months to resolve by establishing one pig unit and one dairy cattle unit in the core of the educational profile for the Operator animal husbandry. Poultry became an optional unit outside the core; it is of interest for small numbers of students.

Because of partition of the branches for Supervisors and widely applied separation within Manager courses, the numbers of full qualifications increased. This was kept within bounds after a strong reduction in PReview DC '90, but the numbers of full qualifications in the QS increased again (Table 6.12).

Green keeping is an exception. The merger of the Green-keeping and amenity horticulture division, and Forestry, environmental- and land development brought 5 + 6 = 11 full qualifications into one new arrangement of 8.

The further development of full qualifications decreased responsiveness. The increase of full qualification numbers means a decrease of globalisation of subject areas and decontextualisation of content. Strong technological and political countervailing forces need to control this element of self-destruction in responsive SSAVE.

Table 6.12: Full qualifications in divisions of SSAVE between 1990 and 1996.

Full qualifications in the divisions: Divisions of QS for SSAVE:	PReview DC '90	Review DC '92	Review DC '94	Review DC '96
Core divisions				
Plant production	10	11	14	16
Animal husbandry	5	7	9	9
Specific divisions				
Food technology	4	5	9	10
Floristry	3	5	6	6
Green-keeping and amenities	4	5		
Green-keeping			8	9
Environmental control				1
Branch divisions				
Forestry, environment- and land development	6	6		
Animal care and veterinary support	4	4	4	5
Biological dynamic agriculture	3	3	3	3
Horse keeping and equestrian sport			6	5
Total	39	46	59	64

The development of educational profile with units

The educational profile and the size of units were changed.

Discussion Paper DC and Reviews DC up to '94, the educational profile supplied a list of limited choice units (Figure 6.5). This was changed in

Review DC '96; the number of limited choice and free choice units is given and reference is to applicable categories from which to make a selection (Annex 6.3). The original approach was complicated, not satisfactory and was abandoned.

During the development of the QS, the unit size was further adapted to students' abilities. The units are small at the Operator level. One unit in the Operator core has 5 blocks (dedicated to general abilities) all other units have 2 blocks (Driving a tractor, Milking cows, Helping a customer, Cleaning a vessel). The units of 2 blocks function also as sections of JSAVE examinations. Students in JSAVE need small units. The job-related sections of final examinations in JSAVE give exemptions in a SSAVE pathway. The units are largest at Manager level and count 10 blocks (Costing of a farm, Developing a shop, Administration of product control). At higher levels also the complexity, the appeal of transfer, and the required amount of self-management by students should increase. Thus, for pedagogical reasons and for reasons of transferability, units should be broader and larger at higher levels.

The change of the format for the educational profile increased responsiveness. The new definition of the profile is a deregulation and an increase of options. The change of unit size makes the QS more accessible for target groups and enhances internal flexibility.

The development of levels of units

Discussion Paper DC calls for units without links to levels of full qualifications. Someone could attain a unit without following a particular pathway or attaining a full qualification and after assessment be awarded with a certificate. Units should be free standing.

The Preliminary Review DC '90 supplies a table with a hierarchy of verbs that was used to put units in a sequence. The verbs evolved in the course of time. 'Executing' for example could be used for doing something or supervising something. It was agreed between branches to use the verb 'executing' for supervising and to use the verb 'caring' for doing something. Table 6.13 presents the frequency of use of verbs following six years in the Review DC '96.

Table 6.13: Verbs used to sequence units (Review DC '96)

general units	vocational units
progressing/11	developing/12, preserving/2, inspecting/1 guiding/22, administering/15, managing/11, distributing/1 supporting/20, designing/2, elaborating/2, organising/1
applying/17	running/37, processing/4, optimising/1 preparing-work/6, preparing/2
linking/2	executing/72, arranging/2, repairing/1, steering/1

expressing/1	riding/2, training/1, driving/1
helping/1	
	dedicating/14, connecting/1, raising/1
using/12	
assisting/2	caring/47, maintaining/16, assisting/4, operating/3, making/1

Frequently used verbs, for example 'caring' and 'executing' appear at more levels. Details are summarised in Annex 6.4. The verbs refer to elementary processes and are taken from process analysis diagrams (Annex 5.2); the verbs describe operational levels (Table 3.4) and refer to *functional* action structures. Functional action structures are easily recognised by commerce & industry but are difficult to apply in learning (Van de Lagemaat, 1986). They need transformation. The transformation may result in attainment targets with verbs that refer to *educational* action structures. Such a hybrid approach, when applied consistently, may communicate the message, then industry reads the *functional* action structures in the titles and teachers read *educational* action structures in the attainment targets.

The sequencing of units (Table 6.13) independently of the EU-levels of full qualifications increases responsiveness. It is an independent layer of uniform levels, applicable to all competence. Operational action structures are clear for commerce & industry but need transforming to become meaningful in teaching.

Important sequences and balance within educational profiles

Depth in the QS is achieved through a sequence of units. Increasingly higher levels of related subject areas are expressed through verbs taken from the hierarchy in Table 6.13. Basic units are followed subsequently by advanced units. Chapter 5 in Review DC '96 depicts the sequence in the core of all the divisions (example in Annex 6.5).

Another sequence applies to general units. For the development of the general units, the subjects in the SSGE program were cut into 10 blocks. And then three units with 3, 3 and 4 blocks respectively, were made and named Using, Applying and Progressing[49]. The first two units are for work and social purposes and the third one, to SSGE-level, to meet admission requirements of higher (agricultural) education (Table 6.14). Using '…' for mathematics, physics, chemistry and biology, social science and economics, the basic level, have often been integrated in occupational units. The same happened with supporting subjects such as agricultural engineering, enterprise administration and soil science.

Table 6.14: Sequence of general units

[49] The function of the unit is to reach a SSGE level that enables up streaming from SSVE to higher (agricultural) education.

Verb	Noun	Blocks	
Progressing	German/mathematics/…	4	reaches SSGE level
Applying	German/mathematics/…	3	
Using	German/mathematics/…	3	requires basic entry level

Occupational, occupation support and general units are prescribed in the core and limited choice of educational profiles to balance the requirements for work, study, and social life. Units in themselves express a triple qualification. They have however an occupational, an occupation support or a general educational character. Units related to productive tasks are much more occupationally directed than units in supportive domains of economics and engineering and general domains of languages, advanced science and social studies.

In the process phase, the two inspectors (§ 5.2.2) used tables with ideal shares of occupational, occupation supporting and general units in the educational profiles for levels and pathways. However, this was not authorised and did not work. In the project phase the judgement of designers, advisors and consultative groups was relied on. This yielded a wide variety of cores and profiles. The cores were validated and standardised in the Consultancy Groups. The format for the profiles assured triple qualification and made the composition free (Annex 6.3).

The development of subject areas in units

The aim was to have names for units with a single noun for the subject area, which is difficult. E.g. Executing shapes (about bouquets in Floristry) or Developing entrepreneurial skills (a strategic competence for dairy farmers) are vague. The examples illustrate the difficulty of analysing the real nature of acting and of finding clear nouns.

The development of an overall perception of a subject area is a first step in making a unit. Existing school programs, occupational profiles and skills analysis programs offer suggestions. Subject areas are indicated with nouns referring to branches, functions, processes and subjects. For example - Caring for cattle refers to a branch, Retail trading refers to a function, Guiding local maintenance[50] refers to a process, and Applying French applies to a subject (although 'French' may be regarded as a function as well).

Decontextualisation of subject areas is the second step. This means that the subject area is not cow, pig or layer, but farm-animal. Or when 'different soil-types' (in plant propagation) includes rock wool and hydro culture, 'substrate' is a better word. The result is a more formal description of

[50] Guiding local maintenance is a unit about support of local communities when they have wishes and problems with amenities in their neighbourhood.

content that gives teachers the opportunity to utilise a wide variety of contexts to reach a high level of transferability.

The achievement of this result requires content knowledge about skills and curriculum technology (Posner, 1978, p. 312; Nijhof, 1993, p. 328). The result itself is a step in the description of content structure of materials and activities both needed by teachers to guide in learning (Posner, 1978, 336).

The development of units for Workplace experience

One problem during the development was the recognition of the work-based programs of the apprenticeship scheme. The units should be in the core of the educational profile as work experience is an essential aspect of an apprenticeship scheme. For Operator, Supervisor and Specialist respectively, units were developed - Participating in work experience, Supervising work experience and Managing work experience. Each unit contains blocks on 'own tasks, shared tasks and tasks of others'. These units are an important entry for the employment market and awarded to students by industry. The units contribute to the mobility of school leavers.

The development of entry levels of units

The design of the QS demands the definition of entry levels of units. Preliminary Review DC '90 proposes b-levels of JSAVE for Dutch, mathematics and biology. In the Review DC '94, JSAVE was changed into JSVE. The b-level of JSVE compares with the level that should be reached in basic education (BE) after two or three years of secondary school[51].

The Minister of Agriculture referred in to a familiar point, well known to teachers - the admission requirements for the SSAVE-B course (the predecessor of the Supervisor qualification). This also implied that student streams did not change, which is important for school organisation and for public funding. The principal point, however, is the unrestricted access to units for students with a BE-qualification.

The further improvement of the taxonomy mentioned above contributes to the responsiveness of the QS. The protocols for sequencing of units contribute to uniform levels. Definition of broad subject areas for units is a form of decontextualisation. The development of a uniform entry level for basic units improves the accessibility.

6.3.3 Development of the content

The development of content is on construction of attainment targets, describing transfer potential, and broadening.

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[51] In 1990, the entry level of a basic unit was set to be the JSVE b-level for three essential subjects. JSVE is the main supplier of SSAVE. Junior General Secondary Education, the second supplier of students for the SSAVE, had only c and d levels, which were higher than the required b level. The JSVE b-levels are about the same the BE-level in 1995.

The development of attainment targets

The first problem is to transform content into action structures within a standard block.

The standard phrasing of the attainment target in Review DC is *'The student can.... 'verb' .... 'noun' .... 'context' .... '* (examples in Figure 6.6). An attainment target is presented as a task. The description of a realistic task creates attainment targets involving several disciplines.

The attainment target describes personal achievement in a generalised practical context. An effective check on the quality of the description is by transforming it into the phrasing *'How to .... 'verb' .... 'noun' .... 'context' ..... ?'* The 'how to' question should express a real problem at work, social life or learning, to be sure that it corresponds to the right attainment level. When the transformation is difficult, the attainment target may be a poor translation of the task. The 'how to' question should provide a generalised answer, for a broad 'how' is a measure for transfer potential.

The attainment target[52] 'can cultivate plant-breeding material; can make appointments for delivery of a given crop' for example, would in the 'how' form read 'how to cultivate plant-breeding material; how to make appointments for delivery of a given crop?'

The 'how to' questions are realistic and generic. The attainment target is not specific about equipment or type of breeding material and points to criteria for cultivating plant-breeding material in general and making appointments for delivery of any crop.

The traditional phrasing of subject matter in SSAVE usually had the form 'can describe the importance of photosynthesis', and this is in 'how to' phrasing 'how to describe importance of photosynthesis?' The 'how to' question raises new questions. Is the focus on describing, on photosynthesis, or on photosynthesis for something? Verbs like 'draw', 'memorise, and 'orientate' are pedagogic idioms with similar problems; these verbs do not describe an attainment level in a production context.

Van de Lagemaat (1986) stressed the importance of the how question to analyse the core of competence. Engeström (1994, p. 17) supports problem solving - as an advanced form of second order learning.

Most attainment targets of the QS can be transformed into 'how to' questions. Thus, attainment targets are likely to be descriptions of competence, increasing responsiveness.

The development of transfer potential: choice of verbs

The second problem once attainment targets are constructed, is adding transfer potential to the description of content.

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[52] The 1st attainment target of the first block in Review DC '94 (p. 104).

An attainment target describes action structures for added value at work, in learning or social life. The focus is on the verb of the action structure, which should express transfer potential. The search for the right verbs is the centre of the problem.

Abstractions and verbs provided by Bloom (1956), Guilford (1967), De Block (1973) and Kolb (1985) were analysed as possible models. A combination, made by Van Mook & Van Engelshoven (1979) for SSAVE-B, was also tried. The separation of cognitive, attitude and motor abilities, however, does not add to the transfer potential described in attainment targets. The verbs suffer from the 'subject matter verbs' problem described above.

A taxonomy of Van de Lagemaat (Table 3.7) provides a building principle for the construction of attainment targets in the form of *educational* action structures. Van de Lagemaat stays close to the description of the practical problem and avoids pedagogic abstraction. The application of his principle works as follows. The professional, for example the farmer, is made the subject of the attainment target and the word 'can' is left out. When the attainment target expresses the actual activity of the professional, it becomes a *functional* action structure. For example 'the farmer cultivates plant-breeding material; the farmer sets dates for delivery of a given crop'. This *functional* action structure is what actually happens.

It needs a transforming however. Van de Lagemaat notes that the assigned task for students is different in reality. The requirement of the student is the following - 'the student practises[53] the cultivation of plant-breeding material; the student practises setting dates for delivery of a given crop'. A new verb is introduced to construct an *educational* action structure.

The farmer also does this acting. The difference is in the attained result - the farmer works on a physical result in the first place (with all sorts of risks) and the students works on a competency. In the end it is the attainment that counts for the student and not the physical outcome. The actual attainment of the student may be wide-ranging transfer of learning routines.

The example above is generalised in Table 6.15. The *functional* action structures relate to the worker. The *educational* action structures relate to the students. The supporting action structures are about the transfer potential of learning. The first column does not exclusively apply to the worker; the worker may utilise all action structures in the table, but he needs the first column to be productive. The student needs to perform in the second column to be assessed. The supporting action structures are needed for the action structures of the worker and of the student.

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[53] A pitfall is to use here the words describing, memorising, drawing etc. This happens in the Review DC and may be seen as a second cycle subject matter description.

Table 6.15: Action structures and transfer potential (Van de Lagemaat, 1986)

functional action structures of the worker	educational action structures of the student	supporting action structures: the transfer potential
contemplate	reproduce and reflect	
orientate	observe and analyse	abstract
judge	interpret and appraise	transform
decide	set a norm and integrate	reflect
execute	practise	automate
check	evaluate	
wind up	arrange	

Transfer potential enhancing flexibility of school leavers, depends on the choice of verbs in attainment targets.

One may question the relevance of this theoretical starting point. The formulation of *educational* action structures is more difficult and complicated than the formulation of functional action structures. Educational action structures are more abstract and complex and may be difficult to read and comprehend. The *educational* action structure is more precise about the required level of transfer, because it describes the point on which the student should reflect.

The present challenge for teachers in vocational schools is to design a curriculum of assigned study tasks of increasing difficulty, interlaced with motivating practical context and periods of reflection to achieve the required skills and transferability. This work can be based on functional or *educational* action structures.

Unfortunately the 3-year experience of the Desk Group on attainment targets was hardly utilised when LOBAS became responsible for Advice DC in January 1994.

An example may illustrate the problem. The attainment targets for the core of the Operator qualification were changed in 1996 to make them suitable for examination programs of JSAVE. The attainment target that was used as an example above was rephrased as follows in the Advice DC '96[54]; 'can work safely and ergonomically responsible with standard equipment to process plant production material and can check his/her own work'. In the 'how to' form, 'how to work safely and ergonomically responsible with standard equipment to process plant production material and how to check his/her own work?'

How is this change to be judged? The answer on the 'how to' question is also realistic and generic. The attainment target is not specific about equipment, type of crops or type of tasks (exemplary choice) and indicates criteria like safe, ergonomic responsible and own tasks (context). So far so good. The subject area of the new attainment target, however, is narrowed

[54] The 1st attainment target of the first block in Review DC '96, p. 112.

down (the appointment has been left out) and more specific (ergonomically responsible and reporting about own tasks). This brings the attainment target at a higher cognition level, competence requires because the available time remains the same. This is not desirable for the JSAVE examination and for the Operator qualification.

Describing attainment targets with transfer potential is difficult and requires support and control.

The development of broadening: choice of nouns

The third problem is to develop broad attainment targets. The starting point is that transfer potential, broadening, decontextualisation, and triple qualification depend largely on the choice of the noun in the attainment target. How, through attainment targets can it be guaranteed that students experience a variety of contexts and reflect on them, see relationships, generalise experiences, follow own interests and all this with regard of the cognitive, affective and psycho motor aspects of the context?

Broadening means, among others, integration of the traditional subject routines into problem focussed attainment targets. That is difficult in the subject matter oriented regime. Often subjects are reintroduced with a traditional choice of a verb or noun in an attainment target.

Nouns like theory, practice, orientation, introduction, chapter and definition are avoided as nouns of attainment targets. An attainment target is not about a characteristic of a pathway, a school objective or a subject target. Leaving out characteristics of pathways[55] and school organisation minimises the self-referential character of educational change. It is quite an effort to meet these requirements.

One measure to enforce the idea of the triple qualification is the so-called 'fifth attainment target'. The Desk Group gave an overall integrative meaning to the last attainment target of each block, for example with social competencies. The attainment target[56] 'can express his opinion in consultations about labour conditions and can suggest improvements' for example, is broader than the four previous attainment targets about growing a crop. Four examples will illustrate the efforts to broaden the curriculum - the unit 'Dedicating general abilities', the units in Dutch, the integration of subject matter and the units for foreign languages.

- 'Dedicating general abilities' is a compulsory unit in educational pathways of 5 blocks about working safely and moving responsibly, developing contacts, taking decisions, collaborating at work, and living in a community[57].

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55 I.e. 'Maths of the 3rd school year'.

56 The 5th attainment target of the first block in Review DC '94, p. 104.

57 In Discussion Paper DC still two units (see general units in Table 6.9).

- Units for Dutch have the same structure as the other general units. The basic unit 'Using Dutch' is integrated in 'Dedicating general abilities'. The next unit 'Applying Dutch' is compulsory for the Manager qualification. Students that go on to higher education need the final unit 'Progressing Dutch'. Two free choice units are 'Chairing a meeting' and 'Writing a report', which are attained by about 20% of students at level 3 and 4.
- Seven general subject matter disciplines in Review DC '96 are partly integrated in core units. Three basic blocks of the total of ten are integrated in core units. The description of all ten blocks of the discipline allows a check on the attainment of objectives that have been integrated in core units. Nevertheless, many teachers referred to the three integrated blocks as 'the disappearing objectives'[58].
- Foreign languages are not integrated for practical reasons. It would have been in line with the approach in the QS; however, to reserve in the educational profiles an assigned qualification volume to teach for example 'any 10 core units' in one or two foreign languages. This was considered to be a bridge too far in 1990.

Broadening is not a loss of subject matter, but that is difficult to see! It takes time to turn from subject teaching towards problem solving and competence based learning. Thinking and working with pedagogy of attainment levels and subject areas is a different world. The (free) choice of a subject area means that working towards attainments is always done within a context. Some issues from the development in SSAVE have been brought forward to show how a subject-based culture considers competency-based objectives.

Broadening (at all levels in the QS) is necessary for the description of global subject areas. The description of the physical process (this chapter) enlightens how important it is that teachers become involved in the transformation processes in one way or another (chapter 5).

6.3.4 Development of additional educational objectives

Two additional issues are discussed - the pathway independence of the QS and the opportunities for qualified school leaving.

The development of pathway independence of the QS

The funding of SSAVE is connected with the structure of the QS and that is why the QS is not independent of pathways. Units and attainment targets are

[58] It is relevant to recall here the discussion about entry levels and admission requirements in § 6.2.5. Most students entering the IAE at level 3 or 4 have virtually attained the basic unit 'Using … ' for 5 or more subjects; this puts the integration into perspective. The problem is that not all students enter with the same qualifications.

pathway independent, but that is not sufficient according to the supporters of pathway independence. The question of supporters of pathway independence is analysed here.

SSAVE uses two of the four main routes (Table 6.8). The utilisation of all routes would mean that the QS is pathway independent; in that case any pathway would yield a standard or a deepened full qualification. Schools however are not able to offer a deepened full qualification in the training route. This would take twice the present course length (as can be calculated with the data from Table 6.5).

It is likely that schools could achieve a standard full qualification in the educational route in about 50% of the funded time; the government would not allow this. Thus, the present funding of the system, based on attendance of registered students keeps everything as it was.

In retrospect it can be seen that the maintenance of the old structure with an educational and a training route, theoretically doubles the QS (Table 6.8). The reason is that the study capacity, in other words the available study volume for students of the two pathways, differs a factor 2.

The desirability of a change may be questioned. Many parents and teachers would regret that students do not utilise all the possibilities of the educational route although they could attain a standard full qualification. The other option, students in the training route investing double the time for a deepened full qualification, is very unlikely, because the success rate of the present pathway is relatively low due to lack of motivation by the students. The conclusion is that pathway independence at the full qualification level may fail to deliver socially desirable gains.

Changed concepts for qualified school leaving

How can an educational culture in which as many students as possible attain the Operator full qualification be created?

Many branches in industry have questioned at the end of the 1990s the employment market relevance of the Operator full qualification. In 1990, SSAVE however adopted in a SALVO[59] meeting this qualification as a minimum educational target to be attained in SSAVE.

A combined measure was developed to meet the policy aim. In the educational pathway of the Operator, 5 out of 25 blocks have been set apart as links (see the difference between Table 6.5 and 6.10). Some school-leavers from JSVE with access to IAE's; have little or no entry qualification and need support of an orientation or link program for the Operator qualification. The facility may support the students with the capacity to

[59] Chapter 5, note 6.

progress to a Supervisor level course with a deficiency[60]. IAE's may offer the linking in a package or integrated when needed.

Nevertheless, not all students succeed to attain an Operator diploma. Review DC '92 assigned three divisions in which the school can issue a Qualified Entrant diploma when a student attains 40% of the attainment targets of the Operator qualification (20 attainment targets dependent of specific abilities). Unfortunately the assignment was changed in the Supplementary Review DC ' 94 with compulsory blocks (10 compulsory attainment targets and 10 limited choice). This apparently insignificant change misses the core of the problem.

The development, a policy of the Minister of Education, meant a loss of principles. First, the new measure gave level 1 a pathway status with a full qualification that had no currency on the employment market and lost the status of a safety net for those that failed to attain a minimum entry qualification to level 2. Secondly, the core of 2 (blocks (and 2 in the electives) excluded more students from the attainment of this level than in the first design. This is due to the diverse nature of their deficiencies where the one had difficulties with reading or calculation, another was undisciplined or clumsy. As a result the assignment of a fixed set of attainment targets excluded too many from the target group, the original reason for this qualification was the reward of a learning experience in SSAVE. A positive learning experience may give school leavers the self-esteem to gain paid work and a positive attitude towards life long learning. The illusion is that the Entrant qualification has some employment market currency and that a core of 2 units could contribute to that.

The QS utilises 4 EU-levels to make SSAVE accessible for target groups, irrespective employment market currency.

6.3.5 Quantitative data

At the end of a development, a quantitative balance of change and an estimate of progress towards policy targets can be made.

Review DC '96 is like a telephone directory. It amounts to 555 A4 pages. The names of occupational divisions and diplomas take 3 pages, the model educational profiles take 63 pages and unit descriptors with attainment targets take 405 pages. Models for diplomas and certificates are described on 26 pages. The Minister of Agriculture decides on divisions, profiles and descriptors in Review DC; the other items are included for information and explanation.

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[60] Two 'empty units' of 3 blocks each, in the profile of the Manager, offer a similar facility to remedy deficiencies in general and science subjects. This is for students progressing from a Supervisor level into a Manager pathway and for students in a Manager pathway to overcome deficiencies in entry qualifications for higher education.

The structure, taxonomy and content were developed gradually as described in chapter 5 and 6. In the course of time the concept changed from framework into content, from raw collection into a harmonious system, and from an idea into an official decree (Goodlad, 1979).

Table 6.16: The development of the QS for SSAVE

	Advice DC '90	PReview DC '90	Review DC '92	Review DC '94	Review DC '96
sector	1	1	1	1	1
divisions	8	8	9	8	9
full qualifications	48 [a]	38	54	60	64
units	275	200 [d]	323 [f]	298	352 [g]
ia[b], blocks	879 [b]	1255 [e]	1013	1006	1144
eo[c], 5 attainment targets	x[c]	6044	5846	5030	5720
blocks per unit	3,19	6,27	3,13	3,37	3,25

[a] 8 proposed Entrant levels are included (3 ready in DC '96!)
[b] no standard blocks; educational objectives are assigned to interest areas (ia)
[c] no standard attainment targets; the educational objectives (eo) are double and diverse
[d] 200 titles of units of which 28 empty
[e] 1255 interest areas in 172 units (200 unit titles – 28 empty units = 172)
[f] 323 units, of which 216 with 5 attainment targets per block, 66 units with a total excess of 920 objectives, 25 with a total shortage of 139, and 16 with variation in the size of blocks.
[g] the increase of blocks is partly due to the new standard of 2 blocks per unit for the Operator qualification
Underlined are blocks and attainment targets that meet the QS standards.

Table 6.16 gives a quantitative account of the development of full qualifications, units and attainment targets. Some aspects in Table 6.16 deserve fuller discussion. The Entrant qualification was subject to a long drawn discussion. The Educational Council supported this qualification from the beginning. Industry advised in 1990 that the Entrant qualification should be dropped. It returned in 1996.

Advice DC '90 and PReview DC '90 did set targets with 'empty' units; the content of 30% of the units in PReview DC '90 was not described with attainment targets.

Advice DC '90, the PReview DC '90 and Review DC '92 set targets for the volume of units by assigning the number of blocks. Review DC '94 however, was the first issue to balance structure, taxonomy and content with a fixed assignment of levels of mastery, subject areas and the study loads to units, blocks and attainment targets. Table 6.12 provides detailed quantitative data and the rate at which the quality of concrete/specific objectives was applied to the standard of five action structures per block.

Table 6.17: Full qualifications in the pathways of SSVE and SSAVE

1996	SSVE	SSAVE
full qualifications in Dutch VET	660 (100%)	63 (100%)

these full qualifications can be realised:		
- in both the educational and training routes	303 (49%)	48 (76%)
- only in the educational route	204 (30%)	14 (22%)
- only in the training route	111 (16 %)	1 (1.6%)

The advisory committee on the QS for VET in the Netherlands (ACOA) reports totals of full qualifications (Ginjaar-Maas, van Hoof, Houben, Hövels, Persoon & van der Sleet, 1996). A comparison is made with the totals in SSAVE (Table 6.17).

Table 6.16 shows that the numbers of full qualifications and units increased at a national level. The task area of SSAVE did not increase since 1990. That means that the answer on contextual change or on internal pressures has been differentiation. This reaction is contrary to the common conception that qualifications should increasingly cover broad competence. Due to differentiation or fragmentation the QS has become more specific and less global in the course of time. In one way or the other, the schools have the burden of keeping up a more detailed program with relative smaller groups. The school leavers have become less flexible as far as subject areas are involved.
The integration of the educational and training route, and thus internal and external flexibility, is relatively strong in SSAVE. Also learning route independence of occupational qualification is larger in SSAVE. This is mainly due to unit grouping and options, and commonality of qualifications.

6.4 Implementation of the QS

Schools were confronted with many changes in the early 1990s. School mergers, new divisions, new funding and new legal status for teachers were the background to the new qualification structure. This section discusses feed back from schools with respect to the design and development of the QS.

6.4.1 Implementation of the structure of the QS

In 1988 the number of agricultural schools was 49. Merging did increase the size of schools and probably influenced flexibility. In 1990, the new core divisions were assigned and increased the freedom to program in 18 IAE's and to one combined school.

The reception of new divisions

The effect of the new divisions was that all IAE's could offer all courses in Plant production and Animal husbandry. It increased the flexibility of schools considerably, and also competition between schools. In the first years IAE's complained to the Minister of Agriculture about unfair starting of courses by other IAE's and subsequent loss of critical mass in their own schools. The policy has not changed; but schools agreed a common line of conduct.

The assignment of specific and branch divisions to IAE's in 1990 was the result of the Minister of Agriculture weighing up the manpower demand as expressed by industry, social demand brought forward by schools, economies of scale and a fair distribution of the supply in the country. In 1996, when the law on SE came into effect, the active role of the government ended.

Thus, the flexibility of schools increased in two steps. In 1990, schools merged and they were given the freedom to offer all levels and pathways within the newly assigned divisions. In 1996, the schools could apply for any course within the sector and were accepted in the Central Register for VET (CREBO). The principle of division by occupational divisions was abandoned. The IAE's agreed, to respect the assignment of occupational divisions from 1996 and to abandon further applications.

The implementation of new pathways

The new pathways became effective in August 1990, before the new QS for SSAVE became compulsory for all schools in August 1992 (LNV, 1989c). The new funding of the courses in IAE's for the new pathways came in effect in January 1991 and is based on the number of registered students in the courses and not on outcomes.

Time allocation to pathways

The 25% work-based component in the educational route was a basic condition for funding schools from August 1990 onwards. The establishment of school organisation and programs, based on the new condition was fully implemented in the second half of the 1990s.

The standard allocation of days in pathways (Table 6.3) was a clear condition. The law on ET (OCW, 1995) differentiates an educational route with between 20 and 60% work-based training and a training route with more than 60% work-based training. The ET and QS fit.

Time allocation although necessary, appears to be complicated and confusing. It is a necessary step in the transition from a subject-based timetable to a new time/performance ratio for everyone involved in the change. It is complicated; Table 6.3 is a generalisation of the detailed description of the model educational profiles in Review DC '96.

The field of education does not perceive time allocation as a formal exercise to link objectives and funding, rather than a regulation. One has difficulty in distinguishing information about backgrounds for policy from regulations for schools.

Time utilisation by target groups

The expectations for target groups were made explicit. To a certain extent[61] pathways and levels can be regarded as a temporary - time allocation. This idea makes the differences between the pathways of SSAVE clearer to parents and the funding by government effective. The allegation from the past that SSAVE-B was a weak version of SSAVE-A couldn't be made when students are given workloads that fully match their abilities to attain required qualifications.

Qualification volume of full qualifications

For parents and students the proportions show physically the composition of high level courses. For funding purposes the proportion shows striking differences in costs of blocks. For example a course year in the educational route may cost US $ 4,600 per student. The funding of blocks differs for each of the four levels. The average annual number of blocks in the 4- year course is 100/4 = 25 blocks. One block should be funded with $ 4,600/25 = $ 184. Similar calculations yield amounts $ 4,600/17 = $ 270 and $ 4,600/10 = $ 460 per block in courses at level 3 en 2, respectively. The conclusion is obvious - target group policy has a firm price.

Representatives of agricultural industry and SSAVE assessed SSAVE-B and SSAVE-A courses as equivalent (now level 3 and 4 in the educational route with a multiplier 2 of difference). A similar misunderstanding about qualification volume occurred in the early 1980s when industrial representatives placed the basic course in the apprenticeship higher than the new S-SSAVE course (now level 2 in the training and the educational routes, with a larger outcome in the educational route). This type of misunderstanding, that crippled the dialogue about desirable objectives, was cleared up with the QS.

The structure of the QS is about a framework for goals, target groups and funding -

- the horizontal division for goals comprises nine occupational divisions. Units are the vertical division. This framework represents manpower demand and is a general expression of the supply side of SSAVE.
- the framework for target groups accommodates five pathways in which a vertical division of content is integrated with EU-levels to meet the abilities of students. This vertical division responds to the social demand and is a general expression of the demand side for SSAVE.
- the linking of goals, target groups and funding is brought about through the allocation of time. The time for the attainment of a specific goal by a specific target group is the basis for the lump sum.

[61] Complex theory at higher levels is likely remain beyond reach of less able students, no matter how much time they are allowed.

Time allocation, position in the QS and description of content defines the content of an attainment target.

Time allocation has proved a powerful means for design, development and implementation of the QS. It has been the basis for the participation of schools and teachers in the development and implementation of a responsive system. The expectation is that details of time allocation become less important in the course of time once new school routines establish, but that time allocation will remain an important way of defining attainment targets.

6.4.2 Implementation of the taxonomy of qualifications

This paragraph is about the way the new objectives are classified. This was for teachers the most difficult part of the new QS. The change of subject matter into units implies a change of professional attitude.

Implementation of levels of full qualifications

A taxonomy with levels is more transparent than the formal course-year typology of SSAVE was before 1990. The division of operational levels, however, is a construct. Every work situation has an operational level of its own. The four EU-levels that are used in the QS are generalisations; nevertheless they were hardly criticised in SSAVE. This is possibly due to the fact that the levels fitted the old structure exactly.

The levels offer opportunities to discuss content of full qualification directly and that makes SSAVE more responsive. The EU-levels as transformed for the QS (§ 6.2.2) are a description of outcomes. The overall description of attainment levels gives more information than reference to competency and entrepreneurship (Table 2.2 and § 4.1.5). A weak point in the QS-transformation of the EU-taxonomy is that the descriptions do not refer to social competence or attitudes to continued learning as required in the definition of qualification.

Towards the end of the 1990's the IAE's require a closer balance between the articulation of employment market demand and the social demand function of SSAVE. The tacit assumption in the early 1990s was that things would straighten out when external change was taken as the basis for competence based objectives (§ 6.2.1); this did not work and the reason will be explained.

The idea is growing that manpower demand and social demand may be relevant for the levels 3 and 4 and partly for level 2; social demand and public interest (but not manpower demand) may govern level 1 (and 2). For level 1 a positive initiation to work in the broad sense is important. This means that the structure of divisions applied to level (2,) 3 and 4 may be less relevant for level 1 (and 2). This view explains the reluctance of commerce & industry to support level 1 and 2. The government representatives and education interpreted the reluctance of commerce & industry as one-sided

economic thinking. The real problem was a public wish to utilise VET also for students who need a firm base of general education.

Implementation of the entry levels of units

In the design, the level reached in Basic Education in Dutch, maths and biology is the chosen entry level of basic units. This could be reconsidered. Do the old structures still constrict the new QS in an unacceptable way or have creative solutions matched ideals of a complex competency based SSAVE?

A possibly better cut-off point could be primary education (PE); the disadvantages are the loss of a lower secondary schooling between PE and SSVE and more overlap in the description of content.

A practical cut-off higher than the BE level is difficult to find. The choice of the c-level of Junior General Secondary Education (JGSE) would compare with the admission requirements for the SSAVE-A course (the predecessor of the Manager qualification). This entry level would pitch the basic units beyond reach of all students enrolling for level 1, 2 or 3 courses. As a consequence much time would have to be spent on preparatory and bridging work.

The present situation appears better than the alternatives.

Consequences of admission requirements

The QS is a set of clearly defined outcomes in the form of units and full qualifications. Added value is the difference in competence between admission and examination. For the funding of the schools it is important to know where the front line lies.

Courses for the Entrant and Operator qualifications have no admission requirements. These courses should be a provision for all students at the age of 16, qualified or not. The admission to courses for Supervisor and Manager in the training routes requires a full qualification in secondary education. As a consequence, students entering full time education at the Operator level often do not meet the entry level of basic units and need a link program; students entering full time education at Supervisor level have this level or more. Students entering full time education at the Managers' level always have more than the minimum qualification. These students should possibly get exemptions of parts of basic units. Exemptions apply already to vocational qualifications of students from JSAVE. Assessment at entry, exemption, and effective bridging programs and efficient up- and down streaming may gain student time and cut school costs.

Most students in the educational route entering the IAE in the higher level pathways (Figure 6.4) have more than the required entry level of basic units. In the training route all students enter the system at the Operator level and most have more than the basic requirements. The setting chosen worked and still works in favour of schools. Also in retrospect the choice can be

supported; it stayed on the safe side in a time when schools had to change completely and higher performance was asked for. The QS made clear that a qualified Manager should attain twice as many blocks as a qualified Supervisor whereas some schools were of the opinion that the vocational qualifications of the two pathways were equivalent. Another challenge was that the qualified Manager could (and for higher education should) attain units at the SSGE-level.

Implementation of taxonomy of units

Units were classified in four ways to enhance flexibility -

- A classification into 3 clusters of core, limited choice and free choice units is made to combine interchangeability of full qualifications with regional flexibility. This is structured and regulated in the educational profile in a recognisable fashion.
- A classification into 3 clusters of occupational, occupationally supportive and general units helps to ensure the triple nature of full qualifications. It helped to organise deepening in programs and to show teachers 'where their subject-matter went'.
- A classification into 3 clusters of basic, advanced and up- and down streaming units helps to organise the relationship between entry level and the system, between units in sequence, and between the level of full qualifications and advanced education. This is essential in order to make the system both efficient and readily understandable.
- Complementary to the three classifications is the taxonomy with 38 verbs. The verbs are used to assign attainment levels to units and to co-ordinate and subordinate units in (parallel) sequence. The verbs in combination with nouns make up formal titles of units and focus on content (though not on regulation, implementation, or organisation). The formal titles are designed to express the core of a competence and to add to make the content of the QS obvious.

Integration of subjects in units did not find overall approval. Herenius, Jellema, Van Tilburg & Wisselink (1992) and Van Haperen (1992) criticised the Minister of Agriculture for prescribing competence-based objectives in schools where the minister of education did not. Van Haperen (1992) points at the overlap in general abilities between occupational units in Review DC '92. A subject-based taxonomy would avoid the overlap. The authors' belief that subject and competency based taxonomies describe the same knowledge content is wrong. The idea might be based on the thought that general abilities and general subjects are the same. It is the context that gives a meaning to the training for general skills (Dewey & Dewey, 1915). In the view of Van de Lagemaat a curriculum may contain a lot of overlap as long it trains to abstract, transform, reflect, and automate.

Two examples may illustrate the possible responsiveness of units. In 1991 the Perennial Plan for Crop Protection (LNV, 1991) was released. The consequence of this plan was that everyone needed a licence to apply chemicals to his crops and another licence to buy the chemicals. In the Preliminary Review DC '90, the requirements for the first licence were integrated in the Caring crop unit (and other units). The Caring crop unit and similar units were inserted in the sequence of core units for the Operator full qualifications of the core divisions.

The requirements for the second licence were described in the Caring crop protection unit. The Caring crop protection unit was inserted in the sequence of core units for the Supervisor full qualification of the core divisions. Both units were offered in specially funded adult education. Table 6.17 shows the figures for the annual issue of certificates.

Table 6.17: The number of certificates in crop protection (LNV, 1998)

	91/92	92/93	93/94	94/95	95/96	96/97
Caring Crop Protection	213	669	1557	1549	1668	1505

The Nature Policy Plan (LNV, 1990c) aimed to establish an Ecological Network and this vast plan would lay a grid of ecological landscape elements over the Netherlands. As a consequence everyone working in the countryside needed skills to contribute to ecological quality of the Ecological Network. In order to provide the opportunity to attain this competence, a unit Maintaining rural landscape was described in Preliminary Review DC '90. This unit was an option in the limited free choice of the model educational profile of all Supervisors' following a land based study. Table 6.18 shows the annual issue of certificates.

Table 6.18: Issues of the certificate Maintaining rural landscape (LNV, 1998)

	91/92	92/93	93/94	94/95	95/96	96/97
Maintaining rural landscape	185	507	819	752	736	868

The volume and speed of innovation was extraordinary, when e.g. the fruitless efforts to introduce Crop protection alongside the established Soil science and Fertilisation science in the time tables of SSAVE-A and -B before 1990, are taken in account. The reaction of the schools to the new units was also very positive.

The implementation was the key to improvements of the taxonomy of the QS. The units allow a well-addressed and effective change of educational objectives and policy aims i.e. when occupational profiles change. In the past it was almost impossible to transform contextual changes into a new subject objectives and to put the changed objectives in (a) proper places in the curriculum.

6.4.3 Implementation of the content

Is a well-formulated attainment target a guarantee for implementation of competence based learning? The problem is that attainment targets as such may not be powerful enough to communicate the core of a required competency. One (long) sentence with a well-chosen verb to express an attainment level and a delicate noun to depict a subject area may not carry the intended broad qualification.

Two types of context with relevance for the learning process apply to the attainment target - the context of the QS and of the learning process. The hierarchy of competencies in work, study and social life determine the context of a required competence. This was formalised with the position of the attainment target in the hierarchy of full qualifications and units. That is where and how the attainment target acquires a meaning with which students and teachers must become acquainted to determine work and study targets.

Psychological approaches to competence based learning determine the context in the learning process (Collins, Brown & Newman, 1989; Soden, 1994). The attainment target as an action structure fits into a hierarchy of competencies that are to be learned in one way or the other (Kolb, 1985; Romiszowski, 1981, pp. 252-262). The teacher should be aware of this context when he designs a curriculum and utilises the students' competencies from the work-based and the school-based program (Berryman & Bailey, 1992).

Because of differences in the perception of contexts, one must accept discontinuity in the meaning of qualification (Ellström, 1998). For example between the content knowledge of the student, the teacher and the craftsman acting in practice, whose competencies go beyond the formal qualification. Consequences of this will be discussed in greater detail in § 7.3.1.

Does an attainment target express competence when the pedagogical and qualification contexts are well understood? In the paragraphs about content in this chapter the actual change of subject areas is explained. In fact it is not a change of area; it is a change away from subject matter based toward problem solving based on action structures. Attainment targets are formulated in a way that allows free choice by the school and the teacher, as long as required attainments and transfer are achieved. The free choice allows a course to be matched to regional and individual demand. This enormous change explained here couldn't be prescribed on paper. It couldn't be implemented with the turn of a switch but takes positive attitude and perseverance of teachers to conquer it.

It is seen that the construction of decontextualised attainment targets with transfer potential depends on developing sound educational action structures. Chapter 7 analyses the actual development of attainment targets with transfer potential in the QS.

6.5 Construction of the QS: Conclusions

The overall conclusions of foregoing sections are the following. A structure with pathways determined by divisions and EU-levels, and funding connected with pathways and student abilities, is the foundation of clear and powerful steering concept. A taxonomy of full qualifications and units, and model educational profiles and unit descriptors is a clear and flexible means to organise a responsive system. The construction of attainment targets by means of *educational* action structures is the right approach for the production of competence based objectives with transfer potential.

Discussion Paper DC although presented as a blueprint for the QS (Gielen & Le Rütte, 1998, pp. 56-58) could not fulfil such a function. The Discussion Paper DC acted as a stepping-stone in a knowledge creating and innovation process leading to the adoption of new content and new methods in a responsive system (chapter 5).

The QS is more than a clear representation of required qualifications for work, study and social life. It is also a means to control a responsive system. At first sight this control function is contrary to the advice of Achtenhagen (1994) and others. However, the intention of Achtenhagen was that contextual changes should be the starting point for educational change and he did not object their being used in institutional and organisational context. It has been seen that during design and development of the QS institutional and organisational considerations came secondary to response to contextual changes. The result of the combined exercise was a QS, which was expected to be implemented quickly and at low risk.

This last section considers alternatives and consequences.

Alternative concepts of approach to QS-construction

Now, ten years after the design of the QS, the progress made on educational content is amazing. ‘Could this have been done better?’

The approach described in chapter 5 was that with a few firm steps the targets and context for development process were set. After that the dynamics of the process maintained the pace of the change.

The approach with respect to content was in essence that new content should be demand driven, that content consists of an attainment level and subject area and that the provision of learning time should depend on context and abilities. The achievement of these requirements determined the sequence of new product targets. New product targets fuelled the processes of design, development and implementation.

Of course, the process and product requirements were much more complex. The QS itself must be more than a representation of required qualifications. A QS must support the public function of a responsive SSAVE. It should not be based on occupational profiles only, or be directed by the needs of the employment market only, or focus on function training

and be competency based only, or deny that the employment market fails to take in social demand.

Educational change to improve the school-to-work transition based on subjects is by definition more complex and more vulnerable. It requires an extra elaboration to transform an *educational* action structure into generic subject matter. It is more vulnerable because learning facts, relations and theories may pass by the achievement of transfer potential.

It is likely that a more general definition of the outcome would have increased the confusion about the educational objectives. Definition of content at the level of blocks would cut away much contextual detail. A broader decontextualisation was another possibility; it would have cut down the number of units, i.e. by calling every creature a plant or an animal instead of differentiating within domesticated plants and animals. This latter approach has been tried for specialists units in post Manager training and although technologically this was fine, the units lacked context.

Present insights do not lead to the belief that the content approach as reconstructed in this chapter, could be conceived and organised in a more appropriate way.

Organisational requirements for transfer potential

The achievement of transfer potential in the school-based program requires careful planning of the practical work in the work-based program. The planning and utilisation of this element will be the main activity of teachers in vocational education in the future.

The aim to achieve transfer potential has to be balanced against supporting subject areas, for higher levels of transfer require higher levels of theoretical abstraction (Gielen, 1995). Balancing is necessary for the maintenance and further development of the QS for SSAVE and also for the design of the curriculum in the schools. Balancing requires the co-operation between teachers. Team-members must keep in sight an overall educational objective.

Consequences of the QS

The QS increased the degrees of freedom for schools; the QS is a basic requirement for responsive SSAVE. The QS is also a means to steer the system. In a wider context, the QS is a basic requirement for the improvement of the school-to-work transition. The QS describes the ‘what’ of occupational choice, school choice, curriculum development, qualification, demand on the employment market and capacity on the work floor.

The goals of the QS were to change SSAVE from supply oriented VET into demand oriented VET, and to change from subject based objectives to competence based objectives. These goals serve the provision of responsive objectives to VET in a dynamic world, of flexible structures to schools for

diverse target groups and of learning that ensures transferability of qualified school leavers.

The QS for SSAVE was made with the claim that it offered real proposals for the employment market. Full qualifications would have value in the professional employment market segment and units in the residual and complex sub-markets. Recognition and modularization would provide promising conditions for lifelong learning (Kloas, 1997). The appeal of the full qualifications and units to the employment market and their half-life are indicators of quality.

The use of full qualifications and units is (still) rare or absent in collective agreements and in regional employment mediation, and is common the agricultural service; the QS is clear to most divisions (Gielen & Le Rütte, 1998, pp. 99-101 & 120-123). Professional journals write easily about the new QS (Nijhuis, Noorduyn & Siemes, 1996; Van Toly, 1992). This may be an indication of a positive appeal. The estimation is that the half-life of the units in the Review DC '92 may be greater than 5 years. The half-life of units may increase for a unit in the later issues of the Review after the QS has found a final form.

Problems are the controllability of numbers of full qualifications and units. Too many full qualifications may make the QS diffuse and ineffective, decrease efficiency of schools and lower transferability and flexibility of qualified school leavers. Every system of VET seems to suffer from fragmentation and compartmentalisation. Also the QS needs strengthening of a countervailing power enhancing global subject areas and decontextualisation of content. LOBAS (§ 5.4.2) and ACOA (§ 6.3.5) should do that.

The conclusion is that important policy aims were set in motion in a relatively short time and the IAE's are positively motivated to implement the real change (Ros, Swinkels-Kuijlaars, Theunissen, Visser, Jongmans & Geijsel, 1996; Swinkels-Kuijlaars & Van Wijlick, 1995). Or to quote Van den Berg (1992) 'The main aim of large-scale innovation projects is to create optimum conditions for small-scale innovations' and that has been achieved.

The new QS has been tested with the set of criteria for responsiveness (Table 6.2). The overall conclusion is that many of the criteria are met (deregulation, uniform levels, accessibility and communality of qualifications) or that improvements are realised (unit groupings and decontextualisation of content). The study areas, however, became less global and more fragmented such to the cost of broad competence. Broad competence itself is at large a matter of transferability - one pre-requisite for broad competence is the description of transfer potential in attainment targets - the subject of chapter 7.

7 The Transfer Potential of Attainment Targets

Does the QS work, is it effective? Educational effectiveness has many forms as described by Scheerens & Bosker (1997). The authors mention several factors improving effectiveness of which curriculum quality is one and effective learning time is another.

The focus in this chapter is on the achievement of the required quality in the attainment targets as a prerequisite for educational effectiveness. An indicator is needed to respond to questions about the quality of the attainment targets. In addition, norms are needed to evaluate the measurements. This analysis provides an assessment of the intention of the QS to articulate the external demand by means of an information structure (Figure 7.1).

description matrix			**judgement matrix**	
intents	**observations**		**standards**	**judgements**
articulated demand	policy plan	**antecedents**	-	-
shared responsibility	information structure	**transactions**	-	-
transfer potential of national objectives;	qualification	**outcomes**	qualifications with transfer potential	T
flexibility of organisation	structure		efficient & effective pathways	T

Figure 7.1: The research area (shaded)

A basic prerequisite at the system level is improvement in the transfer potential of objectives. Transfer potential of objectives is related to the achievement of transferability. Acquiring transferability rather than required skills is possibly the most important policy aim (§ 4.7.1). The transfer potential of attainment targets is not an outcome of the educational process; on the contrary, it is an input requirement.

The way curricular priorities are set, i.e. the attention to learning skills and the extent to which the provision of subject matter is determined at macro and meso level, are relevant for educational effectiveness (Scheerens & Bosker, 1997).

This thesis is about a system change and the chapters 7 & 8 aim to measure improvements in the system. A problem is that Scheerens & Bosker (1997, p. 310) cast considerable doubt on facilities on systems level. Their analyses at a general level indicate that there is hardly any evidence that organisational factors directly affect student outcome. A measurement of change at the micro level of the system, however, can possibly be linked with change at the systems' level.

Four sections describe the approach to the problem, the instrument, the results of assessments and the conclusion.

7.1 What to measure precisely?

Achtenhagen (1994), Van de Lagemaat (1986) and Nijhof and Streumer (1994b) have formulated important criteria on content.

Achtenhagen states educational content should be from a pedagogical approach and focus on person, content, goal and process rather than on institution and organisation. The philosophy behind the QS is that attainment targets are clarified with a tangible content, an allocated time and a place in a functional hierarchy. Units and attainment targets are formulated with respect to person, content, goal and process-related considerations. At the level of full qualifications a link is made between time allocation and funding, which is an institutional and organisational consideration and thus a concession to Achtenhagen's concept. Nevertheless it is the conclusion of § 6.4.2, that in the QS institutional and organisational considerations come secondary to response to demand and pedagogy.

Van de Lagemaat (1986) requires attainment targets to be described in terms of action structures. The description of attainment targets in the form of action structures took until 1994 (Table 6.15). The verbs used express an attainment level and the nouns represent decontextualised subject areas to allow the choice from a wide range of exemplars in order to enhance transfer (§ 3.2.4) and to respect freedom of choice by schools (§ 4.1.6). Most of the attainment targets in the QS are easily transformed into 'how-questions' (§ 6.3.3). That may indicate that attainment targets are algorithms or heuristics, and they describe problem solving - possibly a competence.

Most of the attainment targets in the present QS (Review DC '94, '96 and '98) though, are descriptions of *functional* action structures and not *educational* action structures as Van de Lagemaat proposed (Table 3.7). The *functional* action structures refer to the actual activity by a professional (who decides to buy a cow). Educational action structures refer to an attainment of a student (who arranges the applicable norms and integrates the considerations on which to base a decision for buying cows). This fundamental and technological point in the development of the QS requires further consideration (§ 6.3.3) and possibly improvement.

Nijhof and Streumer (1994b) stressed the decontextualisation of attained skills. The description of attainment targets in the form of action structures and the use of well chosen verbs to describe attainment levels mean a great deal of decontextualisation. Also triple qualification has been given attention.

Many attainment targets in the present QS, however, are complex sentences in which subordinate and co-ordinate clauses are not always clear about the core of the required ability. It becomes difficult to identify

univocally the central act (§ 5.3.2). An attainment target ought to be a valid, precise and operational representation of an occupational competence, in which relevant activities are generalised, transformed and broken down. Experts in the process of designing, developing and improving the new QS should validate attainment targets.

After this qualitative overview one main issue remains - transfer potential. This chapter analyses the transfer potential of the attainment targets in the QS. Transfer potential in the description of competence is important due to the continuous change of tasks, jobs, functions and occupations. Such a competence is called transferability.

Transfer potential is a specific quality in the description of attainment targets, which touches, on top of the description of required skills, aspects of life long learning. The description of transfer potential is expected to enhance the training of transfer i.e. by reflection on experiences and by generalisation of these reflections.

The problem with transforming external demands into attainment targets is keeping the balance between required operational skills and long term competence (§ 4.5.2). This is an economic requirement - to be successful in the employment market - which coincides with a social requirement - to accommodate all target groups with clear subject areas - and a pedagogic requirement - to acquire routine and reflection skills as a basis for transfer.

The summarised research question is ‘Do attainment targets express transfer potential?’ Questions about Bildung or Ausbildung, education or training, the development or utility principle of education, key qualifications or required skills are expressions of the same dilemma and will always dominate the public debate about good education (Geerligs, 1991; SER, 1997; Nijhof, 1998, pp. 155-156). It is important to be able to reiterate this perennial question, for ‘has transfer potential been worked out in a proper way?’ is also a continuing question for SSAVE.

7.2 The measuring of transfer potential

The measurement of the balance between required skill and transfer potential in educational objectives requires an object, a standard, a norm and a reproducible procedure.

7.2.1 The object of measurement

To measure change it is necessary to measure the new QS and to compare it with a similar situation before its implementation. The QS from Review DC ‘94 was selected as representing QS; this is the first ‘finished’ version in which all blocks have five attainment targets. It is also the version through which most of the present new school leavers have been qualified.

For comparison traditional educational objectives were taken from the most recent versions from courses similar to courses described in the QS.

This choice included recent examination programs that had been changed applying principles later applied to the QS.

Three systems were compared - the new QS, traditional day release courses and apprenticeship scheme. The reason for this selection was that before compulsory implementation of the QS in 1992, the educational route was a more theoretical and the apprenticeship scheme a more practical way to learn. The two pathways are extreme poles of the old system. Both had courses comparable with Operator, Supervisor and Manager levels of the new QS. A further advantage is that both pathways did offer courses in all common divisions.

In all three pathways objectives were chosen at three levels and in three divisions. This number was chosen to be able to compare possible patterns between pathways, levels and divisions. For each pathway potentially nine types of objective could be selected (Table 7.1). The actual selection of programs is listed in Annex 7.1.

Table 7.1: Source documents for measurement of transfer potential

systems:	before the implementation of the QS in 1992		Review DC '94
EU-levels:	day release courses	apprenticeship schemes	
2	SSSAVE	Primary AS	Operator
3	SSAVE-B	Secondary AS	Supervisor
4	SSAVE-A	Tertiary AS	Manager/Specialist

EU-levels selected are Operator, Supervisor and Manager/Specialist and the equivalents of the EU-levels in the educational and the training routes from before 1992.

The full qualifications are selected from three divisions - Animal husbandry, Food technology and Green keeping, because these divisions have a different contextual structure. They represent agricultural production, processing of agricultural products, and services to the public. These differences should be seen in the attainment targets of a responsive system. In Animal husbandry the entrepreneur in production is dominant, in Food technology the employee, and in Green keeping the entrepreneur providing a service.

The source documents had a different structure and needed to be made assessable. This was done as follows. The core programs of the QS for SSAVE have ten specific blocks at each level (Annex 6.2). Ten blocks contain a total of 50 attainment targets. These 50 attainment targets were taken as a starting point. To create a comparable situation, the other source documents were divided into 50 units. Sometimes programs were combined and weighting given to components to create a representative and balanced over all pictures.

It is relevant to note the historical differences between the descriptions of objectives for SSAVE. The QS is entirely new and designed and developed in one process according to the standards described in chapter 6. The other source documents are very variable. Different groups developed them, at different times, following different instructions.

Exceptions are the S-SSAVE program units from mid 1980. These units were made with a well-structured design, they were modularised and the content was based on activities. S-SSAVE was developed for Animal husbandry and Green keeping, but not for Food technology. The S-SSAVE program units were examples for the new QS (ARVO, 1988b). So S-SSAVE and the Operator in new QS may appear similar.

S-SSAVE program was taken as a starting point for reform of the SSAVE examination programs, before 1990 in the SSAVE-B and -A programs for Animal husbandry and Green keeping, but not in Food technology. So the programs in Food technology were likely to show the largest differences from the new QS.

The youngest 'old' program is the Secondary AS in Animal husbandry. This program was designed in 1990 – 1991 according to the QS for SSAVE standard, but not in the SSAVE-project for new QS (§ 5.2.1). The secondary program for animal husbandry may resemble the Supervisor in Animal husbandry program.

The 'oldest' programs are in Food technology and in the apprenticeship scheme (except the Secondary AS in Animal husbandry). It is likely that the historical differences will show up in the assessment.

7.2.2. The taxonomy to measure transfer potential

At present, no standard scientific method is available to measure transfer potential. That is why an instrument has to be constructed that is able to score the degree of required skill and transferability.

To De Corte, Geerligs, Lagerweij, Peters & Vandenberghe (1976) an educational taxonomy is a classification of educational objectives with the purpose of facilitating discourse about the intended behaviour of students. It provides a means of identifying one-sided or incomplete approaches to educational objectives. Thus, an educational taxonomy may also be an instrument with which could be used to score levels of required skill and transferability of educational objectives.

In the QS for SSAVE, an attainment target is built around a verb and a noun, which represent an attainment level and a subject area. The taxonomy needs to measure both aspects. Five taxonomies were compared (Annex 7.2). The taxonomy of Olbrich & Pfeiffer (1980) has been chosen because it identifies competence at work, in social life and for learning, and also the aspects required skills and transferability.

Olbrich & Pfeiffer's taxonomy scores performance (of the process) and cognition (knowledge) - the 'first decision' in Figure 7.2. The level of performance indicates occupational skill and the level of cognition indicates ability to learn. In both are aspects of social skills.

The second question is about a level of performance and/or cognition - the 'second decision' in Figure 7.2. The third question relates to a specific action - the 'third decision' in Figure 7.2.

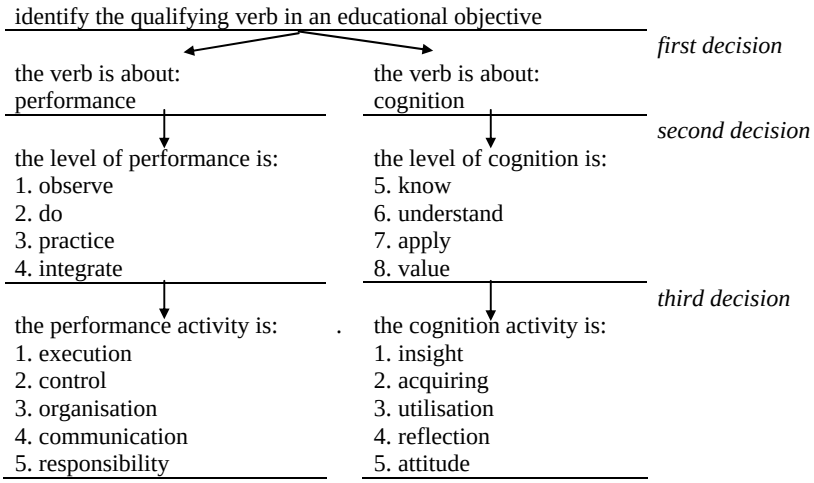

Figure 7.2: Algorithm using the Olbrich & Pfeiffer's taxonomy

Some of the combinations of level and action represent a required occupational skill i.e. 'apply quick and precise corrections at work'. Other combinations refer to study skills; i.e. 'create an environment for private study, and transferability, i.e. 'apply the principles to comparable situations'.

Olbrich & Pfeiffer's definitions have been adapted for use in SSAVE. The industrial context of the original taxonomy has been changed into a general context. The typology of discrete performance in controlled conditions has been changed into continuous performance in a holistic context. Van de Lagemaat's taxonomy (§ 3.2.4) was used to adapt the verbs. Discrimination between the categories has been increased. An example of adaptation is the following. The original phrasing of area 1.1was 'Merkmale des Arbeitsvorganges werden erkannt, unmittelbar verarbeitet und in Teilhandlungen umgesetzet'. It was translated and altered as follows - 'observe signals and transform into a single action'.

The taxonomy was then moulded into a flow chart to define the sequence of questions for assessors. In the flow chart and during the assessment three discriminative decisions were required -

- is the required transfer performance or cognition;

- what is the transfer level;
- what is the transfer activity? - Figure 7.2.

Both performance and cognition are subdivided into 4 levels of transfer and further divided into 5 activities for each level of transfer. This results in 40 areas (see Annex 7.3). Each of these areas may be called an area transfer potential.

A second set of indicators is required to complete the assessment of the attainment targets. The chosen taxonomy should enable criticism on the choice of subject areas in SSAVE. The most recent analysis of subject areas is available from Pierik (1993, p. 157). He concluded that the main focus of SSAVE needed to shift from a specific subject matter approach to broadly applicable vocational qualifications and from specific craftsmanship to broader entrepreneurship.

Table 7.2: Taxonomy of broad subject areas of SSAVE

broad subject areas					
plans	reports	production factors: administration	production factors: equipment	production technology	context

Pierik's first recommendation for broadly applicable vocational qualifications is considered alongside Olbrich & Pfeiffer's taxonomy. The broadening of subject areas from craftsmanship to entrepreneurship can be assessed through the taxonomy in the form of information models (see Annex 5.2). A division in six subject areas has been derived from the information model (Table 7.2) and the six subjects were added to the indicator.

The craftsmanship to which Pierik refers is 'production technology' in the taxonomy of subject areas. The entrepreneurship includes the relationship between plans and context.

7.2.3. The desired standard of transfer potential

The measure for transferability has been found in Olbrich & Pfeiffer's taxonomy. Three decisions (on performance/cognition, level and activity) about an attainment target result in a score that measures the transfer potential. The final problem is to evaluate the score. This is solved with a set of standards to classify the scores.

The EU-levels of full qualifications (§ 6.2.2) are logical starting points for considering standards for transfer potential. These EU-levels describe the required vocational skills. Linking the descriptions of the vocational skills to appropriate definitions in Olbrich & Pfeiffer's taxonomy results in clusters of scores that make up the full qualification and express the required the transfer potential. The linkage of the EU-levels and appropriate scores in the taxonomy, to design a standard prescription for the desirable transfer potential for each level is worked out below.

The linkage of attainment scores to the EU-levels

A direct 1:1 comparison between attainment scores and EU-levels is impossible. The reasons are that the aggregation levels of EU-levels and attainment targets differ (Table 6.1), and that descriptions of the EU-levels[62] refer mainly to required skills rather than to the required transfer potential. A transformation is possible and the applied principles are described below.

Required transfer potential of the Operator

The Operator qualifies for practical work, done in collaboration with others within the bounds of trained or experienced techniques; the Operator applies to operational work in the production process of an enterprise (§ 6.2.2).

This means that the Operator, with reference to EU-levels of performance, can 'approach and execute work in a logical way', and can 'apply quick and precise corrections at work'. He is 'after instruction self-employed in the execution' of that work. The Operator 'takes instructions from a discussion on progress of work'. He is expected to 'act as prescribed in regulations'.

With respect to cognition, the Operator has the ability to 'connect basis, methods, rules and principles with practice'. He can 'create an environment for self instruction'. The Operator is able to 'utilise supplied learning aids' and 'to supply theoretical explanations for practical situations'. He 'has interest in practical application of theory'.

The thesis is that this Operator has an appropriate level of transfer suitable for his abilities and level. (The description above corresponds with the areas 3.1, 3.2, 2.3, 1.4 and 1.5 for performance and the areas 6.1, 6.2, 5.3, 5.4, and 5.5 for cognition in Figure 7.2 and Annex 7.3).

Required transfer potential of the Supervisor

The Supervisor qualifies for the professional execution and assessment of practical work and/or other responsibilities, such as the allocation of tasks, the planning of work and management (§ 6.2.2).

This means that the Supervisor, with reference to EU-levels for performance, can 'choose the setting and correction of work' and 'plan the operational production process'. He is 'self-employed with respect planning and preparation of work'. The Supervisor 'discusses progress of work with colleagues and superiors'. He can 'share responsibility for work with colleagues'.

With reference to cognition, the Supervisor should have the ability to 'apply rules and principles in practice' and utilises experiences for enhancement of his own performance'. He 'looks up information' and

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[62] The original description of EU-levels (Table 4.1) refers to pathways and the adapted description (§ 6.2.2) refers to required competence.

'collates information from different sources'. The Supervisor 'receives motivation from the process and content of learning'.

The thesis is that a Supervisor scoring on these attainments has an appropriate level of transfer suitable for his abilities and level. The scores presuppose the Operator scores. (Corresponding with the areas 4.1, 4.2, 3.3, 3.4 and 3.5 for performance and the areas 7.1, 7.2, 6.3, 6.4, and 6.5 for cognition in Figure 7.2 and Annex 7.3).

Required transfer potential of the Manager/Specialist

The Manager/Specialist has responsibility for planning and/or administration and/or management in a professional and independent way. The Manager/Specialist has abilities for self-development and acquires quickly high levels of craftsmanship (§ 6.2.2).

This means that the Manager/Specialist, with reference to EU-levels for performance, can, like the Supervisor, 'choose the setting and correction of work' and 'plan and implement the production process'. He can 'plan and assign tasks at the tactical level'. The Manager/Specialist 'co-ordinates and communicates the organisation of the production process' and 'bears final responsibility' for it.

With reference to cognition, the Manager/Specialist 'sees through patterns and methods'. He 'organises his own learning' and 'utilises own experience in the use of information sources'. The Manager/Specialist 'assigns theoretical views to comparable cases' and he 'has the attitude to improve own learning'.

These performance and cognition applies to reports plans and context of the enterprise and thus to marketing and financial responsibilities – and to analysing the process and reporting to senior management.

The thesis is that a Manager/Specialist scoring on these attainments has an appropriate level of transfer suitable for his abilities and level of responsibility. The scores presuppose the Operator and Supervisor scores. (The description above corresponds with the areas 4.1, 4.2, 4.3, 4.4 and 4.5 for performance and the areas 8.1, 8.2, 7.3, 7.4, and 7.5 for cognition in Figure 7.2 and Annex 7.3).

Three competencies in Olbrich & Pfeiffer's taxonomy have not been included. The ability to 'evaluate alternative knowledge sources', 'to choose theories and methods for the screening of problems' and 'to enjoy learning as a value on its own', are too advanced for SSAVE.

Example

The consequence of Olbrich & Pfeiffer's definitions scoring of the EU-levels is shown in an example about Life Long Learning and entrepreneurship, for the student's attitude to gaining knowledge; i.e. attitude to learning. In respect of attitude, the attainment of knowledge has four levels - 'knowing,

understanding, applying and valuing'. The descriptions of the areas of activity are given in table 7.3. (compare Table 2.2, 2nd column).

The score for entrepreneurship refers to the requirements of the knowledge network. In the traditional research, development and dissemination model of a knowledge network (§ 2.1.2) the attitude 'have interest in practical application of theory' is enough. In this concept for example the farmer is the recipient of the message from research passed through by the extension officer.

Table 7.3: Areas of activity for attitude in respect of the cognitive domain

level: / activity:	know elementary facts	understand sense, goal and coherence	apply principles and patterns	value complex issues
attitude	have interest in practical application of theory	receive motivation from process and content of learning	have the inclination to improve own learning	enjoy learning as a value in its own right

In the chain linked model of a knowledge network (§ 2.1.2) the farmer is expected to participate in the creation of knowledge. For this he should 'have the inclination to improve his own learning'.

The conclusion is that the transfer potential in educational objectives at the level of Operator should be 'have interest in practical application of theory'. The Supervisor should 'receive motivation from process and content of learning' and the Manager/Specialist should 'have the inclination to improve his own knowledge'.

A further conclusion is that requirements on entrepreneurship and Life Long Learning, being a requirement of work and study, could be combined in the desired standard for learning transfer potential.

Linkage of broad subject areas to the EU-levels

The requirement on the new QS is that it broadens the subject areas - away from specific craftsmanship towards broader competence.

The consequences of this requirement and the application of the level (§ 6.2.2) are that the Operator should score in the subject area's 'production factors, equipment and administration and context' on top of the traditional production technology. The Supervisor should score in 'production factors administration, reports and context' on top of the basis of production factor equipment and production technology. The Manager/Specialist should score in the areas of 'reports, plans and context' on top of the basis of the other subject areas. This keeps in mind that the higher levels include the core programs of the lower levels through the principle of commonality.

The transfer described must be interpreted in relation to the subject areas of the Operator, Supervisor and Manager/Specialist respectively, in the task areas linked with these operational EU-levels.

The desired transfer potential for each level

Definition of the desired transfer potential is a score in a graduated calculation of interest. A starting point for definition of the grades is that a qualification structure has overlaps because of linking time assignment to full qualification and through basic attainment targets that lead to required levels.

Some areas are excluded in the definition of scores because they are basic, or a prerequisite for transferability, or broad subject areas, or of a highly abstract nature and not realistic for a given qualification level, that is why the score 41 – 50 has been called exceptional (Table 7.4).

Table 7.4: Grades for scores of transfer potential and of broad subject areas

score	grade
41 - 50	exceptional
31 - 40	good
21 - 30	satisfactory
11 - 20	unsatisfactory
0 - 10	poor

The scoring applies to the ten blocks of the core of the educational profile of the new QS (and the same for before 1992) and is unique for each level. The grades in Table 7.4 have no theoretical basis and but provide a tentative standard for assessing the effect of the QS on the quality of educational objectives in SSAVE.

7.2.4. Making the assessments

Making the assessments requires a reproducible procedure being applied to the source documents. This paragraph describes the selection of assessors and the procedure.

In making assessments an assessors' formal knowledge about assessments procedures is not the sole criterion. Someone's work and experience is also important (Shechtman, 1992). This may also apply to the measurement of transfer potential. The application of the taxonomy to the source documents requires expertise, experience, and also an unbiased attitude. Assessors with these qualities are hard to find. For this reason the assessment was done by two different groups, and also through a desk study.

The first group of assessors was selected from students in educational science and technology of the University of Twente in the 3rd and 4th year of their university graduate course. The members of this group understood assessment procedures, but are neither familiar with the contents of the SSAVE courses or with teaching SSAVE-students. The assessments were assigned at random to 24 students and each of the 24 source documents was sampled 4-6 times (Van Hooff, de Jong, Nijhof, & Geerligs, 1995).

The second group of assessors were teaching trainees in the 4th year of a teacher training course of STOAS for SSAVE teachers, studying Animal husbandry (8 students assessed 2-3 source documents), Food technology (5

students assessed 5-7 source documents) and Green keeping (3 students assessed 9 source documents). The members of this group understood the assessment procedure and they knew the contents of the courses. Their teaching experience was limited to periods of teaching practice.

An attempt to interest teachers in SSAVE for the assessment was not successful. Because of controversy about the qualification structure in 1994, it was difficult to get a representative group of SSAVE – teachers together during a couple days for the assessment. The author of this thesis carried out the desk study.

The two groups of assessors were given two briefings of 2 hours each. In the first briefing the characteristics of SSAVE, the assessment procedure and the nature of the source documents were explained. In a second briefing the unique codes of attainment targets/objectives were explained and training in the assessment procedure. The assessment procedure includes consideration of the level of the full qualification, reflection on the central verb of an attainment target, three decisions from Olbrich & Pfeiffer taxonomy, and assignment of an subject area.

When no central verb was present, for example in an attainment target with several verbs, or in an examination program without verbs, the assessor needed to create a verb appropriate to the educational objective. Without such a verb it is hard to do the assessment.

It takes approximately two hours to assess one program or sample. Assessors took their own time for the work and completed at random between 3 and 9 samples within 2-4 weeks. One sample consisted of 50 items, for example 10 blocks with 50 attainment targets. For each item, the assessors needed to assign a (virtual) central verb representing a level from one of the 40 levels of mastery in Olbrich & Pfeiffer's taxonomy (Figure 7.2). They had to assign a noun representing an activity from one of the 6 areas of the subject area.

Assessors were told to score an attainment target/objective only once; the most dominant qualifying verb should be selected (or created), assessed and registered. This implied a choice of one out of forty for the attainment level and a choice of one of six for the broad subject areas.

The algorithm was explained and the way the scores were entered into a computer program was demonstrated. The computer program required the code of the attainment target/objective, a central verb, the code for the level, the code for the activity area and the code for the subject area.

7.3. Reliability of assessment

This section deals with conclusions drawn from the results. The assumption is made that assessors are able to score in a reliable way the transfer potential of attainment targets by means of criteria from the taxonomy of Olbrich and Pfeiffer.

7.3.1 The result of the assessments

Assessors became accurate observers and significantly reliable when they independently assigned a particular item to a particular category in the taxonomy. The scores for transfer potential are summarised in Annex 7.4 and for the broad subject areas in Annex 7.5. The correlation between assessors could be calculated with Cohen's κ[63] (Zegers, 1991). The results of the second decision (Figure 7.2) for the scores of the eight verbs were the following. Students of educational science and technology scored an average κ smaller than 0.18 (and when 4 badly scoring assessors were excluded from the group of 24, the average κ was 0.25). The score of the teaching trainees was less reliable than of the students' educational science and technology (κ is 0.20).

7.3.2 The conclusions from assessors' results

There is considerable variation in the scoring of different assessors. The chosen quantitative approach to score transfer potential did not work; improvements did not change this. The many aspects of Olbrich and Pfeiffer's' taxonomy may be a reason. Thus has been chosen for a different and qualitative approach, a desk study carried out by the author. The analysis in § 7.4 will focus on interpretation of qualitative scores.

Explanations for the assessors' result

The possible reasons for the low reliability between assessors are -

- complexity of the assessment method
  Reflection on the instruction sessions and evaluations of the actual assessments with assessors do not indicate vague algorithms or criteria. Assessors considered the instruction sufficient, but felt the decision making process as difficult. The students pondered over the meaning of attainment targets (and the other descriptions of educational objectives): 'what could be meant here?' One point of complexity is that the taxonomy for the levels of mastery has 40 areas. As reported above the reliability is already unsatisfactory for the second aspect with 8 options and for the subject areas with 6 areas.
- the assessors' assessment skills
  The assessors' assessment skills may have had an influence on the results. This expectation is based on the following observation. The educational science and technology students made more scores than the teacher trainees and their scores were more reliable.
- the assessors' knowledge of agriculture

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[63] Cohen's κ compares the proportional similarity of scores for one sample of two assessors. The proportion is calculated and compared to a proportion based on chance. It indicates the proportion similarity of all assessors in a group, for example students' didactics.

The assessors' knowledge about occupations in agriculture may have had an impact on the reliability of the scores. This expectation is based on the observation that the scores at the level of Operator, S-SSAVE and primary apprenticeship scheme (all level 2) were more reliable than the scores at higher levels. One may expect that students would find it difficulty to discriminate about the required abilities of Supervisors and Managers.

- the quality of attainment targets
  Students reported the difficulty in deciding about the central verb representing the attainment level of a central act in a description. Creating a verb was even more difficult; the old examination programs did not have verbs at all. The problem with the new attainment targets is that these have several verbs in a sentence or have sentences with co-ordinate and subordinate clauses.
- the interpreting of single attainment targets
  The aim of the attainment targets was to describe a competence rather than a skill and to be holistic rather than specific. The consequence is that many options within Olbrich & Pfeiffer's taxonomy are sufficient (more or less) to judge an attainment target. The context of full qualifications and units may contribute to the clarity of a 'holistic' attainment target.

Neither attainment targets or examination programs are hard and fast descriptions of outcomes; individual interpretation of attainment targets is likely to be one sided and poor; only discussion about them may show the extent of objectives to interested parties. The possibility to interpret attainment targets in more than one way was reported before (Herenius, Jellema, van Tilburg & Wisselink, 1992; Ettema, 1996, pp. 54-55).

The assessment was done with a tool constructed from currently available perceptions. A broader tool could have been more reliable, but would not have yielded the desired information.

7.4 The results from desk-study

The quantitative assessment of transfer potential and broad subject areas was not successful. For this reason a qualitative assessment was carried out in a desk study. The same instrument was used as in the assessments carried out by assessors. The difference was that three cycles of analysis were made on the source documents with comparison and reflection. The results of the study are given below. The four paragraphs are about -

- the transfer potential and the broad subject areas, and at depth;
- the levels of performance and cognition;
- the areas of performance and cognition;
- subject areas.

7.4.1 The transfer potential and the broad subject areas

The desk study gave detailed scoring (Annex 7.6) The scores that contributed to the transfer potential of full qualifications (§ 7.2.3) were added. The result is graded with Table 7.4. The results of transfer potential are summarised in Table 7.5 and of broad subject areas in Table 7.6.

Table 7.5: Transfer potential of educational objectives in SSAVE

Animal husbandry	before 1992		Review DC '94
	day release	apprenticeship scheme	
EU-level 2	satisfactory (30)	good (33)	satisfactory (26)
EU-level 3	unsatisfactory(19)	small (16)	satisfactory (30)
EU-level 4	unsatisfactory (16)	-	satisfactory (24)
Food technology	before 1992		Review DC '94
	day release	apprenticeship scheme	
EU-level 2	-	poor (6)	satisfactory (26)
EU-level 3	unsatisfactory(12)	poor (4)	satisfactory (23)
EU-level 4	poor (0)	-	poor (8)
Green keeping	before 1992		Review DC '94
	day release	apprenticeship scheme	
EU-level 2	satisfactory (28)	good (35)	good (38)
EU-level 3	poor (9)	unsatisfactory (13)	satisfactory (28)
EU-level 4	poor (0)	poor (1)	satisfactory (21)

Table 7.6: Broad subject areas in educational objectives of SSAVE

Animal husbandry	before 1992		Review DC '94
	day release	apprenticeship scheme	
EU-level 2	unsatisfactory (14)	satisfactory (27)	unsatisfactory (15)
EU-level 3	unsatisfactory (19)	unsatisfactory (19)	unsatisfactory (12)
EU-level 4	unsatisfactory (11)	-	good (33)
Food technology	before 1992		Review DC '94
	day release	apprenticeship scheme	
EU-level 2	-	unsatisfactory (16)	unsatisfactory (17)
EU-level 3	unsatisfactory (17)	unsatisfactory (17)	poor (8)
EU-level 4	unsatisfactory (12)	-	poor (1)
Green keeping	before 1992		Review DC '94
	day release	apprenticeship scheme	
EU-level 2	unsatisfactory (16)	unsatisfactory (15)	unsatisfactory (20)
EU-level 3	poor (6)	poor (8)	unsatisfactory (15)
EU-level 4	poor (2)	poor (8)	satisfactory (25)

The aim was to use the S-SSAVE attainments (day release, level 2) for the development of the QS. The starting point and the result do, since the scores of all S-SSAVE and QS- qualifications but one were satisfactory or good. The explanation of the poor score for the Manager Food technology

may be that the occupational division Food technology were made for the employee and the other two divisions are for entrepreneur in one way or another.

The Manager in the QS may become a 'supervisor' in the food industry; high scores of 'applying rules and principles in practice' - 13 times - and of 'applying quick and precise corrections at work' - 11 times - may be very relevant for these 'supervisor functions'. This means that the qualification may be valid from a 'required skills' point of view. This does not detract from the fact that the transfer potential described in the attainment targets is judged to be poor.

A EU-level, although labelled Operator, Supervisor and Manager is not a person or a job. A farmer would practice all EU-levels from operative to entrepreneur. Does the same apply to supervisors and managers in Food Technology? The assumption - from an ped/agogical point of view - is that the balance between required skills and transferability is the same for the EU-levels in all divisions. This balance though, appears to be very hard to communicate.

The explanation of the poor scores in objectives from before 1992 may be associated with historical backgrounds § 7.2.1. The poor scores at level 2 and 3 Food technology apprenticeship scheme are possibly that these programs were relatively old and describing traditional 'knowledge of subjects'. The poor Green keeping day release scores at level 3 and 4 are possibly due to the fact that the examination program for SSAVE-B and SSAVE-A was the same. Especially in this division the focus had been on craftsmanship, i.e. quite a lot of knowledge of plant taxonomy was required.

Transferability is one important means to improve the flexibility of school leavers and broad subject areas are another. Broad subject areas, however, do not score satisfactorily.

Review '94 is not a convincing improvement of the broad subject areas in Animal husbandry, Food technology deteriorated and Green keeping improved. It is likely that during the development of Food technology the focus may have been too much on the specific aspects of process technology (this was a major concern of teachers during the development), rather than the business or the business in society.

During the development of Green keeping much attention was given to the approach to clients and at the EU-level of Supervisor and Manager also at costing. This has broadened the subject areas.

Traditionally the educational objectives of Food technology and Green keeping focussed on craftsmanship and the objectives of Animal husbandry on entrepreneurship. This difference can be recognised in the scoring of transfer potential but not in subject areas from before 1992 (Annex 7.6).

The QS achieved an important improvement in incorporating transfer potential into the educational objectives. The attainment targets in the form of action structures and the classifications of attainment targets in units are likely to be the cause of this improvement. The QS did not achieve a break through in the definition and assignment of broad subject areas for the appropriate EU-levels.

The next paragraphs analyse the data in more detail to explore the QS for weaknesses and poor balance of educational objectives.

7.4.2 Levels of transfer potential

First a comparison is made of the ratio of performance to cognition of all the scores of the programs. The starting point is that the Operator should have a fair amount of performance skills in the program; i.e. a ratio larger than 1. For the Manager, the accent should be on cognition; i.e. a ratio smaller than 1. The comparison is made with the data from Annex 7.6. The ratios are summarised in Table 7.7.

Table 7.7: Ratio between practical skill and knowledge in the SSAVE objectives

Animal husbandry	before 1992		Review DC '94
	day release	apprenticeship scheme	
EU-level 2	29/21 = 1.38	24/26 = 0.92	39/11 = 3.55
EU-level 3	37/13 = 2.85	37/13 = 2.85	31/19 = 1.63
EU-level 4	37/13 = 2.85	-	23/27 = 0.85
Food technology	**before 1992**		**Review DC '94**
	day release	apprenticeship scheme	
EU-level 2	-	25/25 = 1	39/11 = 3.55
EU-level 3	8/42 = 0.19	6/44 = 0.14	33/17 = 1.94
EU-level 4	0/50 = 0	-	24/26 = 0.92
Green keeping	**before 1992**		**Review DC '94**
	day release	apprenticeship scheme	
EU-level 2	36/14 = 2.57	30/20 = 1.50	38/12 = 3.17
EU-level 3	28/22 = 1.27	41/9 = 4.56	38/12 = 3.17
EU-level 4	28/22 = 1.27	14/36 = 0.38	35/15 = 2.33

Performance and cognition as aspects of transfer potential

The data show that the ratio between performance and cognitive objectives varies. In the full qualifications from before 1992, the ratio of the EU-level 2 scores in Animal husbandry is unexpected[64] small and smaller than the EU-level 3 and 4 scores. This could mean that the EU-level 2 course is the course directed to cognition. In the programs from before 1992, the Food

[64] Area 6.1 'connect basics, methods, rules and principles with practice' scores 12 times and this causes a relative high share of cognition.

technology scores are all less than 1. This could mean that Food technology is a very technical[65].

Review DC '94 shows a more regular pattern. All Operator scores (level 2) are between 3 and 4; this means a fair amount of skills objectives. The Supervisor (level 3) and Manager (level 4) scores have a smaller ratio; these full qualifications demand more technical knowledge. This is in line with what was expected. An exception was the Green keeping division; here the ratios remain high; this means that even at higher EU-levels the focus stays on performance.

The comparison between 'old and new' raises new questions. What could, for example, be the explanation of the similar score of the Primary apprenticeship (level 2, 0.92) and the Manager (level 4, 0.85) in Animal husbandry? The answer to this and other questions requires a deeper analysis and that is done below.

Diversity of transfer potential between full qualifications

The QS should articulate the differences between the EU-levels and this should emerge from the attainment targets. That is why different EU-levels are compared.

Table 7.8: Diversity of levels of transfer potential within Animal husbandry

Animal husbandry	before 1992		Review DC '94
	day release	apprenticeship scheme	
	S-SSAVE, level 2	Primary AS, level 2	Manager, level 4
performance/cognition	29/21 = 1.38	24/26 = 0.92	23/27 = 0.85
levels of performance			
1. observe	1	0	0
2. do	24	16	2
3. practice	4	7	4
4. integrate	0	1	17
levels of cognition:			
5. know	9	25	0
6. understand	12	1	0
7. apply	0	0	22
8. value	0	0	5

The scores of levels of transfer (the second decision in Figure 7.2) show large differences between full qualifications, i.e. between the Primary apprenticeship (level 2) and the Manager (level 4) in Animal husbandry (Table 7.8). Also the level 2 scores of S-SSAVE, as an example from the QS development, are brought in from Annex 7.6.

From Table 7.8 it is clear the score in the performance domain of the Primary AS is due to 'doing' and of the Manager due to 'integrating'. The

[65] Area 5.4 'reproduce concepts, facts, … ' scores high in the apprenticeship scheme (23- 30 out of 50), and the areas 6.1 and 5.4 in SSAVE-B and -A.

score in the cognitive domain of the Primary AS is due to 'knowing' and of the Manager due to 'applying'. The conclusion is that a considerable higher level of transferability has been described for the Manager. Thus, an almost similar ratio of skills to knowledge between two full qualifications can have a very different background.

Primary AS and S-SSAVE although of the same level, have some interesting differences. The ratio between performance and cognition is wider for S-SSAVE, and the score within the cognitive domain is on 'understanding' rather than 'knowing'. This means that the S-SSAVE objectives require slightly more practical skills (with more scores in the performance domain) and a higher level of transferability of the remaining scores in the cognition domain. The attainments in the S-SSAVE program are elements of the policy aim.

Balance between levels of transfer potential

Has a gradual build-up of skill and transfer potential been achieved in the QS? Was the S-SSAVE example, as recommended, applied?

A consequence of the principle of commonality (§ 6.2.3) is that practical skill at the lower level is a basis for knowledge at the higher level. This combination may create opportunities for reflection and training for transferability. The build-up from Review DC '94 may increase transfer potential.

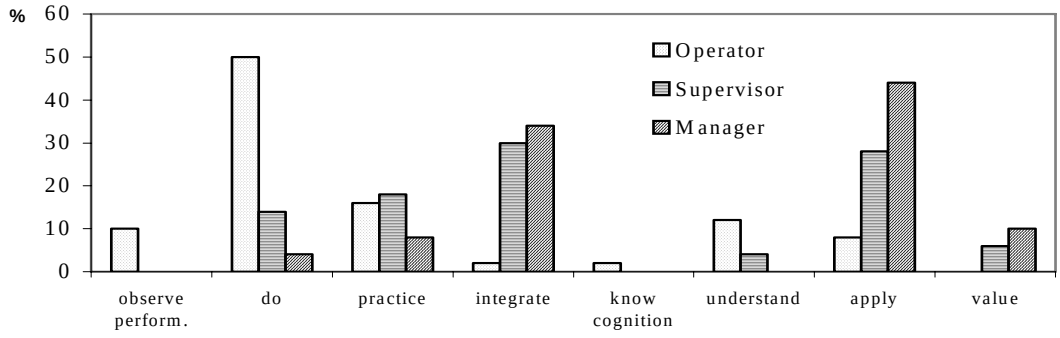

Figure 7.3: Score distribution on transfer potential in Animal husbandry (1994)

In Figure 7.3, the levels of performance and cognition in Review DC '94 are shown for Animal husbandry. The figure shows that within the performance domain the accent for the Operator is on 'doing' (25% of the scores) and also practising (16%). Integration may be too difficult for the Operator. In the cognitive domain the accent for the Operator is on understanding (12%) and applying (8%). Total performance is 39 (out of 50) and cognition 11 (ratio 3.55).

The transfer potential of the Operator Animal husbandry is satisfactory (Table 7.5) and Figure 7.3 shows a balanced build up of levels of transfer potential. The ratio of 3.55 between the performance and cognitive domains of the Operator is considered to be right, as skills for practical work are required at EU-level 2 (§ 6.2.2) - mainly performance - and the Operator in the Review DC scores on top of that in both performance and cognition.

In Figure 7.3, the scores for the Supervisor and the Manager have the same pattern as the Operator. The difference is that the patterns move to the right - towards higher levels of transfer potential. The transfer levels 'practising' and 'integrating' gain at the cost of 'doing', and the cognitive domain gains from performance. The Supervisor and Manager score relatively high in 'applying' and 'valuing'.

The analysis depicts, with regard to EU-levels, a balanced distribution of transfer requirements for the whole occupational division. For the full picture, the transfer potential activities are analysed (§ 7.4.3).

The build up of transfer potential above is also seen in Food technology and Green keeping. The Operator, Supervisor and Manager of the three divisions in Review DC '94 have similar frequency distributions of the eight verbs in both performance and cognitive domains ($\rho > 0.70$); except between the Supervisor Animal husbandry and Green keeping ($\rho = 0.3$).

The requirements for levels of transfer potential have a balanced distribution within full qualifications and between the full qualifications of the three divisions of Review DC '94 that were analysed.

Comparison of Supervisors

Table 7.9 shows the difference between the levels of transfer potential of the Supervisor in Animal husbandry and in Green keeping. The SSAVE-B examination program in Green keeping is added for comparison.

The transfer potential of the Supervisor in Green keeping is satisfactory (Table 7.5), but the problem is that the score of 'doing' is still high at the cost of the higher levels in the performance domain, and in the cognitive domain. The performance/cognition ratio is too high (Table 7.7). Within the performance domain the Supervisor in Green keeping scores 'doing' and 'practising', where the Supervisor in Animal husbandry scores the higher transfer level of 'integrating'.

The scores in Table 7.9 also explain the poor transfer potential of the 'old' SSAVE-B examination program. In that program the focus was on 'doing' in the performance domain of and 'knowing' in the cognitive domain. These areas do not score transfer potential at level 3.

In the past, the problem of the objectives for Green keeping was that they were too craft orientated. This was improved in Review DC '94. The impro-

vement was not sufficient as indicated by the ratio between performance and cognition (3.17); it should be about 1.

Table 7.9: The transfer potential at level 3 (Review DC '94 and Desk study)

EU-level 3	before 1992 SSAVE-B	Review DC '94 Supervisor	
	Green keeping	Animal husbandry	Green keeping
performance/cognition	28/22 = 1.27	31/19 = 1.63	38/12 = 3.17
levels of performance:			
1. observe	2	0	0
2. do	15	7	14
3. practice	11	9	14
4. integrate	0	15	10
levels of cognition:			
5. know	14	0	0
6. grasp	7	2	0
7. apply	1	14	12
8. value	0	3	0

Similar patterns have been observed for the 'old' programs of Food technology. The focus is on knowing facts for all three 'EU-levels'. As a result the transfer potential was low and also the ratio between performance and cognition appeared to be too low. An exception is the SSAVE-B with a high score on 'understanding' and 'applying' (62%).

The description of level 2, 3 and 4 of Food technology score relevant improvements in Review DC '94. The change from the past is evident. The correlation between the 'old' Primary apprenticeship scheme and the new Operator profile is negative ($\rho = -0.22$).

The ratio between performance and cognition has an even build up from Operator towards Manager (Table 7.7). The transfer potential is satisfactory for the Operator and the Supervisor, but poor for the Manager (Table 7.5).

Reasons for the different built up of levels of transfer potential

Food technology was a division without a S-SSAVE course; it had one relatively young SSAVE-B course (1984). In the SSAVE-A course the general subjects were dominant, due perhaps to the SSAVE-A having no competition from S-SSAVE and SSAVE-B influences. The poor transfer potential of Manager in Food technology is analysed and compared with the Manager in Animal husbandry (Table 7.10). The score of the SSAVE-A program has been included for contrasting with the past.

Table 7.10 shows that the 'old' SSAVE-A examination program was focussed on technical knowledge; the required levels were 'knowing', 'understanding' and 'applying' in equal proportions. The Manager in Food technology in Review DC '94 has a better balance between performance and cognition (see also Table 7.7). The transfer potential of the Manager remains too low (poor in Table 7.5). The scores on 'integrating' in the performance

domain of and ‘valuing’ in the cognitive domain appear to be too low. The scores of the Manager in Animal husbandry show a satisfactory transfer potential.

Table 7.10: The transfer potential of level 4 (Review DC ‘94, in the Desk study)

EU-level 4	before 1992, SSAVE-A	Review DC ‘94, Manager	
	Food technology	Food technology	Animal husbandry
performance/cognition	28/26 = 1.27	31/19 = 1.63	33/27 = 3.17
Levels of performance:			
1. observe	0	0	0
2. do	0	5	2
3. practice	0	14	4
4. integrate	0	5	17
Levels of cognition:			
5. know	18	1	0
6. understand	15	9	0
7. apply	17	16	22
8. value	0	0	5

These figures do not indicate where the profile of the Manager in Food technology could be improved. An analysis of the objectives in the performance and cognitive domains is required (see Table 7.14).

Gradual change

The programs have a different history (§ 7.2.1). In the late 1980s, the emphasis shifted from knowing facts onto competence. Then, higher levels of knowledge were introduced based on practical abilities. Also learning through participation became an important concept. Following the example set by S-SSAVE, the new QS adopted the same format. The example shows that, although occupational divisions seemed to change radically with the development of the QS, they proceeded at their own pace.

Some programs in Animal husbandry at EU-level 3, but with a different construction year, provide a comparison, which illustrates this development in SSAVE. The three courses are SSAVE-B revised in 1988, secondary apprenticeship scheme designed in 1990-1991, and the Supervisor, which was completed in 1992.

Table 7.11 shows a gradual shift. Within the performance domain the focus shifts from ‘doing’ in SSAVE-B and to ‘practising’ in the secondary apprenticeship scheme, and to ‘integration’ in the attainment targets for the Supervisor. A similar development is seen in the cognitive domain, where the focus shifts from ‘understanding’ in SSAVE-B and secondary apprenticeship scheme, to ‘application’ for the Supervisor.

Developments as illustrated at level 3 in Animal husbandry could be traced through a precise sequence of development. This is rare for several

reasons among them being the different histories and to differences in the periods between the dates when the objectives were formulated.

Table 7.11: Change of transfer potential of the Supervisor Animal husbandry

Animal husbandry	before 1992		Review DC '94
	day release	apprenticeship scheme	
	SSAVE-B, level 3	Secondary AS, level 3	Supervisor, level 3
performance/cognition	37/13 = 2.85	36/13 = 2.85	31/19 = 1.63
levels of performance:			
1. observe	1	2	0
2. do	14	12	7
3. practice	13	17	9
4. integrate	9	6	15
levels of cognition:			
5. know	3	2	0
6. understanding	7	9	2
7. apply	3	2	14
8. value	0	0	3

Conclusions on levels of transfer potential

The overall conclusion of this qualitative analysis is that the Review DC '94 changed the levels of transfer potential in the performance and cognitive domains. The description of the knowledge outcomes in both examination and total programs of SSAVE was improved. This resulted in a balanced distribution of requirements for levels of transfer within the full qualifications and between the full qualifications of a division in Review DC '94.

Levels of performance are the start of a learning process that aims to teach high levels of transferability and broadly applicable abilities. The Operator performance is the starting point for a complement of levels of cognition for the Operator and for Supervisor and Manager. The analysis of the development shows that the QS is a 'next step' in an ongoing process.

Transfer potential can be described with attainment targets. In the new QS higher levels of transfer potential have been described. The use of decontextualised attainment targets was an improvement for all the occupational divisions. Some full qualifications have not yet a satisfactory transfer potential and other full qualifications have not yet a fair balance between performance and cognition. In many cases the requirements are still one sided and the balance between the levels of transfer need further improvement.

Review DC '94 gives a better description of required transfer than any previous scheme. Originally, knowing more facts was an indication of a higher level. Now, the higher level includes attaining a level of practical ability and the use of knowledge rather than knowing facts.

7.4.3 Transfer potential activities

The scores on actions from Annex 7.6 are summarised in Table 7.12.

Table 7.12: Distribution of 50 scores on transfer potential actions at three EU-levels for three divisions (Animal husbandry/Food technology/Green keeping); i.e. Level 2, day release, Animal husbandry (S-SSAVE) 29: 2, 5, 19, 1, 2; 21: 9, 12, 0, 0, 0.

EU-level 2	before 1992		Review DC '94
	day release	apprenticeship scheme	
actions of performance:	(29/-/36)	(24/25/30)	(39/39/38)
1. execution	2/-/7	3/17/2	4/2/3
2. control	5/-/3	9/4/0	11/17/2
3. organisation	19/-/26	12/4/28	19/14/28
4. communication	1/-/0	0/0/0	4/4/2
5. responsibility	2/-/0	0/0/0	1/2/3
actions of cognition:	(21/-/14)	(26/25/20)	(11/11/12)
1. insight	9/-/9	7/25/2	9/7/9
2. learning	12/-/0	0/0/0	0/0/0
3. utilisation	0/-/3	0/0/0	0/1/0
4. reflection	0/-/2	19/0/18	2/3/3
5. disposition	0/-/0	0/0/0	0/0/0
EU-level 3	before 1992		Review DC '94
	day release	apprenticeship scheme	
actions of performance:	(37/8/28)	(37/6/41)	(31/33/38)
1. execution	11/8/3	8/6/15	7/1/15
2. control	7/0/2	10/0/5	3/9/3
3. organisation	19/0/23	6/0/17	10/1110/
4. communication	0/0/0	10/0/0	7/6/5
5. responsibility	0/0/0	3/0/4	4/6/5
actions of cognition	(13/42/22)	(13/44/9)	(19/17/12)
1. insight	13/32/22	12/44/9	17/13/8
2. learning	0/0/0	0/0/0	0/0/0
3. utilisation	0/0/0	1/0/0	0/0/0
4. reflection	0/10/0	0/0/0	2/4/4
5. disposition	0/0/0	0/0/0	0/0/0
EU-level 4	before 1992		Review DC '94
	day release	apprenticeship scheme	
actions of performance:	(37/0/28)	(-/-/14)	(23/24/35)
1. execution	9/0/3	-/-/2	4/5/5
2. control	12/0/2	-/-/0	1/13/3
3. organisation	13/0/23	-/-/12	11/2/11
4. communication	2/0/0	-/-/0	3/0/10
5. responsibility	1/0/0	-/-/0	4/4/6
actions of cognition:	(13/50/22)	(-/-/36)	(27/26/15)
1. insight	10/32/22	-/-/14	23/18/10
2. learning	0/0/0	-/-/0	0/0/0
3. utilisation	0/0/0	-/-/0	1/0/0
4. reflection	3/18/0	-/-/22	3/8/5
5. disposition	0/0/0	-/-/0	0/0/0

In the previous paragraph a deeper analysis of transfer potential was demanded to get a better understanding of the balance, the build-up, and the possible weaknesses in the transfer potential of the new QS. The levels of transfer potential are one means of judging multiform attainment targets and identifying imbalance.

The logical next step is to use Olbrich & Pfeiffer taxonomy to analyse transfer potential in particular activities. Is for example, a higher transfer potential demanded on the area of study, or the way of learning, or the utilisation of prior learning? A glance at Annex 7.6 shows most areas empty. This could mean that the QS does not cover vital transfer potential on specific practical activities or knowledge. The transfer potential actions are not even covered. 'Is this a problem or not?'

At level 2 the 'communication and responsibility' were not covered before 1992; 'control' was not covered in some divisions. For the Operator both activities are prescribed in Review DC '94. The result is that all practical activities are covered in the QS; much attention, however, is given to 'control and organisation'.

In the cognitive domain, the actions requiring insight and reflection received much attention. Differences between the examination programs were considerable. In Review DC '94, 'insight and reflection' had comparable scores in all three divisions. Learning itself, utilisation of information and attitude towards learning (affective domain) are not mentioned in the attainment targets. These are real omissions; all three are connected with life long learning. The analysis at level 3 and 4, is almost the same for before 1992 and in Review DC '94.

Transfer potential in the performance domain has been described for all relevant actions; 'communication and responsibility' need more attention in the attainment targets of the QS. In the cognitive domain in Review DC '94 there are three serious omissions - 'learning, utilisation and attitude', for all EU-levels in all three divisions.

7.4.4. Transfer potential areas

In § 7.4.2 the levels of transfer are balanced in the QS. In § 7.4.3, however, some vital actions are not described in the educational objectives before 1992 or in Review DC '94. This paragraph looks at these problems in more detail. Olbrich and Pfeiffer's taxonomy has 40 areas and the scores on these areas are compared with the desired standard of transfer potential as described in § 7.2.3.

The coverage of the 40 areas of transfer potential

In the division Food technology the Operator, Supervisor and Manager score respectively on 18, 20 and 18 areas out of the total of 40. This score is almost the same for the divisions Animal husbandry and Green keeping of Review DC '94. The division Food Technology scores on 7 and 4 areas out of 40 for the SSAVE-B and SSAVE-A courses before 1992.

In Review DC '94 more areas are covered than in the examination programs from before 1992, and that seems to be an improvement. A deeper analysis, however, is needed to prove this. Since the Operator should not

score in the higher levels of transfer potential, and since the higher levels of mastery include the lower levels, a careful comparison with the exact requirements described in § 7.2.3 is needed. Examples are worked out below.

The required performance of the Operator in Green keeping

Will the conclusions on the Operator in Green keeping be sustained when the transfer potential areas are compared 1:1 with the transfer requirements? The Operator in Green keeping scores in 15 of 40 areas (Annex 7.6). Of those 15 areas, 7 are in the performance domain. The distribution of 38 out of 50 scores on the 7 areas are depicted in Table 7.13.

Table 7.13: Transfer potential in the performance domain for the Operator in Green keeping

action / level	1. execution	2. control	3. organisation	4. communication	5. responsibility
	1.1	1.2	1.3	1.4	1.5
1. observe	0	0	0	0	0
	2.1	2.2	2.3	2.4	2.5
2. do	0	1	28	1	3
	3.1	3.2	3.3	3.4	3.5
3. practice	3	1	0	1	0
	4.1	4.2	4.3	4.4	4.5
4. integrate	0	0	0	0	0

The Operator Green keeping scores in the performance domain, and particularly within 2.3 ‘carrying out work independently after instruction’.
The required transfer potential, as described in § 7.2.3, covers 3.1, 3.2, 2.3, 1.4 and 1.5.Therefore, as seen in Table 7.13, areas 3.1, 3.2, 4.1 and 5.1 are serious omissions. These are about ‘approaching work and working in a logical way’, ‘applying quick and precise corrections at work’, ‘taking instructions from a discussion on progress of work’ and ‘working within given regulations’. Hardly any attainment targets in the core program for the Operator in Green keeping at these levels describe ‘execution’, ‘control’, ‘communication’ and ‘responsibility’.

The description of transfer potential of the Operator in Green keeping has been improved in many respects, however, omissions are observed for transfer potential for ‘execution, control, communication and responsibility’.

The required cognition of the Manager in Food technology

The Operator in Green keeping, and in fact, all full qualifications have three severe omissions in the cognitive domain - ‘learning’, ‘utilisation’ and ‘attitude’. This problem will be further analysed. Manager in Food technology scores on 18 of 40 areas (Annex 7.6). Of those 18 areas, 5 are cognitive. Within the cognitive domain, the distribution of 26 scores out of 50 in the 7 areas of cognition are depicted in Table 7.7.

Table 7.14: Transfer potential in the cognitive domain for the Manager in Food technology

action / level	1. insight	2. learning	3. utilisation	4. reflection	5. attitude
	5.1	5.2	5.3	5.4	5.5
5. know	0	0	0	1	0
	6.1	6.2	6.3	6.4	6.5
6. understand	5	0	0	4	0
	7.1	7.2	7.3	7.4	7.5
7. apply	13	0	0	3	0
	8.1	8.2	8.3	8.4	8.5
8. value	0	0	0	0	0

The transfer potential of the attainment targets for the Manager in Food technology is poor (Table 7.5). The ratio between scores in the performance and cognitive domains is fair (0. 92, in Table 7.7). The balance of required levels of transfer potential is good (§ 7.4.2). The omissions are mainly in the cognitive domain and concern ‘learning’, ‘utilisation’ and ‘attitude’ (§ 7.4.3). What does an analysis of the areas of transfer potential in the cognitive domain add to these conclusions?

In the cognitive domain the Manager in Food technology scores at the levels of ‘understanding’ and ‘applying’ on the insight and utilisation actions. The required transfer potential covers 8.1, 8.2, 7.3, 7.4 and 7.5 (described in § 7.2.3). As seen in Table 7.14, all the required areas, except 7.4, are omissions.

This means for the cognitive domain that the attainment targets cover the Manager/Specialist learning to ‘assign theoretical views to comparable cases’. However, there are no attainment targets that prescribe the Manager learning to ‘see through patterns and methods’, ‘organise self learning’, ‘utilise own experience in the use of information sources’ and ‘have the attitude to improve own learning’. This analysis explains the poor overall transfer potential for the Manager. The analysis also puts the good balance of required levels of transfer potential in perspective. This positive conclusion is based on high levels of transfer potential for actions that are not relevant for the transfer potential of the Manager.

The analysis above is representative for the three divisions (Annex 7.6). All Managers have a high score of attainment targets that demand ‘apply rules and principles in practice’. This area (7.1) is for the Supervisor. All Managers show the deficiencies analysed above, with the exception of a good score on ‘seeing through patterns and methods’ (8.1) for the Manager/Specialist in Animal husbandry.

The operational value of the observations

The operational value of these observations is considerable. Once the omissions are detected, their relevance may be discussed, new objectives may be developed and the attainment targets improved.

The transformation of attainment targets to the standards designed in § 7.2.3 is just not a technological problem. This is illustrated in the example below from which conclusions can be drawn about the significance of the standard.

The first attainment target in the QS for the Manager/Specialist in Animal husbandry with a score in 7.1 is 'can handle indicators to judge the results of farm economics and can compare internal and external data' (Review DC '94; ctaa; p. 167).

The transformation to the higher transfer level 'see through patterns and methods' (8.1) is possible with the phrasing 'can identify the strength and weakness of indicators to … etc.'.

The transformation to the area of activity 'organise self-learning' (8.2) in the activity 'learning' is possible with the phrasing 'can utilise different occasions to learn from indicators to … etc.'.

The transformation to the activity 'utilise own experience in the use of information sources' (7.3) is possible with the phrasing 'can add criteria from own experience to the set of indicators to … etc.'.

The transformation to 'have the attitude to improve own learning' (7.5) is possible with the phrasing 'can reflect on own learning from working with indicators to … etc.'.

The ability to reflect does not assure the attitude (urge) to do it; the ability, however, of organising reflection in different situations is assessable and an educational objective to allow the functional action.

Conclusions about the transfer potential areas

Olbrich & Pfeiffer's taxonomy provides criteria to identify precisely omissions in the QS. The coverage in the performance domain is reasonable and this is an important improvement on the educational objectives before 1992. Nevertheless omissions have been detected that require attention and correction. Operator for example, does not cover required transfer potential for 'execution, control, communication and responsibility'.

The high scores on factual knowledge in the cognitive domain, common in the description of educational objectives from before 1992, hardly occur in the QS. This is an important improvement. In comparison with the performance domain, the cognitive domain has serious omissions. The Manager/Specialist for example, does not cover 'insight, learning, utilisation and attitude' at the required levels.

The necessity for a change of principles, and reflection on the articulation of required qualifications, and the desirability of changing attainment targets,

is a matter for the information structure. Technology allows an upgrade of attainment targets to EU-levels that are built into the present QS full qualifications.

This latter discussion could also justify the design of indicators in § 7.2.3. The theoretical validity of the indicators requires a practical confirmation.

7.4.5. The subject areas

The analyses of the transfer potential and attainment targets in the broad subject areas are two points in the assessment of quality in the QS.

Broad subject areas are regarded as the physical dimension of transfer, where transfer potential is the mental aspect. Change of transfer potential, as discussed above, reflects new operational levels to what can be taken as 'changes in the knowledge society'. For example it has become more important to handle information rather than knowing by heart. Change of task areas of occupations requires a corresponding change in the subject areas. The subject areas should shift from narrow craftsmanship and skills to 'entrepreneurship as a whole'.

This section is about the analysis of the broad subject areas. The analysis is done with an indicator derived from information models for the agricultural enterprise. The indicator is straightforward and has six categories (Table 7.2) - five categories of processes in an enterprise (plans, reports, administration, equipment and production technology) and a non-vocational category (context).

'Craftsmanship' - the focus on production technology - is a narrow qualification for Operator, Supervisor and Manager/Specialist. Thus production technology does not add to the desired standard. Grades were added to the standard (§ 7.2.3) to be able to assess the source documents. The overall result (§ 7.4.1) is that the QS was not an improvement on the subject areas at each of the EU-levels. This section analyses the background to this conclusion.

Comparison of subject areas for Animal husbandry

The assessment covers 50 attainment targets or similar objectives. The result is a distribution of scores over six areas.

Figure 7.4 shows the distribution of scores for subject areas at level 2, 3 and 4 of the 'old' S-SSAVE, SSAVE-B and SSAVE-A in Animal husbandry from before 1992 (taken from Annex 7.6). In all three full qualifications at level 2, 3 and 4, 25 or more of a total of 50 scores focus on production technology. The second highest score is on equipment - tools, machinery and buildings. This is what Pierik (1993) observed as an undesirable stress on 'craftsmanship'. S-SSAVE, at level 2 has a remarkable high score on context.

A comparison is made with the description of attainment targets for level 2, 3 and 4 in Review DC '94. Figure 7.5 shows the desk study results from

the new Operator, Supervisor and Manager in Animal husbandry. The comparison of Figure 7.4 and 7.5 learns that the Review DC '94, at least at the EU-level 3 and 4, puts less emphasis on production technology - on craftsmanship. Below a comparison is made with the required standard described in § 7.2.3.

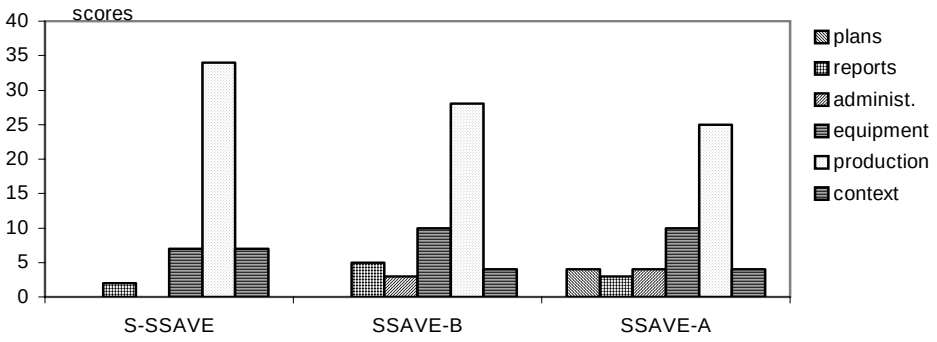

Figure 7.4: Scores of 50 subject areas in Animal husbandry (before 1992).

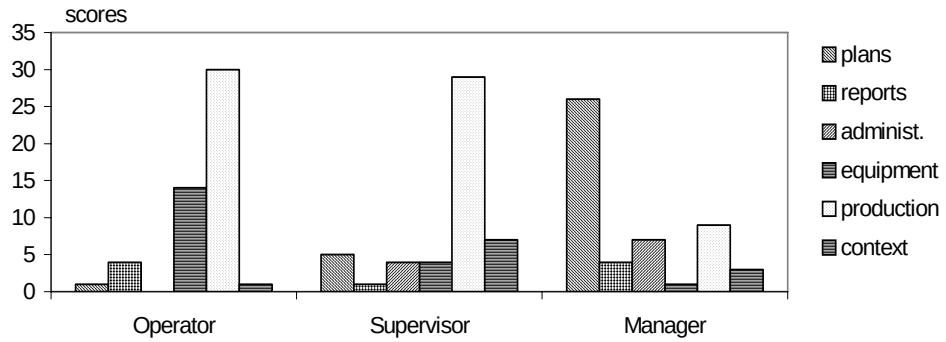

Figure 7.5: Scores of 50 subject areas in Animal husbandry (Review DC '94)

Operator should score in studies on the production factors administration, equipment, and context (in addition to the traditional production technology). The requirement is met for equipment (14 scores) but not at all for administration and context.

The Supervisor should score on reporting, administration and context (in addition to the Operator studies). The requirement is partly met for context (7 scores) but not for administration and reporting. The focus is strongly on craftsmanship.

The Manager/Specialist should score on plans, reports and context (on top of the Operator and Supervisor bases). The score on plans is high (26)

and reasonable on reports (4). The score on context (3) is low. The relative high score on administration (7) here would suit the Supervisor.

The analysis shows that the coverage of broad subject areas in the division Animal husbandry of the QS does not answer the expectations.

The correlation between frequency distributions in Animal husbandry and the comparable full qualifications in the Food technology and Green keeping is above 0,93 between the Operator full qualifications and between the Supervisor full qualifications. This means the Operator and the Supervisor have comparable subject areas in all three divisions. This is not so for the Manager's level. The correlation between the Manager scores is between 0 and 0,7. This means that the subject areas at EU-level 4 differ. 'Is that strange?' Figure 7.15 gives a summary of the score of 50 attainment targets (from Annex 7.6).

Figure 7.15: Distribution of 50 attainment targets in the subject areas for Managers in three divisions.

	planning	reporting	administration	equipment	production	context
Animal husbandry	26	4	7	1	9	3
Food technology	0	0	0	3	46	1
Green keeping	12	10	6	2	17	3

The Manager in Food technology is the exception with 46 out of 50 scores for production. Here we observe a craftsman at a Managers level. Whereas in planning, the Manager in Animal husbandry (26) and the Manager in Green keeping (12) score relatively highly.

One can imagine that the action structures in the food industry as a production enterprise, and in a service enterprise would have similar task areas for the Operator and the Supervisor in the production process. The action structures can differ strongly for the Manager who has explicit tasks in the context of the work situation. For example, the Manager educated in VET, in a small-scale business will often become the person in charge. The VET educated Manager cannot compete with the Manager in Food technology and that is why the profile is different, being more production oriented.

The problem above underlines a weakness of basing the system on action structures instead of levels of skill and decision making. Perhaps the real difference is at the manager level and the extent to which he/she is involved with the policy (entrepreneurial) decisions for the business, which, is linked to who is providing the capital – himself or some external organisation.

The differences above show strong and weak points in the assignment of subject areas in the QS. The assignment differs with differences in enterprise structures. That may be a strong point. Entrepreneurship, although a beauti-

ful pedagogical carriage for learning life long learning abilities, may not match with required skills.

A weak point is perhaps the one sided content of Food technology. Another weak point may be the philosophy behind the differences. In Animal husbandry, and also in Green keeping, the assumption is a one-man business. The one-man business is losing ground. Intensive agriculture (pigs and glasshouses) and also horticultural -enterprises are not typical family-enterprises. They have become enterprises with many employees. The consequences of that development, in terms of qualifications for employees and managers, are not yet seen in the subject areas in SSAVE.

7.5 Conclusions

First the validity of the assessment is discussed below, and then conclusions on the achievements of the new QS, the facility to be responsive and the meaning of attainment targets.

Validity of the assessment

The quality of objectives is measured with Olbrich & Pfeiffer's taxonomy, and a taxonomy of subject areas. The indicators cover the mental and the physical aspects of transfer potential and subject areas. Olbrich & Pfeiffer 's taxonomy is clear and the assessment tool is easy to explain. On these grounds it would be expected that the tool would facilitate communication on the transfer potential of educational objectives.

This is not the case; the assessors disagreed. However, when the scores of individual assessors (§ 7.3.1) were added and when the relative scores are compared with the qualitative scores of the desk study carried out by the author, a remarkable correlation was observed. Of the frequency distribution for transfer potential of the Operator Animal husbandry (Figure 7.3) for example, the correlation between the desk study and student educational science and technology was 0.83. Between desk study and teaching trainees $\rho = 0.84$. This feature observed in retrospect, a paradox, contributes to the validity of the assessment.

Individual interpretations of educational objectives tend to be poor and one-sided. Summarised opinions of parallel groups of assessors however, yield scores with a high correlation. This observation suggests it could be feasible for broad attainment targets to be the points of consideration for teachers and students working with a curriculum. A possible alternative would be a narrow prescriptive attainment target.

Secondly, educational objectives and attainment targets are not hard and fast descriptions of clear outcomes. This is not only because an attainment target generalises about subject areas. The interpretation of attainment level itself, or, more precisely, the interpretation of the verb that expresses the attainment level, is ambiguous.

Are attainment targets a better means of considering programs and study tasks than subject based objectives? The achievements of the new QS might help to answer the question.

The attainments of the new QS

The qualitative analysis in the desk-study indicates that attainment targets describe various aspects of educational objectives.

The balance between the performance and cognitive domains improved and adapted to the specific requirements of Operator, Supervisor and Manager. There have been shifts from learning facts towards competence (the Operator), from elementary competence toward higher EU-levels of performance (Supervisor) and knowledge (Manager).

The cover of transfer potential within the performance domain improved to a satisfactory level. The cover of transfer potential within the cognitive domain improved, but has still many omissions. An important change with the past is that knowledge is not limited to knowing facts and relationships. A serious shortcoming is that transfer potential about life long learning is not covered.

The aim of the new QS was that required skill and transfer potential do not focus on production technology alone but are given a broader interpretation. In some divisions a decrease in the new objectives that focus on production technology and equipment has been observed. On average more than half of the subject areas of the occupational attainment targets refer to the production process; this is considered to be too much. A good understanding of work in a chain requires, appropriate to level a broader scope of the branch and its social context.

It is observed that both attainment targets and traditional descriptions of content are sometimes vague. A second observation is that attainment targets were of help in describing relevant changes of educational content. There needs to be further development in describing clear outcomes. This does not detract from attainment targets being a powerful means of describing new content.

A pitfall is a move away from problem solving and transferability towards action structures with concrete behavioural context.

The facility to be responsive

Changes were measured between educational objectives before 1992 and following Review DC ‘94. The changes produced attainment targets that should respond more readily to public demand. The intrinsic improvement is evident. Was this change necessary, or could the same results have been possible with subject based objectives?

The new QS proved to be a powerful means of articulating external demand and enabling discussions on curricula and study tasks. The use of action structures facilitates the description of contextual changes. Action

structures are the description of required competence and transfer potential, and provide a means of being prescriptive about performance and cognition. Subject matter is always in retrospect (about what has been proven) and is connected to things not to people. So action structures are likely to appeal much more to the imagination than subject matter, in the attempt to describe required future behaviour.

Apart from the tactic value of a different approach to stress urgency at a transition, it is assumed that the considerations above support the thesis that the use of attainment targets and action structures gave an extra positive impulse to the development of the responsiveness of SSAVE.

Attainment targets enabled a direct reaction to contextual changes.

The meaning of attainment targets

Responsiveness is a systems quality to respond to change in the context of improvement to the system.

A QS based on action structures is a powerful tool to support the responsiveness of VET. Attainment targets based on action structures communicate the essence of change.

At the systems level the attainment targets are likely to communicate the required levels of transfer potential and the balance between the various aspects of a balanced competence. At the local level attainment targets are likely to allow tuning to individual and regional needs, and also for interpretation to accommodate particular teachers and schools. Attainment targets suffice when they touch all the relevant points on the educational agenda and when they steer the discussion about responsive objectives.

At the same time, attainment targets are likely to be ambiguous and providing no hard clear outcomes for VET, a powerful means of articulating external demand at a national level, and a means of discussing the meaning of curricula and study tasks in the schools.

Attainment targets tend to communicate transfer potential rather than concrete content. This result is, although not the primary policy aim, a satisfying outcome. QS and attainment targets may form a navigation system for VET in the 21st century (Cornelis, 1997).

8 Effects of the Qualification Structure on the Flexibility of IAE's

The flexibility of educational organisation, together with the transfer potential of qualifications and transferability of school leavers, are main aims of a responsive system for VET. The QS is a means to realise and support these systems aims. The effects on flexibility of school organisation will be evaluated in this chapter. Flexibility is not an aim in itself; it is a means for IAE's to realise an effective and efficient learning pathway.

Improvements in the flexibility are one of the intents in the design and development of the QS. The research investigates possible effects of the QS on the effectiveness and efficiency in SSAVE (Figure 8.1).

description matrix			**judgement matrix**	
intents	**observations**		**standards**	**judgements**
articulated demand	policy plan	**antecedents**	-	-
shared responsibility	information structure	**transactions**	-	-
transfer potential of national objectives; flexibility of organisation	qualification structure	**outcomes**	qualifications with transfer potential; effective & efficient pathways	T T

Figure 8.1: The research area (shaded)

Based on a study in Dutch primary education (Lam, 1996), Scheerens & Bosker (1997, p. 306) conclude 'that in the Western industrialised countries, there are only a few areas where basic supportive conditions for learning and instruction can be improved, notably the conditions related to differentiation and to adaptive instruction'. Their conclusion coincides with the principle allocating time to blocks in the QS; time allocation depends on the effectiveness of pathways and on the entry level of students. Time allocation enhances adaptive instruction and differentiation of target groups so improves the effectiveness and efficiency of the system.

Other measures in the QS are also expected to enhance flexibility in SSAVE, i.e. the principle of common elements of curriculum - commonality. Separating effectiveness from efficiency is difficult. Clearly defined outcomes may assist in the effective selection of content and also in the choice of an efficient organisation. The effect of QS on the effectiveness and efficiency of the system, in terms of improved flexibility, is measured in this chapter. This falls into four sections - the interpretation of flexibility and standards for measuring it, the actual measurement in SSAVE, the analysis of the outcomes, and the evaluation.

8.1 The requirements on flexibility of schools

External changes have become the norm. The policy aims at transferability of school leavers to cope with this situation. Flexibility of schools is a precondition of the Educational Service together with a single system of pathways and competence based learning. In a broad sense, flexibility includes macro, meso and micro levels of the system and encompasses the information, steering and production structure. IAE's form the production structure, and the flexibility of organisation of the internal process at meso and micro levels.

The QS is a description of the essential external changes and should facilitate the internal organisation of schools. That is why the area of research focuses on flexibility of internal organisation.

In 1990 the work-based component of the educational routes was increased. This measure has far reaching consequences for the design of curricula and practice of SSAVE. The effects of this initiative - dualisation - need to be considered in relation with effects of the QS.

That is why, with respect to the QS and to dualisation, two hypotheses about the internal flexibility of IAE's will be tested -

- the QS increases the internal flexibility of SSAVE; the effects are intensified up- and down streaming, shortening of the length of stay and more qualified school leavers;
- dualisation - establishing a school- and work-based program to enhance competence based education as a precondition for acquiring required skills and transferability by students - improves students' results.

The available theory about the QS in IAE's, aspects of flexibility in IAE's, QS-effects that can be measured now, and the desired measurements will be discussed in the paragraphs of this section.

8.1.1 Available theory about the flexibility of the QS in IAE's

Swinkels-Kuijlaars & Van Wijlick (1995, pp. 28-31) concluded that SSAVE was subject of a complex and multiform change between 1990 and 1994. The principles of the QS are accepted, but questions with regard to the implementation are manifold. Schools felt overloaded and left alone with problems of many kinds.

The study of Ros, Swinkels-Kuijlaars, Theunissen, Visser, Jongmans & Geijsel (1996) made clear that the principles of the new QS rooted well in the IAE's. The concerns of managers and teachers moved from 'know what' questions towards 'know how, where and when' questions.

Lazonder (1998) studied the flexibility in SSAVE. 'To what extend are possibilities created for vertical and horizontal streaming; how and to what extend are these possibilities utilized?'

The majority of teachers in SSAVE shares the opinion that the QS made up- and down streaming of students in the IAE possible without loss of time; this is due to communality in educational profiles and units that are obtained pathway independent (Lazonder, 1998). Ros et al (1996) also observed this.

Lazonder (1998, p. 76) draws two further conclusions. First, the flexibility as designed and developed in the QS, has been implemented in the schools. Second, the number of students that utilizes flexibility is poor. Horizontal streaming from the educational to the training route or vice versa does not exceed 1% in a school year. The vertical streaming is only relevant as upstream within schools (4,5%).

From these studies is clear that the flexibility as designed and developed in the QS can and has been implemented in IAE's. A further observation is that the utilisation of the facility is poor. Lazonder (1998, p. 34) refers to Babeliowsky (1995), De Bruijn (1992) and Raffe (1994), who also observed that students appear not to utilise the possibilities of up- and down streaming. Why a policy on flexibility when it is not utilized?

8.1.2 Aspects of internal flexibility of IAE's

Several initiatives may have improved the flexibility of school organisation. Some spring from the QS, for example the description of competence based objectives, the model educational profiles, the commonality of the cores, the modularization of units encouraging modular curricula, and the integration of subject matter. Other initiatives come parallel, for example merging of schools, lump sum funding, dualised pathways, open legal status for teachers and institutional quality control systems. Some initiatives assist in making the school organisation or the learning process easier and other developments improve the approach to clients and the transferability of students; these internal and external flexibility's are often linked.

Short descriptions of situations will illustrate the different aspects of flexibility in relation with the QS. The purpose is to define a basis for measuring flexibility of organisation. This paragraph is also a qualitative description of organisational flexibility in the QS.

Flexibility may be increased by integration of subject matter; as a consequence of competence based objectives. Attainment targets in the form of decontextualised action structures, may ease the choice of exemplars in the educational program and thus add to flexibility of the learning process at the micro level. Decontextualised action structures may ease to serve diverse targets groups and to utilise different enterprises for the work-based program, enhancing organisational flexibility at the meso level.

Descriptions of competence and subject matter offer their own kind of flexibility. The teacher of traditional subjects can be flexible within the subject matter working retrospectively from basic facts. The teacher of a competence-oriented syllabus must be flexible within a particular context

related to current practice and guide learning from that basis. Both teachers have strong and weaker sides. Shifting from one professional approach to the other is very demanding.

However, it is qualifications and not subject matter that allow communication between schools and commerce & industry about the targets of a work-based program. This makes the organisation of the link between the school- and work-based program flexible. Qualifications though need transforming into study tasks, which need to include subject matter for analysis, reflection and acquiring transferability. The transforming process requires teachers to have a new professional skill. The teacher of traditional subjects may not be used to this approach but this is an operational problem at micro level, which may limit flexibility, but not a structural limitation of the QS.

Modularization may also enhance flexibility of educational objectives. The implementation of the new QS was associated with criticism of the blocks and the integration of subjects[66]. 'Too many units are described, the number of blocks in units differs and the prescriptions in the model educational profiles are not uniform and biased' (Herenius, Jellema, Van Tilburg & Wisselink, 1992).

At a macro level the model educational profiles were made uniform and more flexible (§ 6.2.4). The schools at meso level applied what they called emergency solutions, which proved the intended flexibility of the new QS.

The problem at micro level, a clear abstraction of competencies, has been analysed in chapter 7. On one hand there was the ideal of a limited number of units describing broad and abstract vocational qualifications - a structural approach of flexible objectives. On the other are the 'similar' vocational qualifications in clear, parallel units with firm workplace contexts - re-enforcing the operational power.

Decontextualised action structures may increase the flexibility of schools and the transferability of school-leavers, because they anticipate on possible future needs. Decontextualisation has been tried at depth during the development of the QS, but to some extent teachers and businesses turned it down. The background fear was an unacceptable loss of influence and identity.

The increased number of pathways may increase the flexibility of IAE's at meso level. The fact that the QS links the content of education, training, part time and short pathways at the four EU-levels may improve the flexibility of IAE's. Linking content, using the same title for what qualifies for comparable competence, may remove obstacles to internal up- and down streaming.

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[66] Criticism of the QS was brought forward by the experimental gardens from 1990 onward (§ 5.3.2) and by IAE's after the implementation of the QS in 1992.

With respect to school organisation, modularization of programs may increase the flexibility of the school and the learning. The composition of educational profiles for students is more flexible with units than with traditional subject matter and externally imposed timetables.

Modularization was also expected to promote the flexibility of pathways at meso level by applying the principle of commonality i.e. using the same modules in different educational profiles. The principle of commonality should reduce duplication when students change programs, lower the number of unqualified early leavers and may increase the flexibility of school organisation.

Provisions at macro level may also improve the flexibility of IAE's. The Minister of Agriculture maintained for example innovation and practical training colleges (IPC's) in the new system of SSAVE to safeguard a broad and flexible supply of courses in the relatively small IAE's. IPC's offer programs that require specific equipment or expertise, are doubtful in the school- or work-based programs at a regional level, and are carried out more effectively at a national level (Article 1.3.5 sub 3 in the law on ET, 1996). To secure the position of IPC's, the Minister of Agriculture prescribed in detail[67] the number of weeks to spent in an IPC. The outcomes and system requirements were inter-mixed. IAE's agreed with the function of IPC's but complained about the horse-trading. Thus, the wish to guide IPC's reduces freedom at meso and micro level but may increase the flexibility and quality of supply by the IAE's from a macro point of view.

At all levels of the responsive system problems between structure and flexibility are seen, i.e. decontextualisation, integration, modularization, commonality and IPC-service. Flexibility of school organisation is enhanced or inhibited by factors at macro, meso and micro levels of the system. Thus, to enhance flexibility, a QS should contain as little guidance on structure as possible.

That is why the first hypothesis is about flexibility of organisation. The hypothesis is that the new QS creates preconditions at the systems level for the improved internal flexibility of organisation by which more students attain, in a shorter time, a qualification.

The QS has short term operational effects and long term structural effects on flexibility. Right now the effects that may emerge 5-10 years after the implementation of the QS can be measured and considered. The consequence of many initiatives in IAE's is that the measured change of flexibility may

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[67] The Review DC '96 for example, prescribes in the model educational profile for the Supervisor Garden centre 10 days of practical training in an IPC and for the Supervisor Fruit growing 15 days. The Manager Floristry needs to go 10 days and the Manager Animal husbandry 20 days.

not be caused by the QS, and therefore an acceptable linkage between QS and flexibility should be made.

8.1.3 The effects of QS that can be measured in 1999

'What are the current effects on flexibility in IAE's due to the QS, and how should they be measured?' 'What are relevant side effects and what contamination may sneak into measurements?'

Changes in the internal flexibility of IAE's

The QS has three important elements - the structure as a means for steering and funding, the taxonomy to give a hierarchy to content and the content in the form of attainment targets.

The new structure assigns complete occupational divisions to IAE's. This means an immediately relevant increase in flexibility of supply. A short-term danger is that the management of IAE's claims to offer all courses and that a school needs to offer more than it can provide.

A context where the sky appears to be the limit may attract students that have delayed choice of program or in the hope that they will be able to reconsider a choice. Then the quality of supply and also of the intake is lowered and fewer students, after a longer time, attain a diploma.

The QS assigns 4 EU-levels to IAE's. This means that management and teachers of IAE's are able to place a student in a higher or lower level group and to meet his abilities and motivation. This increases the flexibility immediately; more students will leave the school with a diploma. It may decrease the stay in school through higher efficiency in the learning process.

The time allocation, linking requirements for goals with abilities of students, will make the curriculum more easily understood and the tasks of students and teachers clearer. In the long term, it is expected that more students attain a diploma, and in a shorter time.

The taxonomy of qualifications, units and attainment targets has short term and long-term effects on flexibility. The management of IAE's can apply the commonality principle immediately. IAE's will try to issue a lower level diploma to an early school-leaver. This is positive. Some negative side effects, however, may develop. Students may shop for units, which makes SSAVE more demand driven. This is a good thing, but students may exploit the facility and leave school without the level of diploma they could have attained. In the former system an early school-leaver would lose everything. This rigidity forced (and motivated) students to finish any course they had started. Now the losses are cut down to a level, that students may accept them and leave school. They refer to the facility for taking units later in order to complete a full qualification.

A second facility is that IAE's may exempt a student from a unit after an appropriate assessment. This facility may prevent undesirable repetition.

Schools will apply it once they have a procedure for assessment and then it will improve the efficiency of the process. An undesirable side effect is that management and students search for exemptions. This results in apparent efficiency.

Commonality between levels and pathways by means of educational profiles will make the curricula more consistent because common elements are easily recognised and broad competence may be better formulated. Commonality will increase opportunities for management to link the school- and work-based programs. Consistency of the program will increase the motivation of students and enhance the efficiency of the learning process. Organisation and operation of linked school- and work-based programs requires narrow co-operation of teachers, business and school management, and is likely to be effective in the long run.

Integration of subjects in units makes programs more flexible. The required subject matter is integrated in the unit and that lowers entry thresholds for students. In the short term, students may choose units that were beyond the reach of traditional courses. The long-term effect may be that teachers develop higher levels of transfer.

Attainment targets with decontextualised action structures will increase the opportunities for teachers to utilise multiform practical experiences of students in the learning process. They enable modification to meet regional and individual demand. An achievement depends from the integration of the school- and work-based program. Once established, it supports an individualised provision. This flexibility will have a large impact on the motivation of students and might make schools more efficient.

Assessment of prior learning at entry and of attainments of learning programs, in school and non-formal programs, gains importance in EU (Bj∗rn◇vold, 1997a, p. 53, Klarus, 1998). One should question the quality and limitations of present methodology, also the legitimacy of methodology and systems are still at question (Bj∗rn◇vold, 1997a & 1997b). The future system of VET may require an independent assessment structure (Wolf, 1998).

Other initiatives that influence the internal flexibility of IAE's

Other relevant initiatives in SSAVE around 1990 were merging of schools, lump sum funding, normalisation & dualisation of pathways, open legal status for teachers and a quality system for the schools.

The merger of schools increases their size and, thereby, broadens the provision. The larger capacity may in the long run increase their flexibility; in the short term the advantages of scale may be thwarted by policies of the old locations. The merger of schools between 1988 and 1991 may have taken attention from the learning process and temporally decreased the quality of the teaching. The in service- and teacher training were reluctant follow the change in SSAVE. The lump sum funding (based on registered students) that

came into effect on 1 January 1991, supports the long term institutional development and no short term effects on flexibility of schools may be seen. The lump sum funding may strengthen the advantages of scale and greater freedom and so improve the internal efficiency of IAE's in the long term.

Normalisation of pathways is an aim in the schools and may make the provision easier to understand, which in turn should improve the efficiency of the IAE's. Dualisation increases the work-based component of all courses in the educational route. As a result all students need to stay in school for a longer time. The effect in the short term is that more students leave school without a diploma (this will be elaborated in § 8.2.2). Once the work-based component can be utilised in the courses, the motivation of students may increase and more students attain a diploma, and in a short time, because of the work-based component.

The open legal status of teachers is a prerequisite for the integration of subjects in competence-based units and for the organisation of IAE's with units. The extent to which this is used by management and teachers determines the implementation of most of the other new possibilities discussed in this paragraph.

The quality system for schools tends to encourage reflection on all the possible changes mentioned above, for it takes into account what is considered important to the new occupational divisions, the lump sum funding and the open legal status (Hoeben, 1997, pp. 187-188). These are all general pre-requisites for the successful implementation of the new QS and can have a considerable impact on all points of flexibility of IAE's.

Conclusions

The initiatives in SSAVE with a possible strong short-term impact on flexibility are listed in Table 8.1 and summarised below.

Table: 8.1: Short term effects on flexibility of IAE's

initiatives related to the QS: / **effects on:**	(increase of) internal up- and down streaming	(qualified) early school leaving	(shortening of) stay in pathways
Occupational divisions with several courses	+		-
4 EU-levels	+		-
Combination of educational & training route	+	+	+
Commonality of units in educational profiles	+	+	+
Modularization	+	+	+
Accreditation of prior learning			+

- Increased flexibility by improved internal up- and down streaming resulting from commonality and modularization (undesirable side effect is shopping of units by students - they may leave early -).
- Increased flexibility for early school leavers through the combination of pathways, modularization and commonality (undesirable side effect may be that students leave too soon and are satisfied with full qualifications below their potential).
- Shortening of pathways from exemption from units (undesirable side effect may be uncontrolled exemption), combination of pathways in IAE's, modularization and commonality.

The 1st hypothesis is - The QS increases the internal flexibility of SSAVE in a few years time; the effects are intensified up- and down streaming, shortening of the length of stay and more qualified school leavers. (The 2nd hypothesis will be defined in § 8.2.2).

8.1.4 The desired measurements

The required and possible measurements to test the 1st hypothesis are described below, with measurements to analyse side effects and contamination mentioned in the conclusion above.

Increase of internal up and down streaming

The changes in pathways, levels and courses in students' careers before and after the implementation of the QS need to be measured. It is expected that students utilise more pathways.

Qualified (early) school leaving

The proportion of registered students that leave the school with a diploma before and after the implementation of the QS should be measured. A larger proportion qualified school leavers is expected.

The division of qualified school leavers that qualify at the EU-level of first registry or another EU-level, in particular at lower levels needs to be measured to get indications about effects of up and down streaming. An increase of qualified 'early school leaving' is expected.

Shortening of pathways

The time students need to attain a diploma should be measured as a ratio of the normal course length before and after the implementation of the QS. The QS is expected to shorten the length of stay.

The time students spend per block should be calculated to compare the efficiency of the new pathways. It is expected that student utilise school-time more effectively.

The higher performance of the system through accreditation of prior learning should be measured. Exemptions may pervert data about improved outcome of schools.

8.2 How flexibility of IAE's is measured

Section 8.2 holds the objects, indicators, standards and procedures in order to collect and elaborate data for the measurement of the effects of QS on internal flexibility of IAE's.

8.2.1 The object of measurement

The IAE's supply data each year about students under a code number to the ministry of agriculture. The registration data and attainments of students are monitored in a central electronic database. The LNV-register started in 1986 with S-SSAVE and SSAVE-A and -B. In 1993 data from the training routes were collected for the first time. As a consequence these training routes will excluded in this evaluation.

The data from 1986 is not used, because this was the first year of the LNV-register. The cohorts in the period before the QS was implemented and before the pathways of SSAVE were normalised, are from 1987 up to 1989. These three cohorts will be called Old (87-89).

In 1990 the pathways of the educational routes were normalised and dualised and in 1992 the QS became compulsory for all schools. That is why students in the cohorts 1990 and 1991 experienced the dualised structure but not the QS. These two cohorts will be called Dual (90-91). Dualisation and the QS were implemented together in 1990 in the three so-called experimental 'all gardens'.

The 1992 cohort was the first in which all IAE's worked with the QS. That is why it contains very valuable information about the development in the schools after the QS implementation.

By October 1998, the LNV register contained data for the 5 course years of the 1993 cohort. Not all students in the cohort had completed their studies yet. And four schools did not submit all passes in time - the data give approximately an underestimation of the passes of 10 percentage points. For these reasons this cohort is excluded.

Table 8.2: The division of the LNV-register data (with numbers of students)

	Old (87-89)	Dual (90-91)	QS (92)
all IAE's	17,790	9,436	5,282
'all gardens'	3,078	1,552	949
'garden a',	773	386	232
'b' or	1,414	785	508
'c'	891	381	209

8.2.2 Indicators to test increased flexibility

Two traditional indicators may measure the overall effect of flexibility - the success rate and the cost benefit ratio. The indicators are explained through

an example. They are applied to the SSAVE-B project (1975 – 1985). From that conclusions are drawn for the design of the measuring.

The success rate is the number of students leaving school with a diploma expressed as a fraction of the number of students who entered that course in the first year. With a high success rate more students get a diploma.

The cost benefit ratio is the number of school years students take per course year to attain a diploma. The fewer school years students use for a course the smaller the cost benefit ratio becomes.

'Are these two indicators true criteria for the effect of the QS?' The question will be analysed below.

Example: the cost benefit ratio

The success rate and the cost benefit ratio for Dutch VET were monitored by the Centraal Bureau voor de Statistiek (CBS, 1990). The data are based on measurements and calculations on student cohorts (random samples of student populations). CBS cohort data has been collected since 1975 and results published until school year 1988.

The cost benefit ratios in SSCVE (commercial VET), SSTVE (technical VET) and SSAVE between 1984 and 1988 are given in Figure 8.2. The ratios of Dutch VET vary between 1.25 and 1.90 and are fairly constant within the sectors of VET. The cost benefit ratio for SSAVE varies between 1.25 and 1.40 between 1975 and 1988. This means that in SSAVE about 1/4 of the funded school years are lost through unqualified school leaving or repetition of school years.

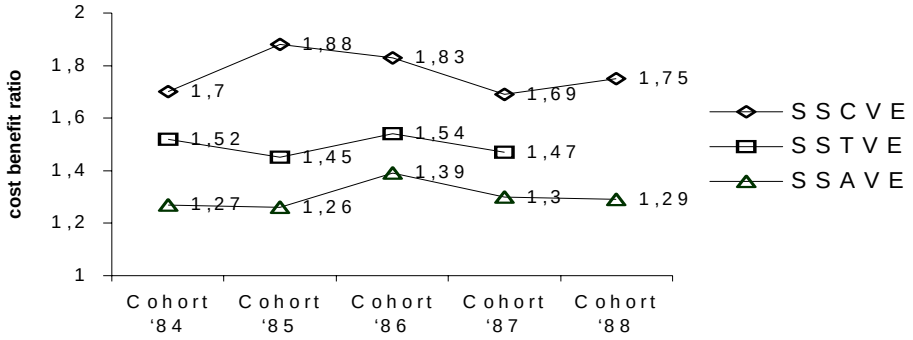

Figure 8.2: Cost benefit ratio in Dutch VET (CBS, 1990)

The success rate of SSAVE is stable during 15 years and shows that between 1/3 and 3/4 of registered students get diplomas (CBS, 1990). The success rate and cost benefit ratio of SSAVE are relatively good in comparison with Dutch SSVE. The favourable score is possibly due to the extra SSAVE-B pathway (§ 2.3.3). This conclusion fits with the conclusion of

Scheerens & Bosker (1997) that external differentiation (classic streaming) is one of the areas where education can improve.

From a flexibility point of view, students in SSAVE have a good chance of obtaining a diploma in a short time. Thus, as this example shows, the indicators allow a generalised conclusion on flexibility.

The QS has strengthened the definition of outcome and differentiation, which is why effectiveness and efficiency are expected to improve after the implementation of the new QS. That expectation needs to be proved and that is why the two indicators are relevant.

Independence of indicators

The two CBS indicators are interrelated and that is a problem. The cost benefit ratio as defined (Kooy, 1984) is a function of the success rate. A high cost benefit ratio can mean that everyone gets a diploma even if some students must repeat; it can also mean that many students leave school without a diploma.

That is why the cost benefit ratio indicator has to be replaced by two other indicators - the relative length of stay of qualified school leavers (LS-Q) and the relative length of stay of early school leavers (LS-E).

The relative length of stay is the ratio of registered school years to normal course years. This indicator can be calculated independently for every cluster of students in a sample.

Three indicators remain and these are clear and straightforward (backgrounds and algorithms will be discussed in # 8.2). Detailed calculations of the indicators were made for students in SSAVE to analyse the effect of the QS. One observation from those calculations requires to be mentioned specifically. It is the dualisation-effect observed in the SSAVE-B courses.

Reflection on dualisation in SSAVE-B (project 1975-1985)

The SSAVE-B pathway is a specific provision in SSAVE to educate the ‘practice oriented successors on farms’. Much was done for the improvement of this pathway. One initiative of the SSAVE-B project (§ 2.3.3) was to enlarge and utilise the work-based program. The 2-year SSAVE-B had a work-based program of 12 weeks in two years and the 3-year SSAVE-B had a work-based program of 54 weeks over three years (Table 8.3). The expansion of the work-based program has been called dualisation (§ 6.1.2). The pathways of the two alternatives had a similar school-based program.

Table 8.3: The pathway structure of the 2- and 3-year SSAVE-B courses

	course time	school-based program	work-based program
SSAVE-B	84 weeks over 2 years	72 weeks	12 weeks
dualised SSAVE-B	126 weeks over 3 years	72 weeks	54 weeks

From 1975 onwards, the Minister of Agriculture encouraged the agricultural schools to change the 2-year SSAVE-B route into a 3-year dualised route. The aim was to motivate students with a linked school- and work-based program and improve the integration of subject matter. At the end of 1984, the SSAVE-B pathway was dualised for about 40% of the schools and 50% of the students (APS, 1984).

The calculation of the success rate and the length of stay (of qualified and early school leavers - LS-Q and LS-E) in 1987 and 1988, show the effects of the 2-year SSAVE-B and the 3-year SSAVE-B pathway. The students registered in the 2-year and the 3-year pathway who attained a diploma at level 3 are counted. The 3-year pathway scores a low success rate in comparison with the conventional 2-year pathway. So in the 3-year pathway more students leave school without a diploma than in the 2-year pathway (Table 8.4).

Table 8.4: SSAVE-B outcome of the 2- and 3-year SSAVE-B entrants (87-89)

1987 - 1989	n		score		
* $\alpha < 0.001$	2-year pathway	3-year pathway	2-year pathway	3-year pathway	difference
success rate	3,293	4,040	73.58%	63.17%	10.41%*
LS-Q	2,423	2,552	1.13	1.12	0,01
LS-E	870	1,488	0.82	0.67	0,15*

This effect may be comparable with the low internal effectiveness of Dutch apprenticeship schemes (in 88-90 the success rate for the 27 main branches is 54%, between scores of 74% and 20%). Van den Berg, Eimers, Feijnen and Hövels (1994, p. 82) identify three reasons for these low scores -

- poor linkage of diplomas and function structure on the work floor;
- poor relationship between course supplier and branch;
- diffuse objectives and poor supply, e.g. examination requirements.

Of these reasons, only the poor supply of courses can explain the difference between the success rate of the 2- and 3-year SSAVE-B.

Motives for early school leaving are often related to the level of the courses (Lokman, 1995). In SSAVE-B, content is the same. Another reason could be that the motivation of SSAVE-B students falls quickly when the tension between the level of the course and their own capabilities covers a longer period, for example 3 instead of 2 years.

The length of stay of qualified school leavers (LS-Q) in the 2- and 3-year pathway is the same (Table 8.4). Similar proportions of students repeat course years in the two pathways. The relative length of stay of the early school leavers (LS-E) between the 2- and 3- year pathway differs significantly. Based on the costs of a full course of US $ 4.600[68], the total cost of early school leaving is calculated in Table 8.5.

[68] Comparison in prices of 1998 (LNV, costing unit of the Department of Science and Knowledge Dissemination).

Table 8.5: The loss in US $ of early school leaving in 2- and 3-year SSAVE-B

1987 - 1989	2-year pathway	3-year pathway	difference
LS-E	0.82	0.67	
years/ early school leaver	0.82*2 = 1.64	0.67*3 = 2.01	
costs/early school leaver	1.64*4,600 = $ 7,544	2.01*(2/3*4,600) = $ 6,164	$ 1,380
total costs (1987 - 1989)	870*7,544 = $ 6,563,280	1488*6,164 = $ 9,172,032	

The data in Table 8.4 allow a similar calculation from which the total costs of qualified school leavers between 1987 and 1989 in the 2- and 3-year pathway appear to be $ 25 and $ 26 million. A comparison of total costs and losses shows that costs of early school leaving take up 20 and 26% of the total costs of the 2- and 3- year pathway.

The calculation of the financial loss is not complete. The loss of motivation and costs of the student are not estimated and included. The value of a possible difference in outcome of the two pathways has not been estimated either. Nevertheless, the data about the isolated effect are straightforward, relevant and significant.

The dualised pathway was expected to motivate students, rather than discourage them. That is why the effect of dualisation was unexpected and disappointing. The 10-year SSAVE-B experiment did not improve effectiveness and efficiency and the poor outcome was not reported or recognised. The wasteful effect is still relevant since all SSAVE pathways were dualised in 1990.

The 2nd hypothesis to test the effects of changes in SSAVE in the early 1990s is the following. Dualisation improves students' results in a few years time; shortening of the length of stay and more qualified school leavers. This hypothesis - formulated positively like the policy aims are/were - is likely to be rejected.

8.2.3 Data and algorithms

This paragraph provides the data and algorithms to calculate the indicators.

Structuring the data

Utilising the LNV registry data required a comparison of the normal number of course years for a course with the actual number of school years. This comparison is the basis for calculating the indicators.

A course takes a normal number of course years in SSAVE 2, 3 or 4 years. The number of school years differs between graduates because of variance in success in subsequent years. Between one school year and the next a student is promoted to the next course year a), repeats the course year b), or leaves the school with c) or without d) a diploma (Kooy, 1984, p. 20).

The learning career of a student can be monitored with this algorithm. Figure 8.3 shows progression from the first-course-year.first-school- year

(t.t) to the second-course-year.second-school-year (t+1.t+1) - a pass - or to the first-course-year.second-school- year (t.t+1) - a fail.

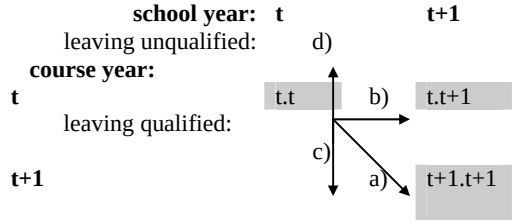

Figure 8.3: Scheme for student up and down streaming in 1st year (Kooy, 1984)

The completion by students in a four-year course may take 6 school years, since in most schools students are not allowed to repeat more than two course years. Data collected over a period of six years provides detailed information about the school careers of students of a certain cohort.

The scheme as presented can be filled with absolute data (the actual number of students) or with relative data (the fraction <1 and >0). The sum of the relative data in the squares of a completed scheme gives the average total length of stay. The relative number of students with a diploma is also available for a completed scheme (Kooy, 1984).

Adapted conventions to apply the method

The application of the success rate and relative length of stay, from data in the register of the Ministry of Agriculture, is not possible without adaptations. Adaptations of conventions are needed to interpret dualised pathways in the traditional system. A convention e.g. has to be decided on equating a pass in the system with a pass in the new QS.

The algorithm is designed for a standard year group system. The courses in SSAVE did not have the same number of course years in every school until the normalisation in August 1990. Some courses had been dualised and to handle this, the normal course years per individual student and also the actual school years per individual student were calculated as if the students were in full time education.

Since the introduction of QS, IAE's turned from a time-tabled and year group system and introduced sooner or later a unit group system. This meant that the production structure in the schools was in transition and that the degree of transition was different between schools. As a result the registry of data depicts a degree of transition too. The IAE's have no defined passes to the subsequent course years and a new definition of a course year is needed to produce algorithms. 'New passes' are calculated by dividing the minimum number of credits in full qualification by the course years (Table 8.6).

For example a student with 78 blocks at the beginning of the 5th school year in a full time 4-year Manager course, is counted as being passed to the 4th course year because he has > 3*25 blocks.

Table 8.6: The 'passes' in the QS, based on attained credits

full qualification	credits in full qualification / course years (Review DC '94)	credits / course year ⇒'new passes'
Operator	20/2	10
Supervisor	45/3	15
Manager	100/4	25

The definition of diploma in the algorithm also needs attention. A student can be counted as a graduate when a(ny) diploma in the IAE is attained or when the specific diploma of the course of entry in the first course year is attained. The LNV register data counts any diplomas attained at any IAE. Most diplomas are attained in IAE of entry; IAE's have only one sector and because of the local availability of an IAE few students change IAE's in a learning career.

When a student attains more than one diploma, the highest level diploma counts. When his diplomas are of the same level the first diploma counts. The logic of these choices is that efficiency counts.

Algorithms of the indicators

For each measurement (§ 8.1.3) the algorithm will be discussed.

Increase in internal up- and down streaming

Analysis of student up- and down streaming as in Figure 8.3 indicates the change of pathways, levels and courses in students' careers before and after the implementation of the QS. The frequency of students taking alternative routes to attain a diploma was expected to increase after the implementation of the QS.

Qualified (early) school leaving

The ratio of registered students leaving school with a diploma before and after the implementation of the QS is calculated. Given -

N = number of students in the first year of a course (t.t in Figure 8.3)

$$R = \frac{S}{N}$$

S = number of students that qualify from the course (Σ c in Figure 8.3)

R = success rate (is the % qualified) (Kooy, 1984, p. 23) -

Qualified school leavers that qualify in the course for which they first enrol or another course, in particular at lower level, are identified and separated. These categories are divisions of N. The ratio of registered students leaving school with a diploma is also measured before and after the

dualisation of the educational route. In 1990 all schools started with dualised pathways. A few 'experimental garden'-IAE's started in 1990 with the QS. The majority of the IEA's, however, started with the QS in 1992. This difference in take-up is used to separate the dualisation effect. The higher performance of the system due to improved effectiveness of courses and also certification of early school leavers (with a lower grade diploma) and by exemptions is measured in the database.

Shortening of stay in pathways

The time students need to attain a diploma is calculated. Given -

J_s = total number of actual school-years of all qualified school leavers (Σ -.t+n (n=0, n=∞) for qualified school leavers in Figure 8.3);

C = the normal number of course years;

E_s = relative length of stay of qualified school leavers (LS-Q).

$$E_S = \frac{J_S}{S * C}$$

E_s is compared before and after the implementation of the QS, and the dualisation effect can be separated as described above. In addition the performance of early school leavers is calculated. Given -

$J_{n\text{-}s}$ = total number of school-years of all early school leavers;

$E_{n\text{-}s}$ = relative length of stay of early school leavers (LS-E) -

$$E_{N-S} = \frac{J_{N-S}}{(N-S) * C}$$

The LNV register can also be used without application of the algorithms above. This has e.g. been done for the comparison of the average time students at levels 1, 2 and 3 spend per block. This provides a test on the actual credits students did attain per year. The number of exemptions given to students has also been taken from the LNV register without application of the algorithms.

8.2.4 Desired standards of flexibility of schools

The initiatives in SSAVE with an expected short-term impact on flexibility of IAE's have been described in Table 8.1. Indicators have been designed to measure the degree to which more students attain a diploma in a shorter time. The assumption is that positive scores with these indicators are signs of flexibility. How are these scores to be weighed precisely?

The problem is that no hard standards are available to weigh the scores. SSAVE did score well in comparison with other Dutch VET, thus the best standard is an improvement of the own performances in the past. As a consequence the scores of SSAVE from before 1990 are compared with scores of SSAVE from 1990 onwards.

8.2.5 Measuring

Collecting data is routine for IAE's and Ministry of Agriculture. The ministry supplied the data to calculate up- and down streaming, success rate and length of stay. The developed algorithms were run at the Employment Market Research Centre (STOAS). The ministry expands some of the data for the annual report on the performance of schools (used was the time students spent on blocks). The next section discusses the objects, standards and procedures of the measurements.

8.3 The measured flexibility of IAE's

Three comparisons of data are made. First the increased internal up- and down streaming is analysed, followed by the qualified (early) school leaving and finally the shortening of stay in pathways.

8.3.1 Change of internal up- and down streaming

The hypothesis is that the QS will intensify up- and down streaming.

In the LNV register it was observed that vertical streaming in S-SSAVE (EU-level 2) was rare; 4 students (< 0,25%) of the 1987-1989 cohorts (n = 1869), streamed up to SSAVE-B. This has changed after the implementation of the QS. In the 1992 cohort (n = 760), 137 Operator students (19,4%) stream up; about 100 times more.

1st year	2nd year	3rd year	4th year	5th year	n	sub totals
Operator					219	
	Operator				352	
		Operator			50	
			Operator		2	623
			Supervisor	Manager	1	
		Supervisor			43	
			Supervisor		39	
				Operator	1	
				Supervisor	9	
				Manager	1	94
		Manager	Manager		1	
				Manager	1	2
	Supervisor				4	
		Supervisor			25	
			Supervisor		6	
			Manager		1	
				Manager	3	39
	Manager	Manager	Manager		3	
				Manager	1	4
total					762	762

Figure 8.4: The routes of the 1992 cohort in the Operator pathway.

The learning paths of the 760 Operator students are analysed with help of the scheme of student streaming (Figure 8.3). The result is given in Figure 8.4. A rich pattern of up- (and down) streaming is observed.

The majority of the students (623) stays in the Operator pathway, a minority (139; 22.3%) streams up. Some Operators (39) change in the second year to the Supervisor pathway, others (94) in the third year. In Table 8.4 is not visible that of the 219 school leavers in the first year only 2 % had a diploma and that all 10 students in the Manager pathway were successful.

Of the stayers (77.7%) 46 % of the students attains a diploma and of the streamers (22.3%) 12% (Table 8.12). The altriticals and the nidifugous are equally successful (> 50%).

In Figure 8.4, the students of the Operator cohort of 1992 utilised 19 routes in different combinations and length of stay. The utilisation of routes (averages of 3 or 2, or 1 cohort) is summarised in Table 8.7.

Table 8.7: Utilised routes by first entries in SSAVE

all IAE's	old (87-89) n = 3	dual (90-91) n = 2	QS (92) n = 1
EU-level 2	5.7	12.0	19.0
EU-level 3	24.0	28,5	30.0
EU-level 4	25.0	25.5	27.0

Before the dualisation initiative, in average 5.7 pathways were utilised by the cohorts 87-89. For early school leavers, one, two or three school years are counted as three different routes. The average in the dualisation period (1990-1991) was 12 routes for Operators.

The analysis shows an increase in the number of routes used. At level 2 (S-SSAVE) the cohorts 87-89 only used the S-SSAVE pathway with different lengths of stay. The QS has changed this. Many more routes are used at level 2 and 3. The observation is a relevant increase of internal up- and down streaming.

These observations do not match the conclusions of Lazonder (1998) that vertical streaming does not exceed 4.5% (§ 8.1.1). A different basis for analysis may explain the different conclusion (Table 8.8).

Table 8.8: The basis for analysis of utilised flexibility in IAE's

	Lazonder (1998)	this study
effect	horizontal and vertical streaming	vertical streaming
reference group	one school year (1995-1996)	cohorts 1987 – 1992
data	opinions of teachers/manager	records from LNV-register

The discussion about effects encompasses vertical streaming; so the result definition is the same.

The reference to one school year will give a similar overall result as the measuring of cohorts in a stable situation. The school year 1995-1996, however, contains students from the cohorts 1990 up to 1995. These cohorts

are different (§ 8.2.1), the school year figure will produce an average of effects and that is why it is not clear from a school year analysis how to assign effects. The differences, however, cannot explain the 4,5% vertical streaming Lazonder (1998, p. 32) measured and the up- and down stream qualification of more than 10% presented in Table 8.12.

Thus it is likely that differences must be explained with differences in the data. The LNV-register is based on records supplied by schools, with reference to unique student numbers - no student can be forgotten no one can be counted double. Lazonder used an inquiry[69] addressed to the school management. It is likely that teachers and managers, unless they consulted to the registry system of the school for the inquiry, underestimated vertical steaming in the school.

The QS enhances up- and down streaming. The question is however, whether or not the increased streaming opportunities have improved the effectiveness of IAE's.

8.3.2 Qualified (early) school leaving

The hypothesis is that the QS will enhance qualified school leaving.

The development of the success rate between 1987 and 1993 has been analysed from the LNV register. The results are given at EU-levels 2, 3 and 4 for all IAE's and for the three experimental 'all gardens' (Table 8.9).

Table 8.9: Success rate development in SSAVE between 1987 and 1993 in %

* $\alpha < 0.05$ ** $\alpha < 0.001$	old (87-89)	dual (90-91)	difference dual-old	QS (92)	difference QS (92)-old	difference QS (92)-dual
all IAE's	72.23	64.79	-7.4**	70.41	-1.8	+5.6**
EU-level 2	55.27	43.84	-11.5**	53.86	-1.4	+10.0**
EU-level 3	70.11	64.19	-5.9**	69.80	-0.3	+5.6**
EU-level 4	77.72	72.38	-5.3**	75.38	-2.3	+3.0*
'all gardens'	75.63	68.56	-7.1**	75.24	-0.4)	+6.78*
EU-level 2	36.42	38.97	+2.6	52.34	+15.9*	+13.4
EU-level 3	74.42	66.48	-7.9*	70.47	-4.0	+4.0
EU-level 4	80.85	77.10	-3.7	81.46	+0.6	+4.2

Before the implementation of the changes in SSAVE, the average success rate for all IAE's was 72.23 %. At level 2, S-SSAVE scored on average 55.27 % and at level 3, SSAVE-B scored 70.11 %. SSAVE-A, at level 4, had a high score (77.72 %). The success rate was low at EU-level 2 and gradually increased at levels 3 and 4. A possible explanation for the different scores is that SSAVE-A was the pathway with the best status and attractive for teachers. In addition to that, students with insufficient ability or motivation were placed in the SSAVE-B pathway and after 1983 also in the S-SSAVE pathway.

[69] The inquiry was held in March 1997 about the school year 95-96.

The cohorts 87-89 of the 'all gardens' show a pattern similar to other schools. The 'all gardens' score better than SSAVE in average (with exception of the lower S-SSAVE pathway with a score of 36.42 % students that attain a diploma). Better schools may pick up improvements faster after which the others may follow (Van Gennip, 1991).

Before 1990, the success rate at the higher levels in SSAVE was better than at EU-level 2 ($\alpha < 0.001$); in 'all gardens' the difference exceds a factor 2.

The first change for all schools is the dualisation of pathways. The success rate of the 1990 and 1991 cohorts dropped significantly with 7,4 percentage points. This is a severe loss of student performance. The loss, however, is smaller than in the dualisation-effect in the 2- and 3-year SSAVE-B course, where dualisation is after 10 years 10.4 percentage points down to the traditional pathway (Table 8.4).

The effects are difficult to explain for S-SSAVE. The school- and work based components, and pedagogy hardly changed because of the dualisation initiative and one would expect no change of success rate. However, at EU-level 2 the change in the success rate was large and significant in all IAE's (-11.5 %).

The drop of the success rate after the dualisation initiative, is almost the same for all IAE's and for the experimental 'all gardens'. The EU-level 2 is the exception (+ 2.5 %); the level 2 score of the gardens gains, this however may be a QS effect - see below.

Implementation of dualisation has a direct, significant and relevant negative effect on the success rate of students - the effect is measured in all schools with or without QS. The 2nd hypothesis was not confirmed - dualisation does not improve students' results in a few years time.

The second change in SSAVE came when the QS became compulsory for all IAE's in 1992. Data for the 1992 cohort showed a significant recovery of the average success rate of students of all IAE's. The difference between the old 87-89 cohort and the QS 92 cohort is not significant (anymore in the 1992 cohort).

The explanation of the improvement is not easy. It might be attributed to the implementation of the QS, and also to fast recovery from the dualisation initiative. However, it is not likely that the cause of recovery is dualisation. It would be in contrast with the observation in the 1987-1989 cohorts of the 2- and 3- year SSAVE-B course (Table 8.4), where 15 years after dualisation there was still a large difference between success rates. The recovery is more likely due to the new QS.

The success rate of the 1992 cohort in the experimental 'all gardens' is the same as the success rate of the cohorts 1987-1989. At the time that these cohorts registered in the 'all gardens', the 'total QS' change was 2 years on

its way. The EU-level 2 cohort shows improved success rates (from 36, via 39 to 52%) and the EU-level 3 students show a small decline (from 74, via 66 to 70%). The success rate of the 1992 cohort of EU-level 4 students is the same as that of the 1987 – 1989 cohort (from 80.8, via 77.1 to 81.4%). This means that the experimental 'all gardens' regained their good 'old' success rates within three years.

Lower levels appear to be more subject to unqualified school leaving than level 4. An analysis of early and non-qualified school leavers in the first year of entry shows the effects of dualisation and of QS and it eliminates the effect of course duration. That is why a comparison was made of the early, non-qualified (ENQ) school-leavers in the year of enrolment (Table 8.10)

Table 8.10: % ENQ school-leavers in year of registry between 1987 and 1993

* $\alpha < 0.05$ ** $\alpha < 0.001$	old (87-89)	dual (90-91)	difference dual-old	QS (92)	difference QS-old	difference QS-dual
all IAE's						
EU-level 2	21.6	26.9	+ 5.4*	28.0	+ 6.4*	+ 1.0
EU-level 3	16.2	17.2	+ 1.0	15.3	- 0.9	- 2.0
EU-level 4	9.8	11.6	+ 1.8*	12.2	+ 2.4*	0.6

Table 8.10 shows that early, non-qualified school leavers in the first year of entry at EU-level 2 (in the past S-SSAVE and now the Operator) are the most vulnerable (over 20% ENQ school-leaving) and particularly the most vulnerable to change (the largest increase of ENQ school-leaving due to dualisation, 5.4%). This vulnerability is also visible at level 3 but far less pronounced.

The change in ENQ school-leaving is significant at level 4; a possible explanation is that the level 4 course has become slightly more difficult in 1992 (to attain in relative high pace 100 credits).

Dualisation makes the pathways longer and may force a no-go decision in an earlier stage; this -than- should result in a shorter length of stay of early school leavers (calculated below).

Another possible explanation is that 12,5% and 15% at level 4 and 3 ENQ school-leaving in the first year, are a fair balance between ability and motivation of students and chances taken by students with doubt as to motivation and ability.

Qualified early school leavers

Further analysis should reveal whether 1/8 ENQ school-leaving in the first year (level 3 and 4 in Table 8.10) is reasonable in an overall picture.

That analysis can also help to test the 1st hypothesis about the increase of internal flexibility due to the QS, particularly the effect of the increased up- and down streaming on qualified school leaving.

Table 8.9 shows the total number of diplomas attained and not the levels at which diplomas are attained. That is why the supplied data can be misleading and a comparison needs to be made of entry levels and diploma levels (Table 8.11). The table shows the effects of regular (stayers) and of up- and down streaming for graduation.

Table 8.11: Comparison of passes through up- and down streaming

%	Cohort			
diploma level:	total	EU-level 2	EU-level 3	EU-level 4
entry level:				
	total	sub total	sub total	sub total
EU-level 2	sub total	regular	up streaming	up streaming
EU-level 3	sub total	down streaming	regular	up streaming
EU-level 4	sub total	down streaming	down streaming	regular

Manager level for example, may attain an Operator diploma through the commonality principle. This would result in a high success rate, while in fact many students are attaining a diploma below their ability. In such a situation the positive score is suggesting an undesired development. That is why an analysis is made of the build up, or composition of the success rate; this analysis also provides information about qualified early school leavers.

Data are presented from 'all IAE's' and of the successful ' garden c'.

Table 8.12: Composition of the success rate between 1987 and 1993 in %

* $\alpha < 0.05$		old (87-89)				dual (90-91)				difference		QS (92)				difference
** $\alpha < 0.001$										dual - old for regular						QS - old for regular
diploma level:	tot.	2	3	4	tot.	2	3	4			tot.	2	3	4		
entry level:	%				%						%					
all IAE's	72	4	31	37	65	6	27	32			70	7	29	34		
EU-level 2	55	**55**	0	0	44	**41**	3	0	-14.1**		54	**43**	10	1	-12.6**	
EU-level 3	70	0	**68**	2	64	0	**58**	6	-10.3**		70	4	**60**	6	-7.6**	
EU-level 4	78	0	7	**71**	72	0	10	**62**	-9.0**		75	0	14	**61**	-9.7**	
'garden c':	72	1	33	38	79	7	37	35			80	9	33	38		
EU-level 2	24	**24**	0	0	62	**52**	10	0	27.9*		70	**61**	9	0	36.4*	
EU-level 3	72	0	**68**	4	81	2	**70**	9	1.7		76	8	**68**	0	0.1	
EU-level 4	77	0	3	**74**	81	0	17	**64**	-10.2		85	0	18	**67**	-7.7	

Table 8.12 gives a breakdown of the success rate. The first column approaches the success rate from an entry level starting point. The total scores (tot. %) are the same as in Table 8.9. For each level of entry the qualification level is given, and when several diplomas have been attained, only the highest diploma level is counted.

Table 8.12 does not only show changes of success rate. For example, the increase of the success rate at level 2 for all IAE's from 4% out of 72% (in

87-89) to 7% out of 70%, is mainly because of the increase of the numbers of students at level 2 (from 11% in 87-89 to 14.5% in 92).

The negative effect of dualisation (between -9.0 and -14.1 % in all IAE's) on the success rate of diplomas attained at the level of entry is very strong significant. The QS hardly compensates for the losses; the negative and significant effect on the success rate persists for diplomas attained at the level of first entry.

This means that the compensating effect of the QS observed in Table 8.9 is mainly due to diplomas attained after streaming - thus an effect of commonality.

'Garden c' shows a remarkable better effect, likely due to the QS, at level 2 and 3 for diplomas attained at the level of first entry. The diplomas attained at the level of first entry do not differ much between the *cohorts 87-89 of all IAE's* and *the cohort 92 of 'garden c'*. Most of the extra in 'garden c' results from up- and down streaming, particularly at level 4.

A focus on up- and down streaming effects of dualisation and QS initiatives, yields the following.

For the 1987-1989 cohorts entry level 2 qualifies only at level 2; level 3 has 3 % qualifying above their entry level (2% out of 68%) and none below; level 4 has 10% qualifying below entry level (7% out of 71%). This situation hardly changed after dualisation in 90-91. After the QS initiative, however, the up- and down streaming yielded significantly more qualifications

In the 1992 cohort the upstream from EU-level 2 to EU-level 3 was considerable; 10 out of 54 is around 18.5 % of the level 2 entrants that attained a level 3 diploma. It is likely that students are placed more easily in the Operator stream than before. This would explain the increase in numbers of students and also the upstream. The 20% upstream, however, represents smaller numbers of students than needed to explain the improved success rate (for example in 'garden' c). Therefore, it is likely that the 'new blood' has improved the entire pedagogic climate of the Operator pathway.

The QS increases up streaming of level 2 entries and enhances significantly the qualification at higher levels (support for the 1st hypothesis). This effect is likely due to commonality of full qualifications.

In the 1992 cohort the significant numbers streamed down from level 3 to level 2; 4 % out of 70% qualifiers at level 2 and even in the 'garden' c 8% out of 76%. This is a clear result of commonality. The number of level 3 entries, which attained a level 4 qualification, did increase significantly from 2 to 6 percentage points; the successful up- and down streaming is about 10%.

In the 1992 cohort, the down stream at level 4 has also grown to a significant 14% out of 75% qualifiers at level 3 and in 'garden' c as many as 18% out of 85%. This again is a clear result of commonality.

These observations put the recovery from the dualisation initiative in perspective. Since the dualisation initiative, the number of students at level 4 failing to qualify in the pathway of entry, has grown substantially. In the 87-89 cohorts, 71% (in 'garden' c 74%) of the level 4 entries attained a diploma at level 4; after dualisation in 1990 and 1991, this dropped to 62% (in 'garden' c 64%); after the QS initiative in 1992, the success rate was 61% (in 'garden' c 67%). For 'all IAE's' these changes are significant. With regard to the attainment of a qualification in the pathway of entry, the decrease due to dualisation is > 10%; this is in line with the observation in the 2- and 3-year SSAVE-B project (Table 8.4).

The QS has improved the flexibility of SSAVE and restored the success rate. The negative effect of the dualisation initiative is compensated for with attained diplomas at other levels than the level of first entry.

The observed differences may also be due to change of entry or graduation levels. A possible change of levels has not been analysed. As concluded in § 6.4.1, the QS articulated a new and higher standard for the EU-level 4. It is unlikely that levels changed in this short time.

A further conclusion is that of the cohorts 87-89 and of 93, 50% of the NQ school-leavers are leaving the school in the first year (comparison of the old 87-89 and the QS 92 columns in Table 8.10 and 8.11). Thus the ratio of NQ school leaving between the first year and the following years did not change due to dualisation and QS implementation.

The success rate in the experimental 'all 'gardens''

It is interesting to note that the success rate in 'garden c' did not decrease following dualisation or the QS initiative. On the contrary, the 1990 and 1991 cohorts improved the success rate significantly by 6.8% from 71.9% to 78.7%), and the 1992 cohort improved again by 1.6% to 80.3%. In this school all three levels score a success rate higher than 70% (Table 8.13). Before conclusions, first the other gardens will be looked at.

In comparison with the success rate of the 87-89 cohorts, the experimental gardens 'a and b' had a significant drop of 17.9 and 8.7% of their total success rate for the 90-91 cohorts. These IAE's suffered from the risk they took in implementing two changes at once. The recovery of the gardens 'a and b' was good, the 1992 cohort gained a significant 10.0 and 7.8% (to 74%) respectively in comparison with the 90-91 cohorts. This recovery strengthens the position of the gardens 'a and b' in comparison with the other IAE's (which had a recovery of 5.6% (to 70%), in comparison with the 90-91 cohorts Table 8.9).

The policy of 'garden c' was to transform the modularised units of the QS into a time-tabled structure with traditional subjects. The school followed an independent line here against the advice of the Ministry of Agriculture.

Table 8.13: The success rate in all 'gardens' between 1987 and 1993 in %

* $\alpha < 0.05$ ** $\alpha < 0.001$	old (87-89)	dual (90-91)	difference dual - old	QS (92)	difference QS (92) - old	Difference QS (92) - dual
garden a total	81.63	63.73	-17.9**	73.71	-7.9	+10.0*
EU-level 2	37.50	36.62	-0.9	67.44	+30.0*	+30.8*
EU-level 3	77.08	69.09	-8,0	60.66	-16.4*	-8.4
EU-level 4	88.54	70.24	-18.3**	82.03	-6.5	+11.8*
garden b total	74.68	65,99	-8.7**	73.82	-0.9	+7.8*
EU-level 2	42.05	29.27	-12.8	26.83	-15.2)	-2.4
EU-level 3	74.87	57.84	-17.0**	72.44	-2.4	+14.6*
EU-level 4	78.41	78.85	+0.4	80.00	+1.6	+1.2
garden c total	71.94	78.74	+6.8*	80.38	+8.4*	+1.6
EU-level 2	24.44	61.90	+37.5**	69.57	+45.1**	+7.7
EU-level 3	72.03	80.92	+8.9	75.76	+3.7	-5.1
EU-level 4	76.98	80.75	+3.8	85.00	+8.0	+4.3

The school policy made it much easier for teachers to keep track. From a steady transformation the QS-principles were gradually incorporated into the curriculum. This approach was an administrative and planning burden but, at the same time, prudent. This strategy brought the school (in the 1992 cohort with 23, 66, and 120 students at level 2, 3 and 4) from the back row to the front line of the three 'all gardens'. The success rate for level 2 students was brought from a deplorable state in significant steps at a point where a student had a good chance of success. This latter point contributes to achieving the aim that IAE's should attune their programs to all target groups.

The experimental 'gardens a and b' suffered severely from the dualisation initiative and had a poor recovery. The 92 cohort of 'garden a' was 7.9% below the old (87-89) success rate. 'Garden b' recovered and the success rate of the cohorts in 'garden c' gained after each initiative, likely due to a gradual implementation policy at school level.

A breakdown of the success rate into qualification levels shows the establishment of a new up streaming from level 2, a new down streaming from level 3 and even more down streaming from level 4. The down streaming from level 4 entries, which qualify at level 3, compensates for the dualisation effect.

The Operator is the most vulnerable target group in the IAE, and this target group has gained the most from the QS-implementation through an increase of flexibility, but possibly also through a higher level of first entries and an improvement in teaching.

A wise implementation strategy - QS in relation with the traditional subject matter organisation structure - may prevent 'inevitable' losses of implementation.

The former S-SSAVE, was set example for SSAVE and has become an integrated part of the system. De Bruijn (1997) has concluded this for S-SSVE. After all, the success rate of S-SSVE (De Bruijn, 1997, p. 139) and S-SSAVE (Table 8.12) were worrisome. The schools did not reach the target groups in S-SSVE (De Bruijn, 1997, p. 248) and in S-SSAVE (Van der Steen, 1986, p. 60). Also the dualisation of day release pathways is not without risk (Table 8.4 & 8.5). Thus, it must have been mainly for educational reasons that this pathway was set as example for development of Dutch VET.

De Bruijn (1997, p. 298) concludes that in S-SSVE the flexible curriculum structure had a negative influence on the success rate. The observation in SSAVE is that the introduction of the QS - increasing the flexibility of the former S-SSAVE curriculum - had a positive influence on the success rate. This positive effect is likely due to the integration of this pathway in the system.

It is likely that also in S-SSVE the way dualisation was utilised by the schools and the isolated position had larger negative effects than De Bruijn observed.

8.3.3 Shortening of stay in pathways

Another aspect of testing the hypotheses on QS and dualisation is the effect on length of stay, which is supposed to be shortened by the initiatives. The central question in this paragraph is 'Are students attaining their diplomas in a shorter time?'

Table 8.14: The length of stay in pathways in SSAVE between 1987 and 1993

* $\alpha < 0.05$ ** $\alpha < 0.001$	Old (87-89) diploma: n/y	dual (90-91) diploma: n/y	difference dual-old	QS (92) diploma: n/y	difference QS (92)-old	difference QS (92)-dual
all IAE's	0.69/1.09	0.67/1.08	-0.03*/-0.01*	0.61/1.04	-0.09**/-0.06**	-0.06**/-0.05**
EU-level 2	0.83/1.07	0.83/1.10	-0.01/-0.04*	0.74/1.09	-0.10**/-0.03	-0.09**/-0.01
EU-level 3	0.69/1.13	0.65/1.11	-0.04*/-0.02*	0.64/1.08	-0.05*/-0.05**	-0.01/-0.03**
EU-level 4	0.64/1.07	0.57/1.06	-0.07**/-0.01	0.52/1.00	-0.12**/-0.08*	-0.06**/-0.07**
all gardens	0.69/1.09	0.62/1.06	-0.08**/-0.03**	0.52/1.01	-0.17**/-0.08**	-0.09*/-0.06**
EU-level 2	0.84/1.03	0.79/1.04	-0.04/0.01	0.81/1.12	-0.02/0.09*	0.02/0.07*
EU-level 3	0.69/1.11	0.65/1.08	-0.04/-0.03	0.49/1.06	-0.20**/-0.05*	-0.16*/-0.03
EU-level 4	0.65/1.08	0.46/1.05	-0.18**/-0.03*	0.40/0.97	-0.25**/-0.11**	-0.06/-0.08**
garden c	0.63/1.07	0.45/1.04	-0.18**/-0.03	0.48/0.95	-0.15*/-0.11**	0.03/-0.09**
EU-level 2	0.84/1.00	0.72/1.03	-0.12/0.03	0.71/1.07	-0.12/0.07	-0.00/0.05
EU-level 3	0.57/1.10	0.39/1.05	-0.18*/-0.05	0.44/1.05	-0.13/-0.05	0.05/0.06
EU-level 4	0.63/1.03	0.37/1.03	-0.26**/0.00	0.42/0.88	-0.21*/-0.15**	0.05/-0.14**

The development of the length of stay has been analysed separately for qualified and non-qualified school leavers between 1987 and 1993. The length of stay is the ratio between school years and normal course years (§ 8.2.2). In Table 8.14 it can be seen that of the 87-89 cohorts the non-

qualified school leavers at level 2 had a length of stay of 0,83 and the qualified school leavers of 1,07. This means that on average a non-qualified school leaver stays at school for 2 * 0,82 = 1.64 years before leaving without a diploma. The qualified school leaver in the 87 – 89 cohorts stays on average 2 * 1.06 = 2.12 years.

The comparison of the 87-89 cohorts with the 90-91 cohorts, shows that the dualisation measure, which leads to an absolute increase of the length of stay, shortens significantly the relative length of stay. The 90-91 cohorts in the 'gardens' show also a significant decrease of the length of stay - this decrease is about a factor 3 larger than in 'all IAE's' (all IAE's total: -0.03/-0.01 & all gardens total: -0.08/-0.03). Shortening of the length of stay by non-qualified school leavers is about a factor 3 larger and more significant than of qualified school leavers.

In the 92 cohort, except for the level 2, a significant continued and gradual decrease of the length of stay is observed in all schools, and in the three 'gardens'. The change due to the QS (all IAE's cohort 92 total: -.0.06/-0.05) is about 3 times larger than the change due to dualisation (all IAE's cohort 87-89 total: -0.03/-0.01). These observations support the assumption that the decrease of length of stay is mainly attributable to the QS implementation.

The experimental gardens showed a significantly stronger progression in the decease in the length of stay in their 3rd year of QS, than ' all IAE's in their 1st year.

The approval of the hypotheses that QS, and to a small extend dualisation, shorten the length of stay in schools applies to qualified and to early school leavers.

The relevance of the changed success rate and length of stay

Before a further analysis is made of the changed length of stay, first an explanation of the relevance of the measured changes will be given. That is why the set of available data from the presented tables was used to calculate a very tangible entity, the cost of the diploma for one set of entrants.

For the comparison the number of students, success rate and length of stay of all students need to be taken into account. The data for the example with level 4 students is collated in Table 8.13. The cost of one school year is US $ 4,600 and on that basis the total costs for one diploma is calculated.

The total cost of qualified students is the product of registered students, success rate, course years, length of stay (yes) and US $ 4,600.

The total cost of non-qualified students is the product of registered students, 1 - success rate, course years, length of stay (no) and US $ 4,600.

The cost of qualified plus non-qualified students devised by the product of registered students and success rate provides the cost per qualified entry.

Table 8.15: The costs of qualified EU-level 4 entries in the educational route

All IAE's	old (87-89)	dual (90-91)	QS (92)
Students that registered at EU-level 4	8,588	4,367	2,762
Success rate (all qualifications)	77.72%	72.38%	75.38%
length of stay (no/yes qualified)	0.64/1.07	0.57/1.06	0.52/1.00
total cost qualified students	$ 131.4*10^6	$ 61.6*10^6	$ 38.3*10^6
total cost non-qualified students	$ 22.5*10^6	$ 12.7*10^6	$ 6.5*10^6
total cost of the cohort at EU-level 4	$ 153.9*10^6	$ 74.3*10^6	$ 44.8*10^6
cost per qualified 'EU-level 4 entry'	$ 23,060	$ 23,510	$ 21,520

Both the success rate and the length of stay determine the costs. At the systems level, the dualisation initiative (90 - 91) increased the costs to qualify a level 4 entry with ($ 23,060 - 23,510 =) $ 450. The costs of the dropping success rate (77.72% - 72.38% =) 5.34 percentage points are compensated by a decreasing length of stay (0.64/1.07 - 0.57/1.06 =) 0.07/0.01 points.

The cost of a diploma at level 4 has not changed much between 1987 and 1993 - an actual decrease of 2 %.

The question is what the effects at the other levels are, and how the development in the 'gardens' compares with the development in the system as a whole (Table 8.16).

Table 8.16: Costs of qualified entries in the educational route of SSAVE

	old (87-89)	dual (90-91)	QS (92)
all IAE's:			
EU-level 2	$ 15,970	$ 19,910	$ 15,780
EU-level 3	$ 19,660	$ 20,300	$ 18,780
EU-level 4	$ 23,060	$ 23,510	$ 21,520
all 'gardens':			
EU-level 2	$ 23,030	$ 20,920	$ 17,140
EU-level 3	$ 18,580	$ 19,450	$ 17,320
EU-level 4	$ 22,760	$ 21,830	$ 19,420
'garden' c:			
EU-level 2	$ 33,100	$ 13,540	$ 12,670
EU-level 3	$ 18,220	$ 15,770	$ 16,450
EU-level 4	$ 22,430	$ 20,600	$ 17,560

The data from the source tables were significant in most cases. The elaboration shows that the data are relevant as well. In 1992 the costs of issued diplomas in SSAVE have decreased with about 5% in comparison with 1987-1989. In 1992 the costs of issued diplomas in 'garden c' have decreased with 61.7, 9.7 and 21.7% for level 2, 3 and 4 in comparison with 1987-1989.

The success rate and length of stay of school leavers are influenced by school policy, i.e. admission policy, study advice, assignment to pathways and streaming policy. Student ability and classroom atmosphere also effect

the outcome. Large numbers (between 8,500 and 765 for all IAE's, and between 417 and 42 in 'garden' c) may largely dissolve these effects and the effects of QS and dualisation may then be seen.

The product of success rate and length of stay provides an overall effect of these initiatives and allows concluding the two hypotheses.

The first conclusion is that the QS enhances success rate and shortens length of stay and the combination of these effects results in significant improvements of the efficiency of the system.

The second conclusion is that dualisation decreases success rate severely and shortens length of stay slightly and the combination of these effects leaves the efficiency of the system unchanged (compare column two and three of Table 8.16).

The changes are relevant - the three 'gardens' show that a cost reduction at the systems level between 10 and 20% is a realistic target.

The possible explanation for the changes of length of stay

The development of the length of stay is analysed by means of data at the level of units and blocks. The source document is the LNV-register.

Credits attained per student per school year

The normal number of credits that a student should attain per school year is given in Table 8.6. The backgrounds are discussed in # 6.2.

For each level of the educational route, the total of attained units (and from there the blocks) and the total of registered students at each level is taken (LNV, 1998; Table 4.9). The division of the two provides the actual credits attained per student per school year (Table 8.17).

Table 8.17: Credits attained per student per school year in educational route

school years:	92-93	93-94	94-95	95-96	96-97
Operator (EU-level 2)	10.7	11.9	11.9	12.1	12.4
Supervisor (EU-level 3)	15.3	15.1	15.3	15.9	16.5
Manager (EU-level 4)	22.8	23.5	24.2	26.2	25.3

The data in Table 8.17 is not about students in cohorts but about credits in school years. From the table it can be seen that at levels 2 and 3 (and at level 4 from 95-96 onwards) the credits attained per student are above the normal requirement (Table 8.6). This means, theoretically that all students could attain a diploma with an average length of stay < 1. Neither of the two is true - the success rate is not 100% and length of stay at the system level is > 1. This means that students leave school with certificates, but without a diploma. The data in Table 8.15 suggest that there is hardly any waste in the IAE. That means that all the waste measured (diploma costs, calculated at an annual cost of US $ 4,600, higher than $ 9,200, $ 13,800 and $ 18,400 for

level 2, 3 and 4 respectively) is 'qualification at the certificate level' (and not at the diploma level). A comparison of the normal diploma costs and the real cost (Table 8.16) gives an impression of the redundancy in the system.

Many school leavers with certificates do not lack ability but leave school for different reasons. One traditional reason may be that the leaver changed his mind; he/she may go to another school or employment for reasons that the system is familiar.

Another reason is that the school leaver is acting as a customer and a selective shopper. This possibility is not a characteristic, but a phenomenon observed in the IAE's.

Although the traditional teacher may not be happy with this development, it is certainly a sign of flexibility and of service to the client. The pedagogic views may be changed. From a new pedagogic point of view, Dutch educators could consider the public responsibility for education completed once students attain Basic Education. After that a student could study for full qualifications or for units, according to personal insights and wishes.

The positive interpretation of the observed development would mean that the effect of the QS initiative is underestimated by considering success rate and length of stay measured only at diploma level. The full effect of the QS-initiative can also be measured at the level of certificates or credits (Table 8.17). This would be an alternative for pass rates, which may give a wrong impression about the efficiency of the system.

Effect of exemptions on the length of stay

In § 6.4.2 the admission requirements for IAE-pathways and the relation with unit entry requirements has been discussed. The assumption was that students in the educational route have a surplus of competence greater than the required basic units. As a consequence schools should be keen to apply exemptions. The hunt for exemptions, however, could decrease the attainment levels and debase the system – not if he is being given credit for previous attainment (§ 8.1.2). Exemptions have been included in the count of attained units and awarded certificates. That is why they are counted separately in Table 8.18[70].

The 325 level 2 students of the cohort 92 attained 2,795 blocks in the school year 92-93, of which 22 blocks by exemptions, this is 0.8%.

The analysis of the way IAE's assign exemptions to students allows some relevant conclusions.

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[70] The cohort 92 and 93 are reconstructed, that is why the numbers of students may differ from previous data (in these cohorts the level of first entry is not used as criterion).

The pattern of the assignment of exemptions in the 92 and 92[71] cohorts is regular (with exception of a 12.9% peak for a small number of level 2 students in the 92 cohort in the school year 95-96). Exemption is rare at level 2 and between 2 and 4% at levels 3 and 4. It is not visible from Table 8.16 that the experimental 'gardens a and b' assign exemptions mainly at level 4, and that the 'garden c' does not assign exemptions at all. 'Garden' c transformed units into weekly periods of subject matter.

Table 8.18: The assignment of exemptions in the cohorts 92 and 93.

	cohort 92				cohort 93			
school year	student	blocks	exemptions	%	student	blocks	exemptions	%
92-93:								
EU-level 2	325	2,795	22	0.8				
EU-level 3	1,334	17,346	675	4.0				
EU-level 4	2,088	44,502	1,527	3.4				
93-94:								
EU-level 2	389	6,032	27	0.4	488	4,061	35	0.9
EU-level 3	1,346	19,835	365	1.8	1,348	17,587	494	2.8
EU-level 4	2,048	49,730	1,663	3.3	2,333	46,807	1,363	2.9
94-95:								
EU-level 2	52	637	12	1.8	569	8,839	39	0.4
EU-level 3	1,372	24,880	550	2.2	1,232	17,771	483	2.7
EU-level 4	1,686	39,631	711	1.8	1,960	47,757	1,844	3.9
95-96:								
EU-level 2	6	62	8	12.	67	896	2	0.2
EU-level 3	239	3,399	9	9	1,321	24,696	103	0.4
EU-level 4	1,781	55,774	814	0.3	1,835	45,427	830	1.8
				1.5				
96-97:								
EU-level 2	2	22	0	-	7	96	2	2.1
EU-level 3	3	419	5	1.2	195	2,838	79	2.8
EU-level 4	264	6,715	247	3.7	1,528	44,236	841	1.9

These observations mean that exemptions because of their infrequency, are not the cause of measured differences between the data of all IAE's, of all 'gardens' and of individual 'gardens'. Exemptions, however, are granted and that means that the system is flexible in this respect.

The length of stay of qualified and non-qualified school leavers needs to be analysed separately. The observation is that the two indicators have dynamics of their own.

The dualisation initiative of 1990 shortened the length of stay slightly and significantly (Table 8.14).

[71] The pattern in the 91 and 92 cohorts is not representative for the cohorts of other years, and differences between schools are considerable. 'Garden' b for example granted 15.7% exemptions of the total attained certificates at level 4 in the first school year of the 96 cohort.

The QS initiative had a strong and significant positive effect on the 92 cohort, which is the first cohort with the new QS for all IAE's. In comparison with the 87 – 89 cohorts the length of stay of qualified school leavers decreased on average by 0.05 points (almost 5%) and of non-qualified school leavers by 0.06 points (almost 10%). This effect would be larger if issued certificates were taken into account. The granting of exemptions, (2-4%) in the 92 cohort, is not the cause of the large differences that were measured.

The effect of the QS initiative after three years can be measured in the 'gardens'. In comparison with the 87 – 89 cohorts in the 'gardens', the length of stay of qualified school leavers decreased on average by 0,08 points (7%) and of non-qualified school leavers by 0,17 points (almost 25%).

To the effect of QS on the success rate and the length of stay, can be added cost of a diploma per qualifying entrant. In 'all IAE's', 'all gardens' and individual 'gardens' all the diplomas have become less expensive. The smallest change is 1% (Operator in all IAE's) and the largest change is 62% (Operator in 'garden' c).

8.4 Conclusions about flexibility

What do the conclusions about the success rate and the length of stay in SSAVE as a whole and in experimental 'gardens' tell us about the flexibility of the system after dualisation and QS?'

Dualisation was expected to improve the students' motivation and be a prerequisite for the linkage of a school- and work-based program for the learning of transferability.

The analysis casts doubt on the assumed positive influence of dualisation on the students motivation. It seems that long courses detract more from motivation than work-based programs can add.

The contribution of the work-based program to the learning of transfer ability is assumed to demand much development time of schools. The consequence is that no results are expected now.

As a result the short-term outcome of dualisation is negative.

The generalised conclusions from the data are the following. The year 1990 had a major impact. Indicators that were fairly constant at the time (Figure 8.2), changed significantly (Table 8.9 and 8.14). The change was due to the normalisation & dualisation of the pathways - the effect was observed in schools with and without new QS.

The negative effect of normalisation and dualisation on success rate and length of stay was almost as dramatic as measured between the 2- and 3-year pathways of SSAVE-B between 1987 and 1989.

The experimental ‘gardens’ recovered quicker than the other schools from the 1990 calamity. In 1992, the recovery of the success rate in the experimental ‘gardens’ was almost complete.

A significant shortening of the length of stay in ‘all IAE’s’ and the experimental ‘gardens’ was observed after dualisation and implementation of the QS. The QS effect was about three times stronger than the QS effect. The dualisation effect may be caused by an earlier no-go decision due to the increased course length. The QS effect is likely due to increased up and down streaming and utilisation of the commonality principle.

With respect to the desired measurements discussed in § 8.1.3, the following results are relevant. An increase of internal up- and down streaming has been observed. The QS increases the ratio of students that leave school with a diploma. This effect is the strongest for the Operator at level 2. The qualification in pathways other than the first entry pathway has increased. A negative effect is that of level 4 entries, fewer students attaining a level 4 diploma. The negative dualisation effect on the success rate is strong, but not lasting as a result of the QS.

Students spent less than the normal time on blocks. The time allocation to courses was efficient. This means in the context of the new QS, that in addition to the measured success rate at the diploma level, substantial numbers of certificates were issued to students leaving the IAE without a diploma.

IAE’s granted exemptions to students at levels 3 and 4. For the 92 and 93 cohorts, exemptions cover 2 – 4% of the total number of attained certificates. This is reasonable; it should be slightly more for level 4.

IAE’s became more effective and efficient for all target groups. Progression increased. Undesirable repetition decreased because of the high level at which certificates are issued. Thus the flexibility of organisation improved.

The difference in pace between IAE’s is likely to be related to school policy; this was also observed by the agricultural education inspectorate (LNV, 1993d). Difference in the organisation of schools is another sign of flexibility within the system. It is likely that the measured improvements were the organisational advantages of the QS.

It is obvious that this conclusion does not cover all the aspects of flexibility that were discussed in # 8.1. The utilisation of educational and training pathways, dualisation of programs, commonality of full qualifications, modularization of units, decontextualised attainment targets, and integration of subject matter, all contribute in their own way to success rate, length of stay, and flexibility. The utilisation may require new organisation in the schools but also new methods in the learning process.

9 Reflections on responsive systems for VET

This concludes with a summary of the demand for responsive Senior Secondary Agricultural Education (SSAVE). The focus is on this thesis about the design, development, implementation and effects of the Qualification Structure (QS), and options and challenges for future development of responsive Vocational Education and Training (VET) in a broad context.

9.1 The aims of this thesis

The work on the QS started in December 1988 and it was implemented in all Institutions for Agricultural Education (IAE's) in August 1992. In January 1994 the new information structure to develop and maintain the QS was established. This thesis is based on this and is a reconstruction of the design, development and implementation of educational change in Dutch SSAVE in that period.

The work on the thesis started in 1993 from a selection of background papers, agendas for meetings, discussion material, project plans, reports, undeveloped ideas, and chronological descriptions of developments. It was a pile of non-transferable information. There had been a concept for the work on the QS but hardly any explicit structures, theory and models to underpin clearly the initiatives and products.

One of the aims of the thesis was to make tacit knowledge about the project explicit. It took many years of structuring and restructuring to present it in the present form, to meet theoretical requirements and to keep it as a project in its own right.

It must be remembered that this externalisation is only one step of four in knowledge creation. That means that the study may be a reference for those who work on similar projects. This study may help to structure thoughts and to prepare for reflection on own design and implementation of educational change at macro level.

The condition mentioned above might apply to people who develop policies for educational change or design and develop curricula. It may also apply to teachers who want to reflect on the changed context of their work.

A second aim of the thesis was to generate information and theory about operational and structural approach to systems change - to create a responsive system (Achtenhagen, Nijhof & Raffe, 1995). The thesis provides models to structure thoughts relevant to the reconstruction and evaluation of the situation for SSAVE. The same models may have value for other situations and for theory. *The central issue is that competence is not a (pre- or) descriptive concept, but an expected behaviour concept.* Examples are the action structure and the decontextualisation in attainment targets. The consequence is that educational objectives need to be positioned with entry levels, level groups and time allocation to provide tangible items to the

agenda for learning - attainment targets. This makes information supply about competence necessary and also difficult. That is why the independent information supply by an information structure has become vital for responsive VET (Figure 3.8).

The third aim was to comment on the policy on educational change and to contribute to future policy. This thesis proved that the 1988 starting points of Dutch policy on VET improved the responsiveness of the system. The thesis also made clear that policy initiatives as such do not assure change. A knowledge creating process with involvement of teachers was observed to be vital. The analysis makes also clear that autonomous mechanisms in VET (with or without QS) enhance fragmentation of study subjects and academic drift - the system lapses. Dutch SSGE (HBS) from 1863, is an example of a growth away from required skills towards academic disciplines (Van Gelder & Wansink, 1998, p. 5). Initiatives reintroducing skill relevance in SSVE improving on objectives and pedagogy (Van de Heuvel & Gankema, 1998) are worthy of strong policy support.

This means that when initiatives as mentioned above fail to come, governments are be forced to intervene in systems for VET to refocus the system on required skills and transferability.

The thesis ends with a discussion of likely future developments and the initiatives that may support sustainable flexibility of learning.

9.2 Reflection on adopted concepts

Chapters 2 to 8 are a reconstruction and definition of the problem, the technology, the policy, the process of change, the new content and the evaluation of the effects of QS on the responsiveness of SSAVE. This section will reflect on the applied concepts.

9.2.1 Responsive systems to handle changing contexts

It is commonly accepted that dynamic contextual changes are the norm. Industrial clustering depends from intellectual resources and associated proprietary or firm-specific assets (Henderson, 1997, p. 14). Knowledge may be *the* resource in the economy of a knowledge society (Drucker, 1993) and learning and schooling assure ‘the capability to learn (and forget) for economic performance and not the stock of knowledge’ (Van Aalst, 1998, p. 6)

Hillebrand, Lokhorst & Donkers (1997) observe the dynamics of the employment market with the focus on agricultural production. The post-war aim of agricultural production was cheap food and a reason to use family labour; and any mechanisation was to reduce physical labour and heavy work. The present drive in consumer-directed production is flexibility to meet consumer demands - this requires a good mix of labour, conditions of production, relationships within the production team and certain other

preconditions. Solutions are team production and lean production. Both have far reaching consequences for required competence at all levels.

The qualification strategies of food industry, green keeping and glasshouse cultures, however, are poor (Van Woerkom, Le Rütte & Nieuwenhuis, 1997). Present strategies focus on short-term qualitative problems - motivation, required skills and the speed of work are the main points (Van Woerkom et al, 1997). Although dynamic contextual changes can make qualifications obsolete, industry and commerce do not yet focus on transferable skills.

These facts imply risks for employment and economic development. This observation calls for (continued) initiatives by the government.

Projects and experiments on educational change in SSAVE showed, that fragmented approaches to educational change fail. The conclusion was that a systems change is needed. Systems change is difficult to organise and may also fail. For a systems change, the organisation of a mutual learning process might be the essence of successful design, development and implementation. Learning processes, however, require a motivation and a background. That is why it is likely that the fast and effective implementation of the QS was possible through the utilisation of experience from projects that failed and the broad basis, given to the process of design, development and implementation.

Systems change requires a long-lasting policy commitment. It is evident that the 1996 law on ET was an enormously valuable basis for the development of a responsive SSAVE. Right at the time teachers in SSAVE raised questions about the desirability of a QS for SSAVE, it became clear that the QS was an important conceptual ingredient for the construction of a national law. Greater justification and continued policy pressure was hard to imagine.

9.2.2 Clear description of outcome as technological concept

The coherence in a system can be guaranteed with information that is homogeneous at macro, meso and micro levels of the system. Clear definition of outcomes is a means of supplying such information.

Clear definition of outcomes for SSAVE is a technological problem on its own. The outcomes should express required skills to initiate for a first job and also transfer potential to lay a basis for employability. The solution for these aims is the construction of attainment targets in the form of decontextualised action structures in a QS. In SSAVE, the production of decontextualised action structures was given to an information structure independent from funding and provision of VET. The information structure should produce the QS that links the working areas of a new responsive system for VET.

The result is a system for responsive VET with three main structures - the steering structure to fund and control, the information structure to articulate external demand, and the production structure to achieve the outcomes.

The model for responsive SSAVE describes how the functions and processes in a responsive system relate. The model can be used at different levels; it was used for example, to assess of the National Council for Agricultural Research and of the Agricultural Education Inspectorate in the Netherlands.

At the end of the eighties modularization, which is another aspect of a responsive VET, was a popular issue. At that time it was not usual to link modularization with competence based units for a national curriculum. Scotland was the exception. The German Dual system was also regarded as being successful and it was held up as an example, probably because of the strength of the German economy. The German system, however, was not chosen as a structure because it lacked the required flexibility and because of the typical German culture of 'Berufssbildung' (Reuling, 1994 & 1998).

In 1999, modularised national QS have become more acceptable and a policy aim in many EU Member states. The Dual System is no longer the obvious system to follow (Van Lieshout, 1997).

This thesis proves that a national QS with modularised competence-based units can work. In a sector with a traditionally good performance, the new QS has improved the quality and flexibility of the system. The objectives are improved, more target groups are reached, the success rate has been increased and the length of stay reduced. The QS has decreased the administrative burden with examination programs. The coherence of the system has improved; the integration of the level 2 pathway in the system and the improved results of that pathway are a good example.

Attainment targets in modularised units were an adequate tool in the process of design, development and implementation of the QS. The evaluation, however, made clear that attainment targets can be interpreted in different ways and indicate transfer potential rather than concrete content. This turns the QS from a rigid prescription into a guidance system (Cornelis, 1997) for responsive SSAVE.

9.2.3 A policy based on a double function of outcome definition

The dominant aim, reconstructed in the policy model, is transferability of school leavers. The model takes the clear description of outcome as the system's means of achieving the aim. It also describes in a means/effects sequence the preconditions to achieve the aim. 'What is the value of this policy concept for now and later?'

The corner-stones of the model are that the core of the problem - the structural dynamic contextual changes - and the core of the solution – diplomas with lasting value - are fitted in. Why is this a good choice?

The structural dynamic contextual changes cause functions, jobs and occupations quickly to become obsolete. The socio-economic process of occupational development is slow and lags far behind. As a consequence the traditional occupational images develop too slowly to express the required competence. The absence of valid occupational images hampers occupational choice, school choice, educational objectives, curriculum development, effectiveness of the employment market, and planning in the work situation. The QS provides description of competence needed to identify the core of the transition problem; i.e. the content of problems with supply, qualification, allocation and utilisation of employees as summarised by Brandsma (1993, pp. 8-9). A QS, describing competence in use (Ellström, 1998), is needed to understand relationships qualification and sub-markets as described by Hövels & Römkens (1993) and Hövels (1998, p. 53, 56). The articulation of competence based outcome has a multiple social function and is a lever to enhance vital processes in the complex school-to-work transition, respectively education and society (Van Lieshout, 1997).

Thus, the means for responsive VET as chosen in the policy model - a description of outcome -, is a socially embedded device. This is relevant for the public support of VET and a clear VET.

Diplomas with a longer half-life are the second corner-stone of the policy. Diplomas get a (longer) lasting value when they incorporate transferability of school leavers. At the same time the diploma needs to ensure a successful first entry into the world of work. That is why both transfer potential and required skills need to be expressed in the attainment targets.

The aims/means mechanism in the model is based on the insight - and coincidence - that clear definitions of outcome are also the means to steer a system of responsive schools. The definition of outcome eliminates the need for many other regulations that would reduce freedom at meso and micro levels.

As a consequence the model places institutional considerations, second to the public need - articulation and attainment of required qualifications.

9.2.4 Change: conditioning a knowledge creation process

Systems change, as conceived in the change of SSAVE, requires many kinds of knowledge creation to think through the required change for the different functions and for the different levels of the system. For utilisation, individual breakthrough requires externalisation, combination, internalisation and socialisation in iterative processes with increasing numbers of participants.

Systems change – not optimising the system – requires a change of principles for many, if not all the people in the system. The change of paradigms requires steering of the knowledge creation processes. ‘Is this a correct conception and can this be done?’

The concept of change - a knowledge creating process - applies to all phases of competence based learning - the problem solving in initial learning, the learning to become a professional and the learning to develop the art of the organisation. The work on the QS can be seen as learning to develop the art or the organisation. The concept of change is also the innovation concept of knowledge communities in flexible networks. The different levels of application make the concept robust.

Personal learning may go through phases of curiosity/distress, conception of the problem, conception of the approach, conception of the solution and developing routine. Similar phases have been identified at the systems level in the process of design, development and implementation of the QS, and of the information structure to make the QS. After a pre-change phase, a process and project phase followed, after which the vital routines could be institutionalised.

Steering –the principle of steering applied in the change of SSAVE –set targets for subsequent steps in the development. Only reflection will clarify the status and value of the previous step - did the problem or approach become clear, and was the solution or routine clear? In iterative processes, e.g. as in action research (Roobeek, 1995, pp. 66-67, 71), the outcomes cannot be set precisely beforehand.

Time limits for the development of half products are the second principle of steering. Half products are stepping-stones and do not need to be perfect; on the contrary the products might change completely after reconsideration in a following cycle. Time limits secure a subsequent step in the process and these steps forward are necessary to create conditions for drawing up, reflection and further development - while the optimising of half products would freeze the development.

9.2.5 Transfer potential: the virtual educational content

The concept of content is based on the aim to communicate required competence and transfer potential. ‘Does this communicate?’

The taxonomy of educational content is organised with levels for full qualifications and for units. The classification of full qualifications is based on 4 EU-levels. The classification of units, independent from the hierarchy of levels, is presented using a set of 35 verbs.

The taxonomy allows discussion of qualification at several levels - i.e. the level of full qualifications, the level of units and the level of attainment targets. It allows the construction of tailor-made educational profiles for students. This is a requirement for information to be used at macro, meso and micro levels of the system.

Time allocation is applied to compensate in the funding of the system for the range in students’ abilities, for the differences in efficiency of pathways and for support of the description of content.

The content of the QS has been given the form of *decontextualised action structures*. As a result, the focus of educational content shifted from the description of facts to be learned to the description of performance and perception to be attained. This does not mean that traditional content has become unimportant; it means that traditional content comes secondary to its utilisation.

The change makes the new educational objectives more sustainable in the face of contextual changes. Action structures are more suitable than subject matter in describing transfer potential for employment and for life long learning. The new description of content is more independent than in the past of short cyclic occupational change and institutional characteristics.

The principle is difficult to communicate Vocabulary needs to be developed and exchange of new content needs to be learned.

9.2.6 Performance and perception at change: transfer potential

The evaluation of transfer potential is based on an elaboration of Olbrich and Pfeiffer's taxonomy (1980). Transfer potential has been conceived as a level of performance and perception as described in the full qualification. Transfer potential of performance applies to the execution of tasks, and to control, organisation, communication and responsibility in the work place. Transfer potential of perception may apply to insights, and also to learning, utilisation of sources, reflection and attitude to learning.

The application of the criteria yields relevant observations. The descriptions of transfer potential tested in the QS are much better than in the traditional examination programs. The measured levels are higher and the scores show that coverage broadened. In addition, mainly with respect to perception, relevant omissions were identified. Thus, the criteria set is operational.

The QS has attempted to formulate a triple qualification - abilities for work, social life and study. For the same reason subject matter was integrated and holistic tasks were described. At first sight the attainment targets in the QS are broad and may be interpreted as broad qualifications. Most of the action structures can be formulated as a 'how to …' question, that means that the action structures describe real actions - physical action (performance) and mental action (perception).

The check with the taxonomy reveals that the scope of physical and mental action, especially the latter, is still too narrow.

The new QS was successful in describing a more complete set of technological, social and cultural educational objectives; the hidden parts of the curriculum were made explicit. Some relevant competencies were not covered according to the Olbrich & Pfeiffer's indicator. Even other relevant competencies may not be identified, because the indicator does not cover all potentially relevant competence.

It may be increasingly important to find better means to describe broad competence and to evaluate them. Description of broad competence is important developing programs that aim to develop broad abilities. It supports the description of tacit competence. Criteria for broad competence in the form of decontextualised attainment targets fill a gap when traditional content becomes less important. These criteria can also be used to identify possible negative effects due to individualisation and distance learning and to compensate for them.

The evaluation criteria themselves, need to be subject to a similar type of reflection as the attainment targets to become valid.

There is still little experience with the new standards for evaluating the attainment targets, so little can be said about their intrinsic and practical value. The QS certainly does not cover all required broad competencies. Organised learning, effective reflection, utilisation of practical experience or explicit information and levels of control, communication and responsibility require new standards.

9.2.7 Success rate & length of stay indicating internal flexibility

Flexibility of organisation has been interpreted as a means of qualifying more students in a shorter time. Important indicators are the up- and down steaming, qualified school leaving and length of stay in pathways. The idea is that up- and down streaming increases when undesirable repetition can be avoided. Qualified school leaving increases and length of stay decreases when the school is able to meet the abilities and motivation of students.

Two important initiatives have influenced the flexibility of IAE's. In 1990 the work-based program of the pathways was given a substantial course time, a half-year for the Operator pathway and a full year for the Supervisor and the Manager. In 1992 the QS became compulsory for all schools.

Measured with the indicators the extension of the work-based program (the dualisation initiative) decreased the success rate of the 90 and 91 cohorts by 10 %. Due to organisational efficiencies in the QS, however the schools recovered quickly. The success rate of the 92 cohort almost reached the level of 87 – 89. The length of stay decreased slightly by the dualisation initiative and considerable after the implementation of the QS. The financial result of success rate and length of stay was positive within three years.

The indicators provide a basis for the calculation of the returns on public funding in VET. The cost of diplomas decreased, that means that for the same public funding more students were awarded a diploma in a shorter time. Thus, the indicators are relevant for the state and for the student. The indicators are also important for schools for internal and external comparison of performance.

Flexibility is more than the three indicators mentioned, i.e. the way the work-based program is organised and the admission policy of the school are not taken into consideration. It may be impossible to measure all aspects of flexibility in one indicator. The indicators definitely measure the effects of flexibility, and increased flexibility by schools.

The consequence of tailor-made provision is monitoring of school performance at the level of (full qualifications and) units, and a funding based on this performance. The QS, and its monitoring by the Ministry of Agriculture, have the potential for such flexibility.

The development of policy to justify this type of outcome requires much care; a possible threshold is the present opinion of the state that qualified school leavers should attain prescribed full qualifications. The state could reconsider her responsibilities and focus on validity of full qualifications and units and on legitimacy of assessment and assignment, and abstain from prescription of the package the student should choose in the initial phase. The independent information structure is for validity of qualifications; a similar systems approach for assessments may be required. Such policy on assessments would enhance the development of a Life Long Learning culture.

Although development of Accreditation of Prior Learning (APL) gets much attention at present in the Netherlands and elsewhere, little attention has was given yet to the systems' requirements of assessment and accreditation (Thomas & Frietman, 1998, p. 35-37; Klarus, 1998; Klarus & Nieskens, 1998, p. 20).

The conceptual distinction between objective, program and award for educational content was not fully made when Discussion Paper DC was issued in 1989. In principle, however, the concept of units, modules and credits (Richardson et al, 1995) has been applied. This may give a strong basis to SSAVE for further development - e.g. for private/public orientated forms of unit development (LOBAS) and unit utilisation (employability advisory); program supply (public IAE's, private suppliers and work experience situations) and award assignment (public schools and commercial assessment centres).

9.2.8 Conclusion

'What is the coherence of all aspects mentioned above?' This thesis will not compare the developments in SSAVE with the close links between nation states and education systems as analysed by De Vijlder (1996). The information structure and the QS, however are 'parts of a multiform and dynamic network' (De Vijlder, 1996, p. 279), rather than a government institution and product.

This section will neither elaborate at length possible limits of education in its present form as summarised by Van Aalst (1998, pp. 19-20) -

- ‘the first limit of education is a knowledge paradigm aiming at general and codified knowledge; this might be difficult to merge with knowledge which is specific, contextual, intentional and related to products and teams;
- ‘standardisation of codified knowledge is the basis for the meritocratic function of educational systems; this is difficult to combine with the local and personal characteristics of new knowledge;
- ‘the third limit is the strong bond between schools and state, which some authors refer to as a large socialist state within our liberal economies; this bond may prevent from merging with new knowledge production;
- ‘the three points above carried the screening function for the hierarchy of the industrial and bureaucratic society; this screening may loose much of its meaning and loose to certification of other learning than in schools;
- ‘the fifth limit is the self-expanding mechanism of education which caused and increase of participation and one of the big successes of educational policies in recent years; the screening function forces to gain ever higher qualifications, which mechanism is put at question.’

Reference to the five points above may be found in respectively -

- the QS is based on competence-based learning (Table 3.9);
- the concession to make subject matter based units (Table, 6.14);
- the funding of full qualifications by the state that may prevent schools from tailor made supply and supplying units (§ 8.3.3);
- the need for independent assessment centre’s increases as life long learning (LLL) gains importance (§ 3.3.2 & § 4.7.1);
- problems to see positive sides of ‘early school leaving’ (§ 8.3.3).

Van Aalst’s points have been touched in this thesis and the responsive system and QS for SSAVE may be interpreted as a movement away from the traditional educational paradigm.

‘What then is the systems- and the QS concept in a nutshell?

The core is a sound relation: work - learning (compare Figure 4.3). This primary loop is extended with qualification norms (a QS), assessment and qualification to realise recognition of Life Long Learning. The primary loop is also extended with a loop providing objectives, means and quality control for education (compare Figure 3.7). These three loops represent together the initial learning and the Life Long Learning (left part in Figure 9.1).

Another loop is qualification for the employment market. Connected with this loop and also with other contextual changes is the development of a QS by an information structure for responsive VET (Figure 3.8) in the top part of Figure 9.1.

The most outer loop connects contextual changes, QS (occupational images), occupational choice, school choice, education, learning, qualification and work- this is the school-to-work-transition.

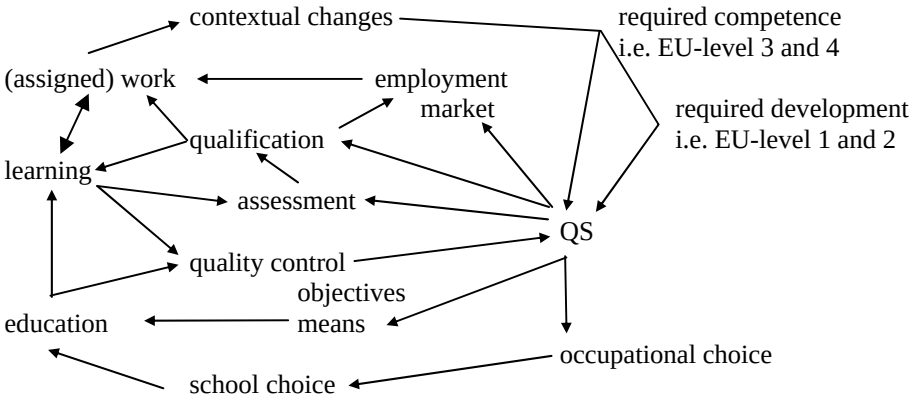


Figure 9.1: The QS and the model for responsive VET in a wider context

A QS is a crystallisation point for -contingent- competence in a knowledge society. Figure 9.1 shows the interrelationships of competence and the role of the QS. The development of a QS with a social-cultural meaning as depicted, should neither depend from postpone quarrels between employers organisations and trade unions as observed in BOOB's (§ 5.2.2) and in national bodies, nor between social partners and field of education as observed in LOBAS (Mulder & Raemaekers, 1997; Nieuwenhuis, Le Rütte, Verkaik & Dijkveld Stol, 1998). A representation, the Dutch Social Economic Council (SER) alike may be more appropriate.

A QS is more than a school objective; it has many functions between the occupational choice before going to school and the assignment of work to graduates in the work situation - in the chain of multiple social processes for school-to-work transition (# 2.4).

A QS must be seen in relation with life long learning (Figure 4.3) and learning in connection with work (Nijhof & Remmers, 1989).

A QS is more than a collection of attainment targets; such a collection would be meaningless without a time assignment, a position in a hierarchy of competencies at work, in social and for learning, and in a hierarchy of competencies that are to be learned (§ 6.4.3).

A QS is a means to control a responsive system for VET (Figure 3.7).

The core-problem of VET is that educational content, the basis of reasoning, has become fluid. The new basis for reasoning about effective and efficient VET is not content but a procedure to compensate for the stable

occupational images from the past. The procedure, however, should have a flexible structure (networking) and be organised on principles of knowledge creation.

9.3 Ten Options and Challenges for responsive VET

Based on insight and experience from theory, design, development and evaluation, some relevant requirements and challenges are formulated for research and design with respect to policy, technology and development of the responsive system

9.3.1 Policy: the validity of EU-levels

The legal basis of the EU-levels is without question. The theoretical basis, however, is questionable. What, for example, are the classifying principles of statistical classification systems; what is the actual relationship between the legitimisation of occupations (recognised by trade unions, employers and governments for statistical purposes) and the legitimisation of qualifications (as validated by industry, schools and government for educational purposes)?

The DOT'65 from the USA (USDL, 1965), the RFE from France (Bertrand, 1993), the ISCO'88 from ILO (ILO, 1987) and the Dutch SCO'92 (CBS, 1993) are compared.

The basis of the four classification systems differs. The criterion 'nature of activities' is used in the Dictionary of occupational titles (DOT'65) and in the Repertoire Francais des Emplois (RFE). The criterion 'level and area of activities' is explicitly the basis for the International standard classification of occupations (ISCO'88) and the Dutch standard classification of occupations (SCO'92). In all four classifications a hierarchy of occupations and a context of occupations are leading principles for allocation of occupations.

The approach of the hierarchy of occupations, however, differs. DOT'95 is based on an allocation of workers' profiles to a hierarchy of verbs. RFE refers to positions in the labour organisations. ISCO'88 and SCO'92 allocate to educational levels required for a job.

The occupational context is also composed from different points of view. In the DOT philosophy, a verb typical for an occupation applies to certain data, people and things. In the RFE system the type of product is the main point of orientation. ISCO'88 refers to specific abilities, tools and equipment used, materials worked with and goods and services produced in relation to the job (skill specialisation). The SCO'92 uses the branch as the leading criterion for context.

In all classification systems, the starting point for the quantitative classification of occupations is work. The occupational hierarchy is an interpretation of the operational level. The occupational context is a

description of task-areas for useful batches of occupational groups (for statistical reasons not too small or too large). The basic principles of the four classifying systems are summarised in Table 9.1.

Table 9.1: Basic principles of quantitative classification of occupations

	starting point	occupational hierarchy	occupational context
DOT'65	workers function	verbs	data, people, things
RFE	individual activities	position in organisation	type of product
ISCO'88	job	skill level	skill specialisation
SCO'92	task load	educational level	branch
summary:	**occupation**	**operational level**	**task area**

A required qualification represents a quantitative fact and a formal qualification represents a qualitative fact. The relation between the quantitative and qualitative description has been analysed in chapter 3 and the conclusion is summarised in Table 3.6.

The hierarchy in SCO'92, being a modern approach supported by ILO, is based on educational levels. This means that there is no objective basis for levels in occupational analysis than in educational streaming. Educational streaming based on a QS, assigns implicitly a social construction function to QS-development (see Figure 9.1). A political recognition of these facts would enlighten the meaning of QS-development.

9.3.2 Policy: responsibilities for qualification

A discussion about the position of VE in the educational system as a whole may end with new division of responsibility in the educational system (OECD, 1994). The questions about the position of VET need to be set against the background of continuous contextual changes, the flexibility of schools, transferability of school leavers, and re-qualification of the older generation. The nature of competence is the starting point to approach the problem, because the achievement of competence justifies publicly funded education.

A division between relatively stable and relatively dynamic competence can be made. The relatively stable objectives are the social and generic basic skills that are learned in Basis and Basic Education (4 – 14/16 years). Another category of competence is the attainment of subject matter as an initiation for the scientific world; this is learned in Senior General Education (12 – 18 years). Also the broadly applicable competence and transferability in Junior and Senior Secondary Vocational Education, and in Higher Vocational Education have a relatively long half-life. The required skills of vocational education, however, as required skills in the work situation often have a very short half -life.

This observation reveals with respect to competence a stable demand in general education, a dynamic demand in the work situation, and mixed demand in vocational education. This is shown in Table 9.2.

Table 9.2: Stable and dynamic competence in school and work

stable competence	stable & dynamic competence	dynamic competence
General education: • social and generic basic skills are stable • subject matter based skills are stable	vocational education: • broad applicable skills are stable • transferability is stable • required skills are dynamic	work situation: • required skills are dynamic

With the observation above as the starting point, the division of general and vocational education may be agreed and also specific responsibilities of the state with respect to qualifications.

General education ends, and vocational education starts when dynamic skills are demanded.

The state needs to ensure the valid description of qualifications and the legitimate issue of qualifications. In general education the state can prescribe minimum targets of social and generic basic skills for young people.

The prescription of minimum targets for skills is pointless, because of the dynamic change and large differences between situations. It is questionable whether the state should prescribe minimum levels for subject matter based skills, the broadly applicable skills and transferability. These are all competencies in relation to future work. The flexibility of the competence and the composition of students' profiles may be more variable and responsive when no prescriptions of students' profiles are given.

A policy debate on the issue above may result in new and advanced principles to steer responsive general education and VET.

9.3.3 Policy: the new Kwalificatiestructuur (KS) 2000+

The present proposals for the new KS 2000+, a format for one QS for Dutch VET and based on an interpretation of the law on ET (OCW, 1995) are rigid for the present QS for SSAVE. Four proposed points of change are that the KS 2000+ will -

- not refer to time allocation;
- not arrange attainment targets in blocks;
- not maintain commonality;
- not recognise the difference between the educational and the training route (all four in § 6.2.1).

'What are the negative factors?'

The applied policy principle is decentralisation. The function of a QS - as enlightened in § 9.2.8, 9.3.1 & 9.3.2 - does not allow this approach.

Fleurke, Hulst & de Vries (1997, pp. 46-47, pp. 55-57) argue that two notions drive Dutch (de)centralisation policy - 1) reinforcement of local policy and 2) inefficiency of centralised administration. A rigid approach was necessary to design, develop and implement the policy. By now weaknesses of the approach become visible (Fleurke, et al, 1997, pp. 72-83), i.e. the value of central norms, a possible inequality of justice, administrative power at local level and the (burden of) guidance of decentralised functions. By now tailor made approaches of decentralisation are possible and desirable from a policy and a technology point of view. This certainly applies to QS development.

The proposals for the new KS 2000+ itself seem to be based on policy assumptions rather than policy theories and on idiosyncrasies rather than proven facts. The definition of content, the interchangeability of units, the efficiency of pathways, the ability of students and the effectiveness of schools are possible negative factors.

Attainment targets are not hard definitions of outcome. Definition of attainment targets requires positioning in a hierarchy relevant for the work situation and also of the learning process. Definition is supported by indication of entry levels and available time (De Bruijn, 1997, p. 301); it is likely that learning time for competence in education is the most reliable indicator for volume of qualification. Time is a quantitative indication of the abilities of students too and of the effectiveness of pathways.

The proposals for the new KS 2000+ are not based on quantitative comparison of the outcome of the educational and the training route; also the different social functions are ignored. Chapter 8 proves that the success of the QS - in the first five years after implementation of it - depended from organisational measures. These measures were based on the structural points 1 up to 4 above.

Teachers and management underestimate critical success factors in the schools and it is unlikely that schools will identify the weak points in streaming and will be able to design tools like commonality and carry through measures to improve on critical success factors.

KS 2000+ proposals endanger evolution of responsive SSAVE. The present system seems to be unable to apply corrections; a policy intervention is a likely way out.

9.3.4 Policy: funding of responsive systems

Providing a desired qualification for everyone requires a flexible school policy to match the needs of diverse target groups. This differs from a policy directed towards achieving a high success rate (in diploma terms) and a short

length of stay. Funding the school years of registered students supports the first policy and funding the issued diplomas pays for the second. The actual funding of IAE's is moving towards a situation in which 80% of the costs of school years is paid in advance and the other 20% of payments depends from issued diplomas. The approach of funding of SSAVE is ambiguous. 'How can these problems with flexibility be solved?'

In the present Dutch educational policy, the quality norm for a full qualification (and underlying units) is at the same time the assessment norm for qualified school leaving. Linking these two norms hinders the achievement of individualisation and tailor-made educational profiles. The two, however, do not need to be linked (see § 9.3.2).

The norm for qualified school leavers, a minimum pedagogic target for every Dutch individual, could be set at a certain minimum level of general education - i.e. a diploma in Basic Education. At the same time life long learning could be encouraged. From Basic Education onwards the state could focus on the quality of qualifications and provision of information about qualifications and not on prescribing the pace and pathway in which a student completes an educational profile.

This would work out as follows. The state confirms the advice from specialists and interested parties about units and full qualifications with required skills, transferability and broad competence. This assures validity and quality of units and full qualifications. The state makes sure that diplomas are only issued to those that meet the requirements. This assures legitimate diplomas and units.

From Basic Education onwards it could be the student's own responsibility to cut and paste with units a profile to match personal needs. It has been observed that students have started utilising the present QS in this way. The utilisation of increased flexibility by students, however, causes a decrease in the success rate and also of the lump sum of the schools. 'How can this be resolved?'

The state could pay schools for attained units rather than attained diplomas. The Minister of Agriculture has the technology to apply this principle. Many different forms are possible for fine-tuning. For example not all units need be publicly funded. Students with low entry qualifications may be given more time per block than students get with a higher entry level. Differentiation of time assignment has been applied in the present QS but not in the funding.

The present and also the intended future way of funding, rewards a strict admission policy by schools (i.e. the exclusion of less able students) and punishes personalised profiles. New policy on funding and possibilities for independent assessments are basic prerequisites for further development of responsive VET.

9.3.5 Theory: criteria for transfer potential

The criteria used for (qualitative) measurement of transfer potential of the attainment targets of the QS were derived from Olbrich and Pfeiffer's taxonomy (1980). The taxonomy discriminates between traditional examination programs and the new QS, and within the new QS between the levels. Changes were measured and omissions identified.

The first question is about the validity of the omissions detected through the taxonomy and the possible missing criteria. Vital aspects may not be covered by the taxonomy. A systemic comparison with the components described by i.e. Onstenk (1997, p. 125) has not been made yet.

The required standards for levels 2, 3 and 4 are taken from the description of the transformed EU-levels 2, 3 and 4. This may give a meaning to the description of levels that was not intended at the design stage. The deduction is logical, but the levels and the standard have not been verified with industry and commerce (utilising the outcome) and with teachers (developing the students' capabilities).

The third issue is the design of a quantitative measurement for the transfer potential of educational objectives.

9.3.6 Theory & practice: decontextualised attainment targets

The attainment targets in the QS are descriptions of functional action structures. Van de Lagemaat (1986) proposed to describe educational action structures. Educational action structures can make general outcomes less clear for clients (business and trade) and probably also for teachers. The questions are about the desirability of educational action structures and about ways to design them clearly.

Decontextualised action structures are based on performance in the work situation and are similar for all learning - in the school- and work-based programs, initial or life long learning, and in education, training or development. The threat is that the definition of outcome is narrowed down towards educational objectives, to skills or even to subject matter.

Outcomes should cover related branches. Units and full qualifications should be kept broad to -

- enhance flexibility of school leavers,
- restrict the number of units in the system, and
- utilise experiences from work-based activity in school.

Similarity of activity should be the criterion for description of competence and not the difference of context. The threat is that specific branches demand specific units.

A student's program to master skills and attain qualifications will stem from the context of the learning. In all situations, however, the learning targets can be transcribed into the same decontextualised action structures.

The problem and possible constraints for further development are that educational policy, theory and practice do not systematically take this view as the starting point to consider VET.

9.3.7 Practice: description of transfer potential

The description of transfer potential in the QS, still has many blank areas. The performance areas are reasonably well developed, but the description of perception is still poor and one-sided. This needs improvement.

9.3.8 Practice: articulation of LLL competence

In the Netherlands educational content hardly changed at all as a result of discussions on life long learning. It seems that the provision of and demand for (short term) required skill to solve problems on the employment market received all the attention. These are matters of flexible organisation and not of new content.

Another critical point, summarised by Onstenk (1997, p 344), is that all the responsibility for LLL is assigned to the employee. Thus, the new content for LLL in a knowledge intensive society in the form of decontextualised competence needs to be articulated in structural respect for all parties involved.

For everyone in work, study and social life the LLL-competence may be to identify and articulate own learning deficiencies and interests, to find and use a personal learning facility, and to create opportunities for using new competence.

For leaders in the world of work the competence to provide better educational/training opportunities for employees (Diekmeijer, 1997; Hoogovens, 1998)

For all leaders in the world of learning the competence to provide and guide learning tasks to meet a learner's needs (Attwell, 1997, p. 118).

And for architects of institutions the competence to design and develop a learning context for parties mentioned above (Tissen et al, 1998, p. 154; Diekmeijer, 1997; Hoogovens, 1998).

Competence as mentioned above requires to be described in a QS. And the facility for individualised programs within qualification programs.

9.3.9 Practice: utilisation of multiple sources for funding

A variety of financial incentives can be given to encourage learning. These may be incentives at the initial level and also for those in employment to boost the economy, from trade union funds to improve employability and from unemployment funds to support the economically inactive. Demand side funding increases the responsiveness of the system and its efficiency.

It is generally observed that with the new QS motivation of students improves; students do not like to miss lessons. It is likely that demand side funding will encourage the 'this for that' feeling of mutual support'.

Issuing vouchers is complicated. It is also a development that cannot be stopped. Funds for specific target groups, educational leave and taxation facilities gain in importance and are a means of reaching specific target groups. It is not likely that the funding presently given to schools is suddenly given to students. It is more likely the sum given to schools will gradually decrease and that the drawing rights of specific target groups will increase simultaneously. One of the future specific target groups is the student in initial programs.

Schools should utilise multiple sources to facilitate learning; they should apply programs in a flexible way - any time, any pace, any unit and any starting point.

9.3.10 Practice: creation of conditions for learning

The core responsibility of the production structure is the provision of programs matching local and individual needs and abilities. The QS describes decontextualised outcomes of learning. The outcomes are more achievable in a competence based learning situation -

- Guidance of learning processes
  Outcomes in the QS require different learning experiences by students and a different and new professionalism in teachers. The guidance of learning processes requires to be directed to people rather than things, to processes rather than programs, to problem solving rather than technical knowledge. It requires innovation rather than conservation, a prospective rather than a retrospective attitude.
- Linking of school- and work-based programs
  A specific aspect of new professionalism is the programmed utilisation of school- and work-based programs. The work-based program contributes to learning routines and skills and also gives experiences to students that are then used in the school-based program.
- Training transferability
  Another aspect of new professionalism is the training for transferability. Sequencing of experience and reflection may help someone to apply attained competence in new situations.

The new organisation of learning demands a consistent institutional development policy at macro and meso levels. This is only possible with a coherent and consistent national policy on responsiveness.

Summary

This thesis provides conclusions about attainment targets, efficiency of schools, and properties of responsive Vocational Education and Training (VET). Responsive VET is education in interaction with its context. The conclusions are taken from a case study about an actual change of Dutch Senior Secondary Agricultural Vocational Education (SSAVE) for 16-20 years old between 1988 and 1993. The thesis contains an analysis of an effective yet complex systems change aiming for a responsive SSAVE.

The research investigates the design, development, implementation and effects of a responsive educational system - 'What are the aims with respect to responsiveness of SSAVE?' 'What are the observations at macro, meso and micro levels of the educational system in the process of designing, developing and implementing a responsive SSAVE?' 'What are the standards for outcomes and what judgements should be made about measuring transfer potential of objectives and flexibility of schools?'

To answer these questions, the study provides a reconstruction including a definition of the problem, development of policy, changes in the system, the Qualification Structure (QS), changes in the curriculum, together with empirical tests on the effects of the QS on educational objectives and the effectiveness of schools.

Defining the problem

The reconstruction of contextual changes supported the view that continued optimising of the accepted VET had become pointless. Vital changes were observed in the policy area of the Minister of Agriculture, in the knowledge society, in the roles of public bodies, in the educational policy and in the schools themselves; also the theoretical views on VET changed.

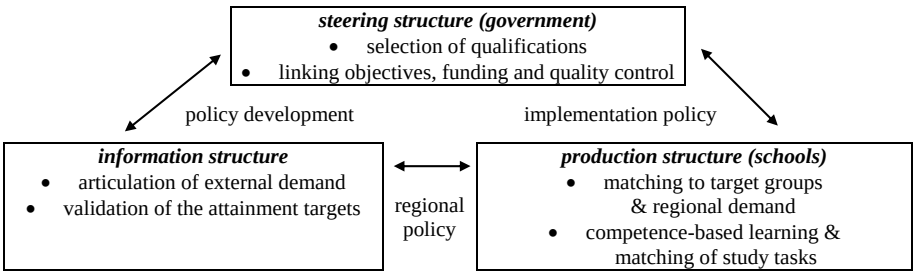
The core of the problem for VET was that educational objectives became unstable. This was due to the change of tasks, jobs, occupations and functions as a result of the dynamic changes in society and technology. The VET system threatened to become bogged down and could only react slowly. SSAVE needed to interact with the changes in its context - SSAVE had to become responsive.

Curriculum and steering technology

The challenge for all in the system was to contribute to the initiation of students for a first job and - at the same time - to the provision of transferability to remain employable. On top of this the schools needed to become responsive but the system should remain coherent. These were curriculum and steering aims.

The aims were positioned into a theoretical model for a responsive educational system. A new information structure should articulate the external demand for qualifications and produce the QS. The existing steering

structure should support qualifications with funding and the existing production structure should supply the required qualifications (Figure).



Qualifications were the core of the QS. Qualifications would enable a person to fulfil various assigned tasks at work, in social life and study. Qualifications should be described with attainment targets and should communicate required skill for a first job and have transfer potential. This requirement could be achieved by describing action structures - actions in a sequence to deliver output. In addition, attainment targets should be decontextualised - by means of broadly applicable nouns. This is to reflect a wide variety of practical experiences in the learning process of students for the development of transferability. Decontextualisation was also important for school organisation as it would allow tuning to target groups and regional demand.

Attainment targets were necessary for the qualification of students and also for the new role of schools. The linkage of curriculum and steering technology would enhance the clear definition of qualifications and the increase of degrees of freedom of schools at the same time.

Policy development for SSAVE

The aims/preconditions/means hypothesis in the policy model was the following. Provide decontextualised competence-based outcomes and the system will provide skilled and transferable school leavers. Requirements are an information structure that provides the system, through appropriate attainment targets, information about required outcome; a steering structure that assigns tasks and funding to schools and schools with freedom to meet the demands of target groups and regional requirements.

The process of design and development in SSAVE

The design and development of tools to meet the aims of the policy required identification of contextual changes needing new competence, translating them into qualifications and then transforming them into results by schools.

The aims of the process were to apply new principles, to utilise teachers' expertise for design and development and to train teachers for the application in schools. The tangible products were the new information structure, the

QS, and exemplar modules. The actual approach had characteristics of a knowledge creating and socialising process, in which increasing numbers of people were involved, in which targets were intensified with great speed and in which ideas and products changed and became more concrete. The idea to learn from the production of the first QS and utilising the experience for the design of the information structure worked. The institution that makes the QS from 1996 onwards was based on the experiences in this phase.

The Minister of Agriculture guided the direction of the process. This approach and the technological concept were criticised. In retrospect, it is noted that the concept and the pace of the process were negotiated at a time when hardly anyone had an overview. In the process the chosen route and pace were not negotiable. This is likely to be a success factor, because a discussion in that stage would probably have paralysed the process.

The qualification structure

The QS was intended to be more than just a clear representation of qualifications. The QS should support the public function of a responsive SSAVE. It should not be based on occupational profiles only, or be directed by the needs of the employment market only, or focus on function training, or deny that the employment market fails to take in social demand for development. It was intended to be also a means of controlling a responsive system.

The QS should support the responsive system and carry information about required competencies; it should enhance internal and external flexibility at the same time. Important criteria for the design and development were increasing degrees of freedom for schools, generic study areas, uniform levels, accessibility, broad competence, unit groupings and options within full qualifications, commonality of units within different full qualifications, and decontextualisation of content.

The design and development of the QS delivered architecture with a clear structure, taxonomy and content. The structure consisted of pathways determined by occupational divisions (e.g. Plant breeding or Food technology), learning/working arrangements and EU-levels. The structure and funding, dependent from efficiency of pathways and of student abilities, were the foundations of the management concept. The educational objectives were filed at the level of full qualifications, units, blocks and attainment targets. The filing was realised with a taxonomy of binary names for full qualifications and units, a model for educational profiles and for unit descriptors. Students were awarded with diplomas and certificates when they met the requirements in full qualifications respectively units. Certificates represented credits, equal to the number of blocks the unit. Schools program their courses, module groups and modules on the basis of the similar educational objectives (Table).

	educational objectives	educational programs	educational awards
from	full qualification	course	diploma
generic	unit	module group	certificate
towards	block	module	credit
detail	attainment target		

The development of attainment targets as action structures (i.e. in behavioural terms) was a right approach for the production of competence based objectives with transfer potential.

A problem with the QS is the control of the number of full qualifications and units. Fragmented full qualifications would make the QS diffuse and ineffective, decrease efficiency of schools and lower transferability and flexibility of school leavers. Every system of VET seems to suffer from fragmentation and academic drift. Also the QS needed external push to enhance generic study areas and decontextualisation of required skills.

The achievement of transferability in the school-based program will require careful planning of the practical work in the work-based program. The planning and utilisation of this element will be the main activity of teachers in the future.

The transfer potential of attainment targets

Traditional educational objectives were compared with similar objectives in the QS. The quality of objectives was measured with Olbrich & Pfeiffer's taxonomy, and a taxonomy of subject areas. Communication on the transfer potential of educational objectives was difficult. The application of the taxonomy to traditional educational objectives and attainment targets was not standard between assessors.

Traditional examination programs and new attainment targets were not hard and fast descriptions of clear outcomes. As far as attainment targets were concerned, this was not only because an attainment target generalised about subject areas. The interpretation of attainment level itself, or, more precisely, the interpretation of the verb that expressed the attainment level, was ambiguous.

Summarised opinions of parallel groups of assessors however, gave a high correlation. This observation suggested it could be feasible for broad attainment targets to be the points of reference for teachers and students working with a curriculum. A possible alternative would be a narrow prescriptive attainment target, but such educational objectives do not allow responsiveness or description of transfer potential.

The balance between the performance and cognitive domains improved in the new QS and adapted to the specific requirements of Operator, Supervisor and Manager (at EU-levels 2, 3 and 4). There have been shifts from learning facts towards competence (the Operator), from elementary competency toward higher EU-levels of performance (Supervisor) and

towards cognition (Manager). The cover of transfer potential within the performance domain improved to a satisfactory level. The cover of transfer potential within the cognitive domain improved, but has still many omissions. An important change with the past was that knowledge was not limited to knowing facts and relationships. A shortcoming was the coverage of life long learning.

The aims of the new QS were that required skill and transfer potential do not focus on production technology alone but are given a broader interpretation. In some divisions a decrease in the new objectives that focus on production technology and equipment has been observed. The new QS proved to be a powerful means of articulating external demand and enabling discussions on curricula and study tasks.

The use of action structures facilitated the description of contextual changes. Action structures were the description of required competence and transfer potential, and provided a means of being prescriptive about performance and cognition. So action structures are likely to appeal much more to the imagination than subject matter, in the attempt to acquire required future behaviour. There is a tactic value in use of attainment targets to give an extra positive impulse to stressing urgency in a period of transition. The main point however remains that attainment targets are a very direct way to communicate required competencies and thus gave a positive impulse to the development of a responsive VET.

The effect of the QS on flexibility of schools

The QS is a description of the essential external changes and should not hinder the internal organisation of schools. On the contrary the QS should increase the degrees of freedom at meso and micro level.

The QS became compulsory for all schools in 1992; in 1990, however, another initiative of importance was carried through - dualisation. In a normalisation of pathways, an increase of the work-based facility up to 100 or 200 days was included in all educational routes.

With respect to the QS and to dualisation, two hypotheses about the internal flexibility of schools were tested -

- the QS increases the internal flexibility of SSAVE; the effects will be, more up- and down streaming, shortening of the length of stay and more qualified school leavers;
- dualisation - will improve students' results, by encouraging competence-based education as a precondition for acquiring required skills and transferability.

An increase of internal up- and down streaming has been noted. The QS increased the ratio of students that left school with a diploma. This effect was the strongest for the Operator at level 2. The qualification in pathways other than the first entry pathway increased. This is a sign of increased

internal flexibility. A negative effect was that of level 4 entries, fewer students attained a level 4 diploma.

An unexpected effect is that the success rate dropped with about 8% because of longer work-based programs. The negative dualisation effect on the success rate was strong, but the success rate recovered with the implementation of the QS. The time students needed to attain a diploma shortened because of the QS; as did the time needed for the decision to leave school (without a diploma). The dualisation measure had a small positive influence on the relative length of stay – the actual school years divided by normal course years.

Students spent less than the normal time on blocks. This means in the context of the new QS, that in addition to the measured success rate at the diploma level, large numbers of certificates were issued to students leaving the school without a diploma.

The 100% of the funds spent in SSAVE are transformed into credits. Students however are selective and in some instances they leave school early when they are satisfied with their selection of units. This form of tailor made supply is worrisome when too many students do not finish the courses at their ability level.

Final conclusions

Some conclusions and challenges for future policy, research and practice are the following.

1. The most important point is probably that the policy decision to give schools more freedom and to discuss at a national level the outcomes of VET, was right.
2. The organisation of a responsive VET requires an institutional provision articulating the transfer potential and entry requirements for the work floor. This results in a QS with multiple functions i.e. objectives and steering for schools and information for the socio-cultural process of school-to-work transition.
3. The new QS improved students' success rate and shortened the length of stay. The dualisation of pathways has negative effects on success rate; possibly students have difficulties to develop a study rhythm. Dualisation has a small positive effect on the shortening of the length of stay. The direct positive effects of the QS are probably due to organisational provisions, i.e. increased up- and down streaming and commonality of units in full qualifications.
4. Because of the diversity of regional requirements and school identities, but more because of required description of transfer potential, national policy should focus on decontextualised action structures. The attainment targets from 1996 are a considerable improvement of the formulation of the educational objectives from the 1980s. The description of required

performances is reasonable and the description of required cognition should be improved.

5. Attainment targets describing transfer potential are not hard definitions of outcome. Definition of attainment targets requires positioning in the hierarchy of competence relevant or the work situation and the hierarchy of the learning process. Their definition is supported by indication of entry levels and learning time.
6. Decontextualised action structures are based on performance in the work situation and are similar for all learning - in the school- and work-based programs, initial or life-long learning, and in education, training or development. A threat is that descriptions of outcomes are narrowed to educational objectives, to required skills or even to subject matter.
7. Tailor-made provision of VET will increase the individualisation of pathways and the shopping around for units by students. The present form of funding is very unattractive to schools that allow electives. The state could pay schools for certificates awarded rather than diplomas.
8. The QS changed the context of learning and possibly the routines of all teachers. Developing new approaches is very demanding of teachers and needs the support of innovative leadership at meso level. At a macro level, the most critical point of the change of SSAVE is likely to be the continued stimulation and support of teachers and management.
9. A structural fact is that educational content, the traditional basis of assessing the effectiveness and efficiency of VET, has become unstable. The new basis cannot be content but a procedure to compensate for the stable occupational images from the past. The procedure should have a flexible structure (networking) and be organised to utilise tacit knowledge about occupational dynamics.

Samenvatting

Dit proefschrift levert conclusies op over eindtermen, doelmatigheid van scholen en responsief beroepsonderwijs. Responsief onderwijs is onderwijs in interactie met haar omgeving. De conclusies zijn ontleend aan een case studie over de vernieuwing van het Nederlandse Middelbaar Landbouw Onderwijs (MLO) voor 16-20 jarigen tussen 1988 en 1993. De studie omvat een analyse van een succesvolle en tegelijkertijd complexe systeemvernieuwing, n.l. de kwalificatiestructuur (KS) die was gericht op het responsief maken van het MLO-systeem.

De onderzoeksvragen gaan over het ontwerp, de ontwikkeling, de implementatie en de effecten van responsieve onderwijssystemen: 'Wat zijn de doelen inzake responsief beroepsonderwijs?' 'Wat zijn de veranderingen op macro, meso en micro niveau van het onderwijssysteem tijdens het ontwerpen, ontwikkelen en implementeren van een responsief MLO?' 'Welke zijn de standaarden voor resultaten en wat zijn de oordelen ten aanzien van de meting van transfervermogen van eindtermen en van de flexibiliteit van de schoolorganisatie?'

Voor de beantwoording van de onderzoeksvragen biedt de studie een reconstructie van de probleemdefinitie, de curriculumtechnologie, de beleidsvorming, het veranderingsproces en de KS. Een empirische toets geeft zicht op de effecten van de KS op onderwijsdoelen en op de doelmatigheid van scholen.

De probleemdefinitie

De reconstructie van maatschappelijke veranderingen leidde tot de conclusie dat voortgaan met optimaliseren van het gangbare MLO niet zinvol was. Het ging om veranderingen op het beleidsterrein van de Minister van Landbouw; in de kennissamenleving, de rollen van de overheid, het onderwijsbeleid en de scholen zelf; ook de theoretische opvattingen over beroepsonderwijs veranderden.

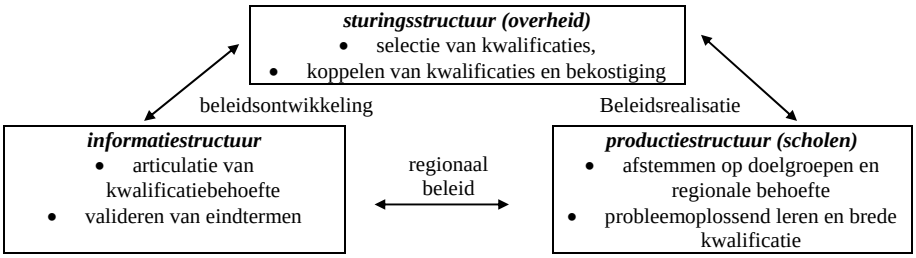
De kern van het MLO-probleem en van beroepsonderwijs in het algemeen was dat de beroepsvereisten geen stabiel gegeven meer waren. Taken, banen, beroepen en functies werden als gevolg van de maatschappelijke en technologische dynamiek structureel veranderlijk. Het MLO reageerde te traag en dreigde doelloos te worden. Het MLO moest in interactie treden met de buitenwereld; het moest responsief worden.

De curriculum- en sturingstechnologie

De nieuwe uitdaging op alle niveaus van het systeem was eraan bij te dragen studenten te initiëren voor hun eerste baan en simultaan te voorzien van transfervermogen zodat zij 'employable' worden. Dat wil zeggen dat gediplomeerden werk kunnen krijgen en behouden. Bovendien zouden de scholen responsief moeten zijn terwijl samenhang en doelmatigheid van het

onderwijssysteem blijven verzekerd. Dit zijn curriculum- en een sturings-doelen.

De doelen werden gepositioneerd in een theoretisch model voor een responsief onderwijssysteem. Een nieuwe informatiestructuur zou de kwalificatiebehoefte kunnen articuleren en een KS voortbrengen. De bestaande sturingsstructuur (overheid) zou kwalificaties met bekostiging kunnen verbinden en de bestaande productiestructuur (scholen) zou kunnen voorzien in de vraag naar kwalificaties (Figuur).



Kwalificaties zouden de kern zijn van de KS. Kwalificaties moeten iemand in staat stellen een breed scala van toegewezen taken uit te voeren in werk, in sociaal verband en bij het leren.

Kwalificaties zouden beschreven moeten worden met eindtermen die uitdrukking geven aan intrede eisen voor werk en aan transfervermogen. Aan de eis kan worden voldaan door eindtermen te formuleren met behulp van handelingstructuren, die de opeenvolging van acties beschrijven die tot een concreet resultaat leiden. Bovendien zouden de eindtermen, door middel van zelfstandige naamwoorden met brede betekenis, gedecontextualiseerd moeten zijn. Hierdoor zou praktische ervaring van studenten in leerprocessen kunnen worden benut bij reflectie en de ontwikkeling van transfervermogen. Decontextualisering werd ook van belang geacht voor een schoolorganisatie die haar aanbod wil afstemmen op doelgroepen en op regionale behoefte.

Eindtermen zijn noodzakelijk voor de kwalificatie van studenten en ook voor de invulling van de nieuwe regionale functie van scholen. De koppeling van curriculum- en sturingstechnologie maakte het theoretisch mogelijk kwalificaties helder te formuleren en de vrijheidsgraden van scholen te vergroten.

De beleidsvorming voor MLO

Uitgaande van de oorzaak/gevolg relatie in de probleemdefinitie werd een beleidsmodel gereconstrueerd met de volgende doel/middel-relatie.

De scholen wordt gevraagd om studenten met transfervermogen op te leiden m.b.v. concrete, gedecontextualiseerde bekwaamheidseisen. Gedecontextualiseerde eisen dekken brede doelen. De informatiestructuur formuleert

deze bekwaamheidseisen in de vorm van eindtermen en informeert daardoor over de vereiste resultaten van het systeem. De overheid wijst op basis van de bekwaamheidseisen middelen toe aan scholen en waarborgt daarbij de vrijheidsgraden voor scholen om op een flexibele manier te voorzien in de vraag van doelgroepen en regio's.

Het proces van ontwerp en ontwikkeling in het MLO

Het ontwerp en de ontwikkeling van een responsief MLO vergden de identificatie van die technologische en maatschappelijke veranderingen welke van belang waren voor bekwaamheden. Aansluitend volgden de vertaling in kwalificaties en de transformatie naar scholen. De procesdoelen waren 1) de nieuwe principes toe te passen, 2) de ervaring van docenten te benutten voor ontwerp en ontwikkeling en 3) docenten op te leiden voor de toepassing in scholen. De tastbare producten waren de KS, model modulen en de nieuwe informatiestructuur.

De feitelijke aanpak had veel kenmerken van een kenniscreatie- en socialiseringsproces, waarbij steeds meer mensen betrokken raakten. De procesdoelen werden in een hoog tempo toegespitst. Ideeën en producten veranderden en werden steeds concreter. Het idee om van de productie van de eerste KS te leren en het nieuwe inzicht toe te passen voor het ontwerp van de informatiestructuur werkte. De vormgeving van LOBAS, de instelling die vanaf 1996 de KS maakt, werd gebaseerd op de inzichten.

De minister van Landbouw leidde het proces. De aanpak van het proces en het technologisch concept kregen veel kritiek. Terugkijkend is duidelijk dat het concept en het tempo van het proces werden besproken in een fase waarin nauwelijks iemand het geheel overzag. Tijdens het proces werden de gekozen koers en het tempo niet meer ter discussie gesteld; dit is waarschijnlijk een succesfactor, omdat een discussie in dat stadium waarschijnlijk verlammend had gewerkt.

De kwalificatiestructuur (KS)

De KS zoals die werd gemaakt, beoogde meer te zijn dan een verzameling van kwalificatievereisten. De KS zou de publieke functie van een responsief MLO moeten uitdragen. Hij mocht niet slechts gebaseerd zijn op beroepsprofielen, of uitsluitend gericht zijn op de behoeften op de arbeidsmarkt, of toespitsen op functietraining, of voorbijgaan aan het feit dat de arbeidsmarkt weinig zegt over de sociale vraag naar vorming. Tevens zou de KS het middel zijn om het MLO te sturen.

De KS zou een responsief onderwijssysteem moeten ondersteunen en informatie geven over vereiste bekwaamheden; hij zou tegelijkertijd de interne en externe flexibiliteit moeten bevorderen. Belangrijke criteria voor ontwerp en ontwikkeling waren vergroting van vrijheidsgraden voor scholen, globale thema's, uniforme niveaus, toegankelijkheid, brede bekwaamheden, clustering van deelkwalificaties en opties binnen eindkwalificaties, en

gemeenschappelijkheid van deelkwalificaties binnen verschillende eindkwalificaties.

Ontwerp en ontwikkeling van de KS leidden tot een architectuur met een heldere structuur, taxonomie en inhoud. De structuur bestond uit leerwegen die bepaald werden door afdelingen (bijvoorbeeld Plantenteelt of Levensmiddelentechnologie), leer/werk arrangementen en EU-niveaus. De structuur en bekostiging, afhankelijk van efficiëntie van leerwegen en van studievaardigheden van studenten, vormden de basis voor het sturingsconcept. De onderwijsdoelen werden geordend op het niveau van eind- en deelkwalificaties, blokken en eindtermen. De ordening werd gerealiseerd met een taxonomie van binaire namen voor eind- en deelkwalificaties en met een model voor opleidingsprofielen en voor deelkwalificaties. Studenten zouden een diploma of een certificaat krijgen als zij aan de eisen in een eind- en deelkwalificatie zouden voldoen. Een certificaat vertegenwoordigde studiepunten, waarvan het aantal overeenkwam met het aantal blokken in de deelkwalificatie. De aansluitende onderwijsprogramma's waren cursus, moduulcluster en moduul (Tabel).

	onderwijsdoelen	onderwijsprogramma's	onderwijserkenningen
van	eindkwalificatie	cursus	diploma
generiek	deelkwalificatie	moduulcluster	certificaat
naar	blok	moduul	studiepunt
detail	eindterm		

De KS zou een middel moeten zijn dat de communicatie vergemakkelijkt tussen de structuren in het onderwijssysteem en tussen de niveaus van overheidsbestuur, management en uitvoering van onderwijs. Eindtermen werden met handelingsstructuren beschreven om op krachtige wijze in onderwijsdoelen uitdrukking geven aan gewenst transfervermogen.

Problemen met de KS waren de beheersing van de aantallen van eind- en deelkwalificaties. Fragmentatie van eindkwalificaties zouden de KS diffuus maken, de efficiëntie van scholen verlagen, en het transfervermogen en de flexibiliteit van gediplomeerden verminderen. Elke vorm van beroepsonderwijs lijkt te lijden aan fragmentatie en academische abstractie. Ook de KS behoefde externe stimulansen voor de ontwikkeling van generieke thema's en decontextualisering van vereiste vaardigheden.

Daarnaast vergt in de toekomst het verwerven van transfervermogen een zorgvuldige planning van het praktisch werk in het buitenschools programma en een benutting van praktische ervaringen in het binnenschoolse programma. Deze planning en benutting zal in de toekomst de hoofdactiviteit zijn van docenten.

De effecten op het transfervermogen in onderwijsdoelen

Traditionele beschrijvingen van onderwijsdoelen werden vergeleken met overeenkomstige eindtermen in de KS. De kwaliteit van de doelen werd

gemeten met behulp van de taxonomie van Olbrich & Pfeiffer, en een taxonomie van vakgebieden.

De communicatie over de transfereisen van onderwijsdoelen bleek moeilijk. De resultaten van de toepassing van de taxonomie op traditionele doelen van het MLO en op eindtermen verschilden tussen de beoordelaars.

Samenvattingen van parallelmetingen leverden scores op met een sterke correlatie. Deze observatie voedde de veronderstelling dat breed geformuleerde eindtermen geen concrete duiding waren maar wel richting gaven. Eindtermen kunnen als agendapunten dienen bijvoorbeeld als docenten programma's ontwerpen, of bij gesprekken tussen docent en studenten over de doelen van het leren. Een alternatief voor de breed geformuleerde eindterm is een beschrijving van een smalle voorschrijvende eindterm, maar deze staat ruimte voor responsiviteit en transfervermogen in de weg.

Traditionele onderwijsdoelen (examenprogramma's) noch nieuwe concrete eindtermen bleken klip en klare beschrijvingen van heldere uitkomsten. Dit kwam wat de eindtermen betreft niet alleen doordat zij generalisaties waren van een bekwaamheid. De interpretatie van het niveau van beheersing, of meer nauwkeurig, de interpretatie van het werkwoord dat het niveau van beheersing uitdrukt, bleek ambigue.

Het evenwicht tussen de beschrijving vanuitvoerende vaardigheden en capaciteiten verbeterde in de KS en paste beter bij de specifieke eisen van de Beginnend Beroepsbeoefenaar, de Zelfstandig Beroepsbeoefenaar en de Kaderfunctionaris (op EU-niveau 2, 3 en 4). Het leren van feiten verschoof in de richting van vaardigheden (Beginnend Beroepsbeoefenaar), van elementaire vaardigheden naar hogere uitvoerende EU-niveaus (Zelfstandig Beroepsbeoefenaar) en naar capaciteiten (Kaderfunctionaris). Een belangrijke verandering met het verleden was dat kennis niet beperkt bleef tot het weten van feiten en relaties. Een tekortkoming bleek de uitwerking van kwalificaties m.b.t. een leven lang leren. De nieuwe KS bleek wel een middel om transfereisen van buitenaf beter te articuleren en daardoor discussies over curricula en studietaken wellicht beter mogelijk te maken.

Het gebruik van eindtermen vergemakkelijkte de beschrijving van veranderingen in de praktijk. Handelingsstructuren beschrijven vereiste bekwaamheid en transfereis, en zijn daardoor een middel om uitspraken te doen over gewenste capaciteiten en beroepsvereisten. Daarom kunnen dit type van eindtermen meer tot de verbeelding spreken dan schoolvakken. Los van de tactische waarde van een andere benadering om urgentie te benadrukken bij een onderwijsvernieuwing, hebben eindtermen een extra positieve impuls gegeven aan de ontwikkeling van een responsief MLO.

De effecten op de flexibiliteit van scholen

De KS is een beschrijving van de belangrijkste veranderingen in de praktijk en zij mag geen hinderpaal zijn voor interne en externe flexibiliteit van

scholen. In tegendeel, de KS moet het aantal vrijheidsgraden op meso- en microniveau vergroten.

De KS werd in 1992 verplicht voor alle scholen in het MLO; in 1990 echter, was al een andere belangrijke maatregel doorgevoerd namelijk dualisering. Als gevolg van het normaliseren van leerwegen, werd het buitenschools programma van beroepsopleidende leerwegen vergroot tot 100 of 200 dagen. Met betrekking tot de KS en dualisering, werden twee hypotheses over de interne flexibiliteit van scholen getoetst:

- de KS vergroot de interne flexibiliteit; de effecten zijn versterkte verticale stroming, verkorting van de verblijfsduur en meer gekwalificeerde schoolverlaters;
- dualisering verbetert de resultaten van studenten door bijvoorbeeld. probleemoplossend leren mogelijk te maken als voorwaarde voor het leren van vereiste vaardigheden en transfervermogen.

Er werd een toename van de verticale doorstroom geconstateerd. Het aantal studenten dat de scholen met een diploma verlaat nam toe door de KS. Dit effect trad het sterkst op bij EU-niveau 2 (bij de Beginnend Beroepsbeoefenaar). De kwalificering in andere leerwegen dan de leerweg van inschrijving nam toe; dit is een teken van grotere interne flexibiliteit. Een negatief effect is dat studenten die op niveau 4 inschrijven, relatief minder dan voorheen op niveau 4 kwalificeren.

Een onverwacht inzicht was dat dualisering (verlenging van stages) de slagingskansen van studenten sterk verlaagde (circa 10%). Het negatieve effect van duali-sering op het slagingspercentage was groot, maar het slagingspercentage in het MLO herstelde dankzij de KS.

De verblijfsduur van studenten verkortte door de KS zowel voor degenen die met, als wel voor degenen die zonder diploma vertrokken. De dualisering verkortte de relatieve verblijfsduur (de feitelijke schooljaren gedeeld door het normatieve aantal cursusjaren) een beetje. Verder bleek dat studenten gemiddeld minder dan de normatieve tijd aan blokken besteedden. Dit betekent dat door de KS grote aantallen certificaten werden uitgereikt aan studenten die de school zonder diploma verlieten.

Het geld dat in het MLO wordt gestoken, wordt voor 100% omgezet in studiepunten. Het maatwerk gaat zover dat studenten de krenten uit de pap halen en met onvolledige diploma's de school verlaten.

Slotbeschouwing

Enkele conclusies en uitdagingen voor de toekomstige politiek, het onderzoek en de praktijk zijn de volgende:

1. Het belangrijkste inzicht dat dit proefschrift oplevert is wellicht dat de politieke keuzen juist waren om scholen meer vrijheidsgraden te geven om responsief te zijn en op nationaal niveau een discussie te voeren over de gewenste uitkomsten van beroepsonderwijs.

2. De organisatie van een responsief beroepsonderwijs vereist een institutionele voorziening voor de articulatie van intredeëisen in arbeidsprocessen en van transfervermogen. Deze voorziening is een onderdeel van de informatiestructuur van een kennissysteem en brengt de kwalificatiestructuur (KS) voort. De KS heeft een doelstellende en sturende functie voor beroepsonderwijs, en daarnaast een sociaal-culturele functie voor de afstemming van school en werk.
3. De nieuwe KS verbetert de slagingskansen en verkort de verblijfsduur van studenten. Dualisering van leerwegen vermindert de slagingskansen hevig, mogelijk doordat studenten niet in een studieritme komen. Dualisering verkort de verblijfsduur enigszins. De directe positieve werking van de KS berust waarschijnlijk op flexibiliteit vergrotende, organisatorische voorzieningen, b.v. doorstroming en gemeenschappelijkheid van deelkwalificaties in eindkwalificaties.
4. Vanwege de diversiteit van regionale eisen, vanwege schoolidentiteit, maar vooral vanwege de eis aan transfervermogen, zou de overheid haar beleid moeten toespitsen op de realisatie van gedecontextualiseerde eindtermen. De huidige eindtermen zijn een belangrijke verbetering van de vroegere exameneisen, vooral m.b.t. beroepsvereisten; de formulering van de vereiste capaciteiten vraagt echter nog een forse verbetering.
5. Eindtermen duiden transfervermogen en zijn geen harde definities van resultaten. Een eindterm wint aan betekenis door een positionering in de hiërarchie van bekwaamheden passend bij werk en in de hiërarchie van het leerproces. De inhoud van een eindterm wordt ook helderder door een indicatie van beginniveaus en toegewezen leertijd.
6. Gedecontextualiseerde handelingsstructuren zijn gebaseerd op prestaties in de praktijk en deze zijn voor alle vormen van leren gelijk: leren in de binnen en buitenschoolse programma's, in het initieel en leven lang leren, en in onderwijs, instructie en vorming. Definiëren van leerresultaten met transfervermogen is moeilijk en definities dreigen te versmallen tot onderwijsdoelstellingen, tot functie-eisen of zelfs tot leervakaanduidingen.
7. Beroepsonderwijs op maat zal leiden tot verdere individualisering van programma's en het selectief kiezen van deelkwalificaties door studenten. De huidige vorm van financiering is onaantrekkelijk voor scholen die keuzemenu's toestaan. De overheid zou de scholen voor deelkwalificaties kunnen betalen in plaats van voor eindkwalificaties.
8. De KS veranderde de omstandigheden van leren en mogelijk ook de werkroutine van alle docenten. De ontwikkeling van een nieuwe aanpak vraagt veel van docenten en behoeft ondersteuning vanuit een innovatief leiderschap in de school. Op het macro niveau is de meest kritische succesfactor mogelijk de voortdurende stimulering van docenten en schoolleiders.

9. Het is een structureel gegeven dat onderwijsinhoud, de huidige basis van redeneren over effectief en efficiënt beroepsonderwijs, voortdurend in beweging is. De nieuwe basis van redeneren kan geen inhoud meer zijn maar een procedure die de plaats inneemt van de stabiele beroepsbeelden uit het verleden. Die procedure zou flexibel in netwerken moeten zijn georganiseerd en zodanig dat ervaringskennis kan worden benut.

The Glossary

Keywords and acronyms are defined in this glossary.

Responsive Vocational Education and Training (VET)

Responsive System	is a VET system that is capable of responding quickly to new demands arising from changes in the context in which it operates. It will have articulated steering, information and production structures with iterative processes between them.
Steering structure	is the of set coherent functions to approve, fund and monitor the educational system; i.e. the national government.
Information structure	is a set of coherent functions to identify contextual changes, to articulate external demand and to transform the demand into educational objectives which express required skills and offer transfer potential.
Production structure	is the set of coherent functions to organise the providers of education and support these providers.
Qualification Structure	a QS is a coherent architecture of structure, taxonomy and educational content which provides information about required competencies for a responsive educational system.

Interactive processes in a responsive system

Responsiveness	is the ability of the educational system to respond quickly to changes in the demand for its services.
Flexible organisation	is an organisational system in educational establishments which allows them to respond with the minimum of external constraint to meet the specific demand of clients and target groups.
Accountability	is the response by schools to clients and the general public to questions on provision and outcomes.

Competence and Qualification

Competence	is the ability of someone to handle a particular situation. It is concerned with the 'know why and when' questions within changing contexts; it is a concept with a holistic meaning and it refers to overall capacities.
Skill	is the competency to fulfil an assigned task at work, social life and learning: it is used in the context of required skills.
Qualifications	are descriptions of a continuum of knowledge, skills and attitudes that enable someone to fulfil various assigned tasks at work, in social life and for learning.
Competence-based learning	is a pedagogy directed to acquiring competence rather than solely knowledge and/or skills; the student is learning to master.

Competence-based objectives	are the elements (educational objectives) of competence-based learning.
Employability[72]	is the quality of a person to satisfy the requirements of a work situation as can be observed in the career of qualified school leavers.
Transferability	is the ability of qualified school leavers to utilise prior learning in a new context.
Mobility	is the potential of qualified school leavers to supply effectively demands of the employment market.

Educational content: competence-based objectives

Attainment targets	are descriptions of competence; an attainment target is an action structure describing the achievement of an identifiable area of knowledge, skills and attitudes that makes someone competent to fulfil an assigned task in work, social life and study.
Blocks	a block is the volume of education in the 4-year educational route in five days of school based study. A block is made up of five attainment targets.
Units	consist of 2 – 10 blocks; a unit is a significant component of a full qualification; a unit may have its own recognisable value in the employment market.
Full qualifications	are descriptions of competence; a full qualification has its own recognisable value in the professional employment market.
Decontextualisation	is the description of educational objectives with a broad qualifying meaning, which allows the utilisation of diverse experiences for acquiring transferability.
Commonality	is appearance of common units within full qualifications of different EU-level, of different pathways or of different occupational divisions.

Educational content: programs

Modules	are descriptions of content - a module is a learning program of about one block.
Module groups	are descriptions of content - a module group is a program consisting of a group of modules which cover the outcomes of a unit.
Course programs	are descriptions of content - a course program relates to a full qualification.

[72] The word practical directedness has been used in SSAVE to point to skill orientation, the ability to get a first job; together with transferability it is the prerequisite for employability. The word employability was not used in SSAVE until the second half of the 1990s.

Educational content: awards

Credits	are awards for the attainment of qualifications, they prove that someone attained a block; credits add up to a diploma
Certificates	are awards for the attainment of a unit; it is a final award in its own right.
Diplomas	are awards for the attainment of full qualifications.
Exemption	is awarding a qualification after assessment of prior knowledge from learning elsewhere.

Educational organisation

Pathways	are educational arrangements with the proportion of school- and work-based training as a point of reference (for example educational routes with day release to school, training routes with the apprenticeship scheme).
Educational route	is a learning pathway with a predominantly school-based program.
Training route	is a learning pathway with a predominantly work-based program.
Dualisation	is assigning a substantial work-based program to a course program, i.e. the training route.

Miscellaneous keywords

Contextual change	is the phrasing used for changes in the context of vocational education; when used at the level of schools, a contextual change includes systems change.
Land based	is an adjective that includes forestry, arboriculture, horticulture (both production and amenity), agricultural production, agricultural engineering, environment and other outdoor functions of Agriculture in the wider sense.
Review DC ‘96	Review of Diplomas and Certificates issued in 1996.
Outcomes	are the achievements, products or results of a process.
Qualified school leavers	are students that leave the system with one or more diplomas or certificates (qualified school leavers may include people with a career based on a qualification attained in school).
Up- and down streaming	is the shift of learning routes by students to higher or to lower levels; this is also called vertical mobility.
Success rate	is the number of students that leave a course with a diploma, expressed as a fraction of the number of students that entered that course in the first year.

Miscellaneous acronyms

ARVO	Advisory Council for Secondary Education
EdCo	Educational Council
ET	law on Education and Training
EU	European Union
IAE	Institute for Agricultural Education
IPC	Innovation and Practical College
JSAVE	Junior Secondary Agricultural Vocational Education (12-16 y)
JSVE	Junior Secondary Vocational Education
LOBAS	National Body for Agricultural VET
SE	law on Secondary Education
SSAVE	Senior Secondary Agricultural Vocational Education (17-20 y)
SSGE	Senior Secondary General Education
VE	law on Vocational Education
VET	Vocational Education and Training
VT	law on Vocational Training
QS	Qualification Structure

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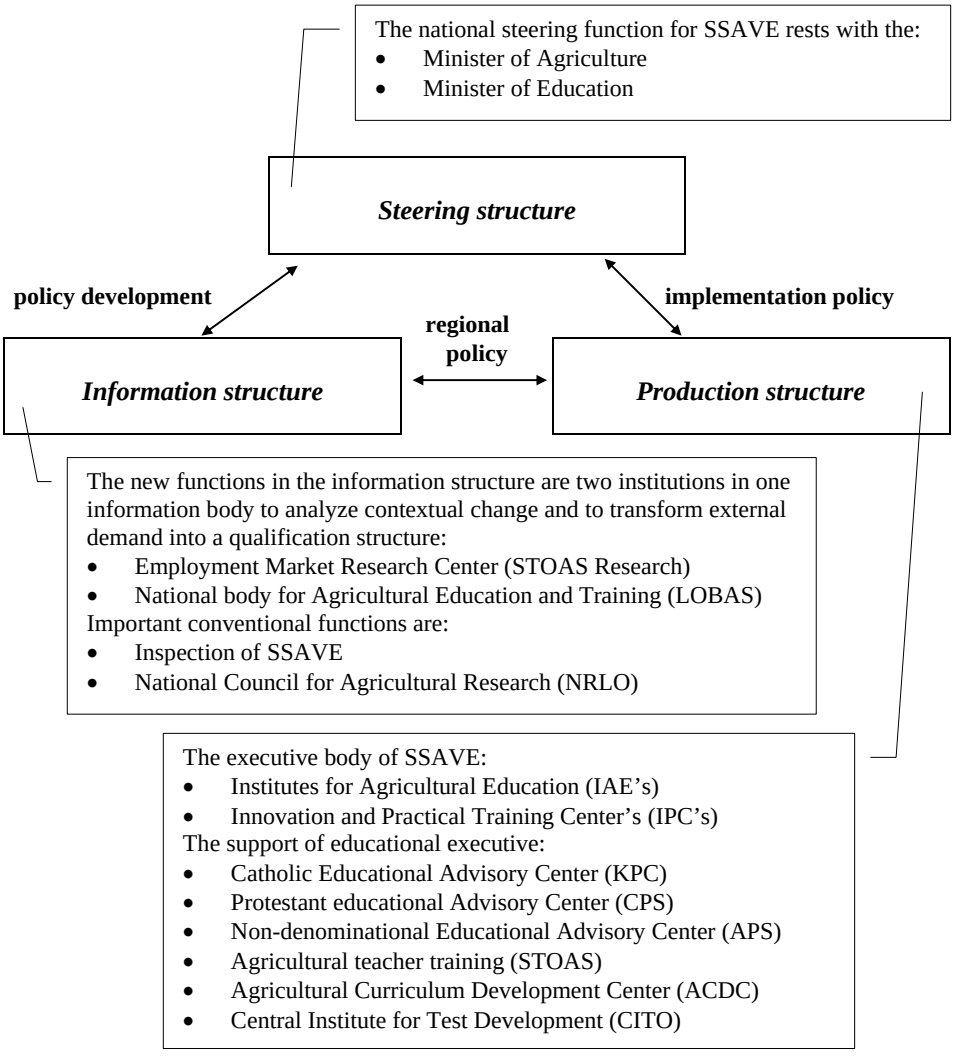
Annex

Annex 1.1 The institutional body within the system of SSAVE

The model for a responsive system of VET is described in the Introduction and elaborated in § 3.1.1 (Figure 3.1), § 3.1.3 (Figure 3.3) and in § 3.5.1 (Figure 3.7) and concluded on in § 5.4.2 (Figure 5.5). The model describes the functions in a responsive system. The scheme below pictures how in 1999 the functions are realized by conventional and new institutions and how these institutions are positioned in the system.



Annex 1.2 The '1989 aims and projects' for change of SSAVE

Objectives of change	INPUT	PROCESS	OUTPUT
MACRO the national system for the makers of regulations	Formulate concrete objectives and increase the managerial possibilities (O&W, 1988a and 1988b); industry, the field of education and the government should share responsibility for a qualification system (Wagner, 1984; LNV, 1989c); take occupational profiles as point of departure and make a division in units (O&W, 1986, 1988a, 1988b); interconnect courses, inclusively the first vocational qualification (Lavi, 1987a); introduce work-based learning (Borkhuis, 1976; Boomsluiter, 1978);	Let working groups of teachers develop new concepts of teaching (Borkhuis, 1976); change should be from, for and by teachers (APS, 1984); final examinations should be school examinations (Borkhuis, 1976; Van den Broek, 1988; Roosma en Verhoef, 1989); strengthen the relation between schools and enterprises (Wagner, 1984; LNV, 1989d and Rauwenhoff, 1990) and knowledge infrastructure (Biesheuvel, 1992, LNV, 1993b); allow learning through participation in regulations (Van de Lagemaat, et al 1985; Boomsluiter, 1986); realise horizontal and vertical streams (LNV, 1989d); organise all pathways within one institution (Lavi, 1986; O&W, 1988b)	Balance personal, social, labour and knowledge abilities in VET (O&W, 1988a; Van Lieshout, 1991; Biesheuvel, 1992); make coherent diplomas and certificates for courses in full time education and apprenticeship scheme (O&W, 1988a, 1988b, 1993b; LNV, 1989d); design coherent pathways (LNV, 1989d; O&W, 1993a); respond to the question for education of all (Lavi, 1984); Design a funding system based on added value and quality systems of the schools (Lavi, 1988b, O&W, 1993b)
MESO the school in the region for school managers	Position the attuning responsibilities at regional levels (Wagner, 1984); train sufficiently senior teachers (Lavi, 1987c); pay full attention to broad access (O&W, 1982); enable exchange of comparable certificates in JSAVE and SSAVE (LNV, 1989b);	Take learning through participation as point of departure (Van de Lagemaat, 1985; Van der Steen, 1986) and train problem solving skills (APS, 1984, Roosma and Verhoef 1989); organise work-based learning in practical stages and also in day programs; enable exchange of comparable certificates within SSAVE (LNV, 1989b); assign time to remediation within units (Van de Broek, 1988);	Enable qualification of early school-leavers (O&W, 1982, 1993b; LNV 1989d); enable exchange of comparable certificates in SSAVE, and HAE and adult education (LNV, 1989d);
MICRO the process of learning for teachers	Utilise practical experience in the build up of the program and describe objectives with structures of acting at work (van de Lagemaat, 1985 and 1986; Roosma and Verhoef, 1989); create conditions for up to date and attractive education (APS, 1984; Lavi, 1987c); utilise and create time for coaching in the work-based program (APS, 1984, Lavi, 1987c);	Point at various methods of transfer and explanation in teacher training (Borkhuis, 1976; Van der Steen, 1986; Roosma and Verhoef, 1989); integrate general subjects in appropriate vocational subjects (Borkhuis, 1976); use self efficacy in the process of learning and working (Borkhuis, 1976); integrate work-based learning and introduce the principle of learning through participation (Borkhuis, 1976; Boomsluiter, 1986);	Include insight in the enterprise, decision making and taking responsibilities in qualifications (Borkhuis, 1976; Van Lieshout, 1991); realise qualifications directed to sustainable, safe and competitive production technology(LNV, 1990d), to functions in the country-side and spatial quality (LNV, 1990c), to reduction of emissions, volume and dependence of pesticides to safety, health and well being at work(LNV, 1991).

Annex 2.1 A taxonomy and a flow chart for development of LTP

A project group for the development of learning through participation (LTP) in SSAVE-B produced in 1985 two development aids. First a taxonomy of objectives.

	psychomotor domain	affective domain	cognitive domain
employee:	doing all manual routines	enjoying physical labour	looking some steps ahead in a procedure
caretaker:	self efficacy at routines on different enterprises	desiring responsibility and independence for given tasks	knowing facts and norms in production technology
manager	controlling all manual, oral and written routines	having ambitions to shape own values	planning the execution of activities for a year
entrepreneur	handling all relevant information	shaping own ideas and feeling coherence and trends	planning the objectives for development

In the agricultural schools' all 12 fields were relevant. The traditional target group for example enters the school with a strong orientation on the fields 1, 2 and 3. The fields 10, 11 and 12 are the domains of adult courses. The aim of the project group was to communicate with colleague teachers the levels of mastery and the study subjects with a shared concept of the relevant fields (Van de Lagemaat, Hoving, Verheul, Cox & Geerligs, 1985).

The division into a psychomotor, affective and cognitive domain was not very useful, because the three domains can not be separated in discussions about competence.

The project group also reconstructed a flow chart to ask in the various stages of development the right questions. The development process is cyclic and the questions may be used in a prospective or retrospective way.

Achievements	**Research questions for reconstruction and/or design:**
A. The required qualifications with reference to levels and domains	
	What are the relevant structures of acting?
B. The moments of acting and of decision taking in the enterprise	
	What is the educational principle to be followed?
C. The course contents	
	What are the criteria for taxonomy of contents?
D. The course contents order	
	What are criteria for the organisation of the course?
E. The course organisation	
	What are the criteria for regulation of the course?
F. The execution of the course	
A. Etc.	
	Etc.

Cyclic thinking in the flow chart may be found back in the approach of the development of the qualification structure and the application of interventions described in chapter 5.

Annex 2.2 The minimum timetable for SSAVE-B and SSAVE-A

The Decree on SSAVE decides on the minimum amount of lessons (50 minutes) for subjects in the curricula of A- and B- pathways. These minima are listed in a table indicating the required number of weekly lessons during a year per subject for the full course (article 21 and 22 from the Decree on SSAVE, 1985). From three courses the full minimum-tables are listed.

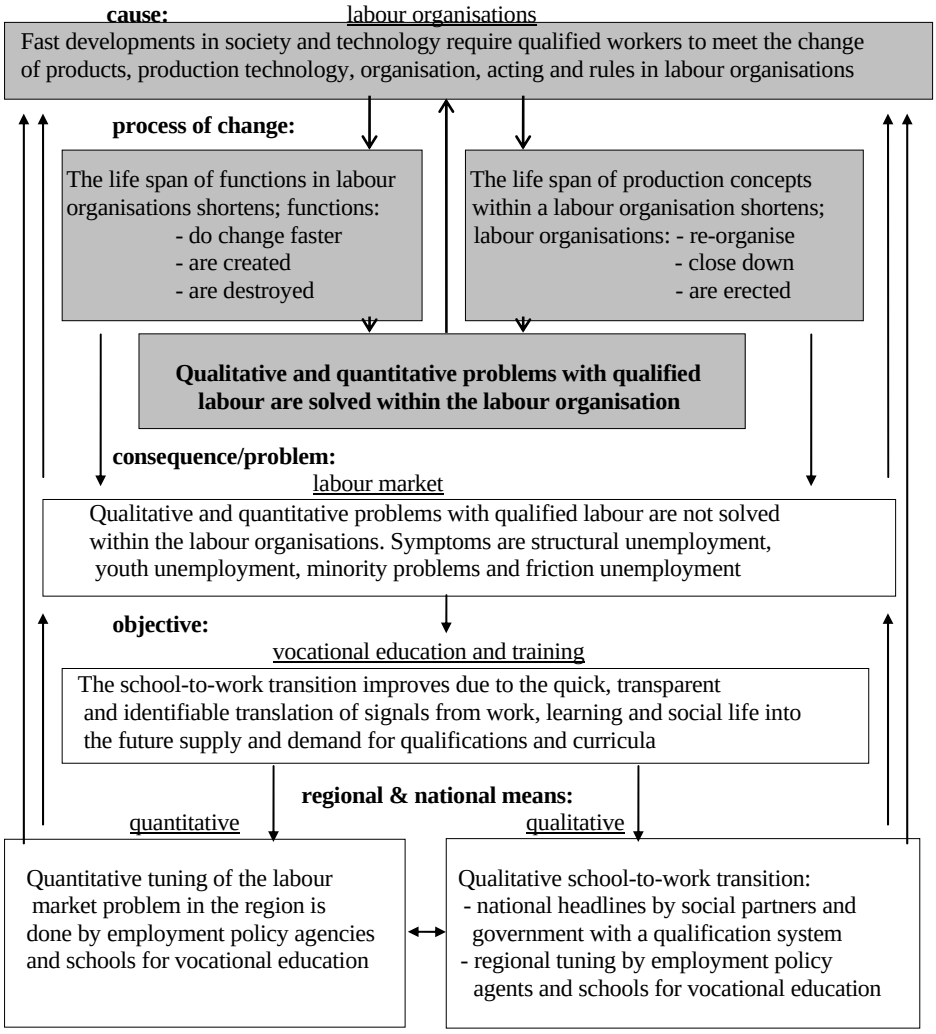
DIVISIONS	**Agriculture**		**Horticulture**		**Food technology**	
courses	Cattle breeding		Design and maintenance of gardens and green space		Food technology	
pathways	SSAVE-A	SSAVE-B	SSAVE-A	SSAVE-B	SSAVE-A	SSAVE-B
SUBJECTS						
Dutch	3	3	3	3	3	3
2nd language	2	1 *6*	2	1 *6*	2	1 6
Mathematics	3		3		3	
Physics	3		3		3	
Chemistry	3		3		3	
Biology	5		5		5	
Physical ed.	4	2	4	2	4	2
Social studies	2	2	2	2	2	2
Expressive sub.	1	2	1	2	1	2
Vocational:						
Economics	7	7	7	7	7	7
Engineering	6	6	5	3	7	3
Soil science	4	3 *36*	4 *42*	3 *42*		*36*
Food technology					3	3
Mathematics		1		1		1
Physics		0		0		0
Chemistry		0		0		0
Biology		0		0		0
1st discipline	3	3	3	3	3	3
2nd discipline	3 *16*	3 *13*	3 *16*	3 *22*	3 *16*	3 *16*
Total minimum	59	48	59	54	59	48
Total available	90	60[73]	90	75	90	60

The data in italics represent minimum requirements of subtotals. For example: The SSAVE-B student in Cattle breeding had a curriculum of 60 periods of of which 48 were compulsory. 3 Periods should be spend on Dutch and 1 at a second language and in total 6 periods on languages. 3 periods should be spent in an discipline and 3 other periods in another discipline: a total of 16 should be spent in disciplines of a total of 42 in vocational training.

The minimum table is together with the specified requirements on teachers' qualifications and the students' examinations a set means for quality control in the traditional system. The minimum timetable has become complicated (braces) and meaningless (0 subjects) and due to that it has lost much of its significance in the course of years.

[73] In 1988 the 60 weekly periods were applied in a 2-year course with 30 weekly periods in 60% of the agricultural schools, and also in a 3-year course with respectively 24, 18 and 18 weekly periods in the subsequent course years.

Annex 4.1 The system of labour organisations, labour market and VET



The grey area depicts the iterative process of function development and development of individual competencies in the work situation.

Annex 5.1 Sources of educational objectives for the Q-SSAVE

The table below presents quantitative data about the available sources of educational objectives for the development of the content of the QS. The main sources have been ultimate tasks, study tasks and test tasks, target tasks and entry tasks (see Table 5.3); target tasks (school programs) were not explicitly used. Entry tasks are the differentiated entry requirements of the IAE and entry requirements of the HEA.

Sources: Divisions:	Ultimate tasks, from *Curr*iculum *conf*erences, *Oc*cupational *prof*iles, *Inf*ormation *mod*els and *Consultancy Groups / Sector commissions*	study tasks and test tasks	LNV policy papers
Plant breeding	*Curr. conf.*: 25-10-1989. *Occ. prof.*[a]: Flower growing, 1988; *Inf. mod.*: Pot plants, 1985; Arable farming, 1987; Fruit growing, 1987; *Consultancy Groups / Sector commissions: regular meetings*	study books test tasks[b]	Agricultural Structure Memorandum, LNV, 1990d; Multy-Year Crop Protection Plan, LNV, 1990; Biological Agriculture, LNV, 1992
Animal husbandry	*Curr. conf.*: 08-11-1989; *Occ. prof.* : Periphery animal husbandry, 1992; Primary production animal husbandry, 1992; *Inf. mod.*: Dairy, 1986; Pig breeding, 1988; Poultry farming, 1988; *Consultancy Groups / Sector commissions: regular meetings.*	study books test tasks	see: Plant breeding
Food technology	*Curr. conf.*: 22-11-1989; *Occ. prof.*: Production & Packaging, 1990; *Consultancy Groups / Sector commissions: regular meetings*	study books test tasks	
Floristry	*Curr. conf.*: 10-01-1990. *cc. prof.*: Garden centres, 1990; Flower arrangement & retail, 1991; *Consultancy Groups / Sector commissions: regular meetings*	study books test tasks[b]	
Green keeping	*Curr. conf.*: 08-11-1989. *Occ. prof.*: Roadman, 1989; Green amenities & land development, 1990; *Consultancy Groups / Sector commissions: regular meetings*	study books test tasks	Nature Policy Plan, LNV, 1990c
Environmental control	*Curr. conf.*: 11-10-1989; short curr.conf: 24-5-1993; *Consultancy Groups / Sector commissions: regular meetings*		see: Green room
Animal care, veterinary support	*Consultancy Groups / Sector commissions: regular meetings*	study books test tasks[b]	Decree (1991) and Provision (1994) on Paraveterinaries
Horse keeping	*Short Curr. conf: 1991*	study books test tasks[b]	

[a] From the Beroepen Analyse Agrarische Sector until 1992 and from the Centre Employment Market Research/STOAS Research from 1992 onward.

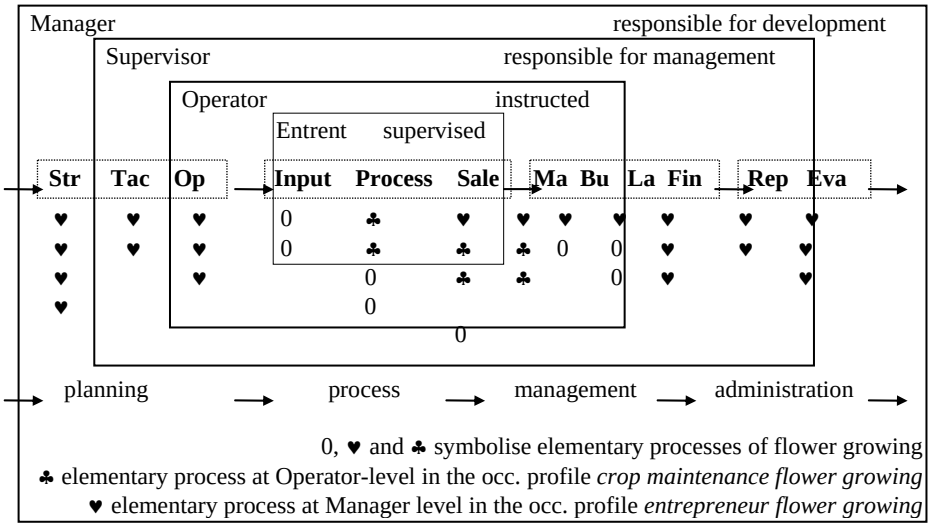
[b] Test tasks (examination programs) used to be specific for learning routes (and sometimes for schools.

Annex 5.2 The occupational profile in a process decomposition model

Occupational profiles describe the score of 'frequency and importance of elementary processes' in an occupation. A process decomposition diagram is a systems approach of all elementary processes in an enterprise.

In the diagram below the most important elements from the process decomposition are put in a flow chart. Str, Tac and Op are strategic, tactic and operational planning. Input, Process and Sale are a very global description of the production process. Ma, Bu, La and Fin are the work with machinery, buildings, labour and finance – the production factors. Rep and Eva are the work with reports and evaluations in the enterprise. Each of these elements consists of a number of elementary processes and under these processes hide action structures and single acts.

Thijssen & Geerligs (not published, 1989) mapped the scores of the 9 profiles for Flower growing (BAAS, 1988) in the process decomposition diagram for the greenhouse branch (Selman, van Rijssel & van der Maas, 1978). The diagram shows all the elementary processes (♥, 0 and ♣) and the elementary processes of two particular occupational profiles: crop maintenance flower growing (♣) and entrepreneur flower growing (♥).



The interesting observation in the 9 occupational profiles of BAAS is, that some entrepreneurs do the entrepreneurial work themselves and leave farm management and farm work to supervisors, operators and assistants. Other entrepreneurs take a large load of operational elementary processes, because of the size of the enterprise, because they like it or they believe that the core of the enterprise is the basic process, because of new technologies, or because the enterprise is fast growing. The second group of entrepreneurs hires extension officers and accountants to prepare decisions. The analysis shows that generalisations are not as convincing as they look like.

Annex 5.3 Curriculum conferences

The conferences that were held in the autumn and winter of 1989, had certain questions/statements in common and were specific for the branches at other points. The table lists some general data and quotes some controversial statements.

Conferences	General	Environ-ment	Plant breeding	Animal husban.	Food techn.	Green keeping	Floristry
Date	14 09 89	11 10 89	25 10 89	08 11 89	22 11 89	08 11 89	11 01 90
Reference	LNV, 1989h	LNV, 1989i	LNV, 1989j	LNV, 1989k	LNV, 1989l	LNV, 1989m	LNV, 1990h
Participants	84[2]	30	14	19	17	21	13
Number of statements	47	27	22[3]	23[3]	20[3]	67[3]	
Statements accepted	45	27	17	21	13	42	20[4]
The proposed divisions: mp[5]: Food technology mn[5]: Green & amenities	94/ - /6[6] 74/20/6						
proposed level names: mp: whole conference mn: Florestry	79/15/6 - /83/17				8/76/18[7]		
The proposal of a level 1			93/ 7/ -	74/21/5	23/18/59	71/19/10	23/69/8
Environmental policy integrated in school programs		50/40/10					
Environmental education in separate qualifications		50/23/27	43/57/ -	16/68/16	53/35/12		15/85/-
Ecology is the point of departure for all courses						100/ - / -	
Plant breeding needs specialists at level 4			29/64/7				
Plant breeding needs broad graduates at level 3			29/71/ -				
Alternative agriculture in separate units			13/73/6	32/68/ -			
Level 2 for both garden centres and flower retail							38/62/ -
Level 2 for either flower retail or flower arrangement							8/92/ -
One level 2 qualification: - industry - government - schools			83/17/ -	63/37/ - 67/33/ -	71/11/18 88/11/11	67/33/ - - /100/ - 33/67/ -	

[1]Exclusively the representatives form the Group of 30 & 4.
[2]84 participants, of which 30 from industry, 18 from government, 26 form schools and 10 others.
[3]One or two statements are detailed checklists on subjects and issues.
[4]In some conferences many different alternatives for differentiation of full qualifications were weighed.
[5]mp stands for: most positive rating by representatives, mn for: most negative rating by representatives.
[6]../../.. is the percentage rating positive/negative/indifferent of a (group within a) conference.
[7]Not alternative names acceptable for majorities are available.
[8]The data apply to full time education; the apprenticeship scheme should qualify branch specific.

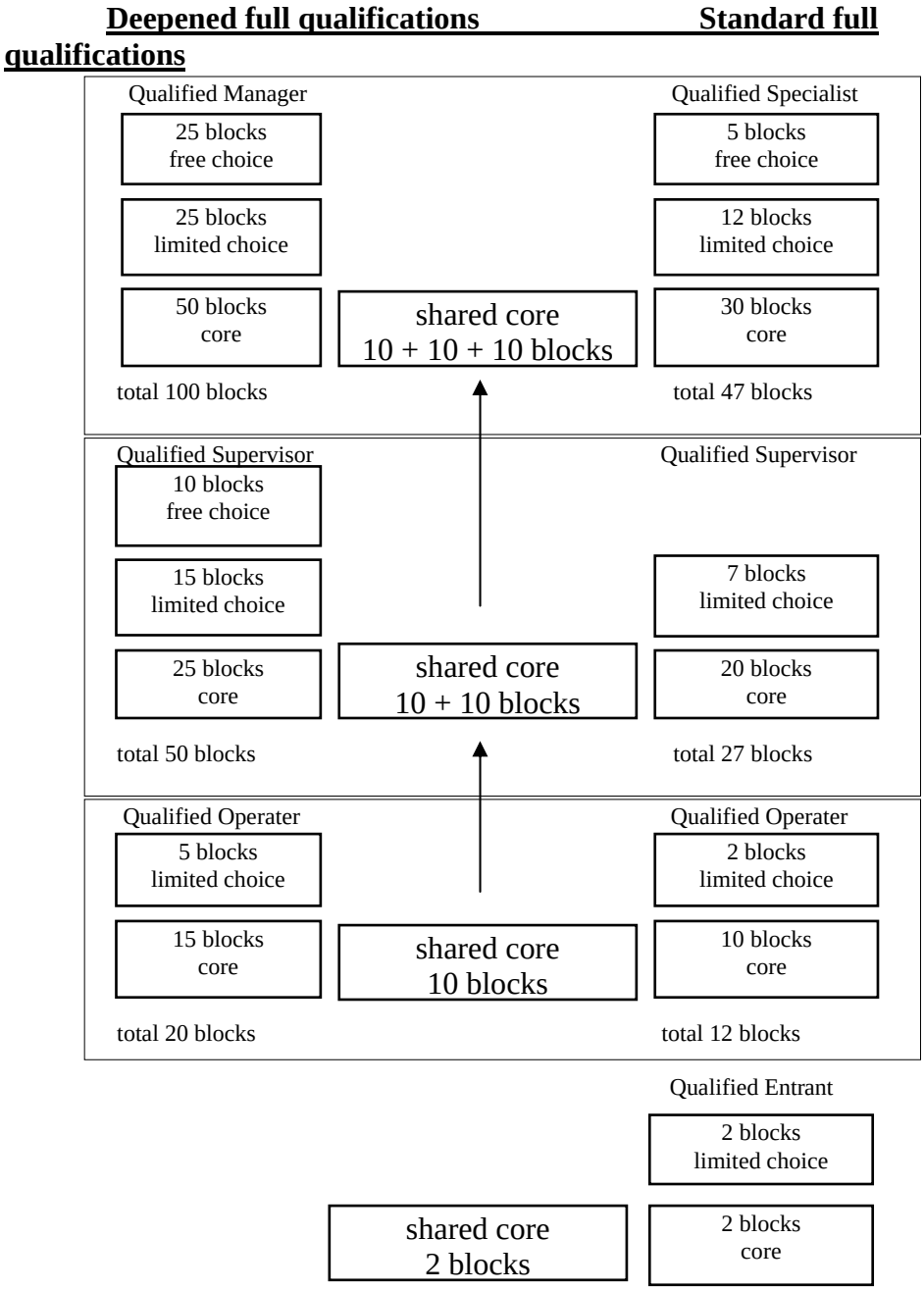
Annex 6.1 Taxonomy of full qualifications for SSAVE

In the QS the names of full qualifications are compositions of EU-levels and a (partition of a) SSAVE-division, these represent a level of mastery and a study object: i.e. the Supervisor Vegetable growing and the Manager Plant breeding & management.

Levels: **Divisions:**	**Entrent & Operator**	**Supervisor**	**Manager & Specialist**
Plant breeding (Pb)	Entrant Pb[a] & Operator Pb	Vegetable growing Flower growing Pot plant growing Arable farming Fruit growing Bulb growing Aboriculture Trade in plant products Contracting Mushroom growing	Pb & management Pb & trade Pb & environment[f] Contracting[a]
Animal husbandry (Ah)	Operator Ah	Dairy cattle Pig keeping Poultry keeping Quality care stock & meat[f]	Ah & management Ah & trade[f] Ah & environment[f] Quality care meat chain[f]
Food technology (Ft)	Entrant Ft[a] & Operator Ft	Foodtechnology Qualitycare meat processing[f]	Ft & product technology Ft & environment techn[f] Concentrate industry Ft & product control[f] Ft & quality care Quality care meat chain[f]
Floristry	Operator Floristry	Flower retailing Garden centre Trade in plant products	Floristry[f] Flower arrangement[a]
Green keeping (Gk)	Entrant Gk[a] & Operational Gk	Small green Large green Land water environment Garden centre	Green management Land water environmental management Forest and nature management
Animal care & veterinary support (Ac)	Operator Ac	Care of animals Animal Enterprise	Care of animals Animal Enterprise
Biological dynamic Agriculture (Ba)	Operator Ba	Ba[f]	Ba[f]
Horse keeping & Equestrian sport (HE)	Operator HE	Horse keeping (Hk) Hk & Es	Equestrian sport (Es) Hk & management
Environmental control			Environmental control

[a] only in apprenticeship scheme
[f] only in full time courses

Annex 6.2 Mutual blocks in the core of full qualifications



Annex 6.3 Educational profiles Review DC '96

Annex 6.3 is an extract from the Review DC '96 to illustrate in the division Floristry the composition of units for two levels and two pathways.

Operator Floristry in educational route		**Supervisor Flower retailing** in educational route		**Supervisor Flower retailing** in training route	
Core units with study load:					
		Core Operator	15	Core Operator	10
Caring basic work	2	Executing shaping	2	Executing shaping	2
Caring basic material	2	Executing flowerarrang.	5	Executing flowerarrang.	5
Making flower work	2	Running enterprise	3	Running enterprise	3
Caring sales	2			Execution floor exp.	
Caring shop	2				
Dedicating general abilities	5				
Sub total 15		**Sub total 25**		**Sub total 20**	
Limited choice units with study load:					
Choice - from this division - from support domain - from general domain of which at least 2 blocks - from support. domain - from general domain **Required sub total 5**		Choice - from this division - from support domain - from general domain of which at least 6 blocks - from this division - from support. domain of which at least 6 blocks - from general domain **Required sub total 15**		Choice - from this division - from support domain - from general domain of which at least 2 blocks - from support. domain - from general domain **Required sub total 7**	
Study load of free choice units:					
None Total blocks 20		**Required sub total 10** **Total blocks 50**		**Required sub total 0** **Total blocks 27**	

Annex 6.4 Level of units

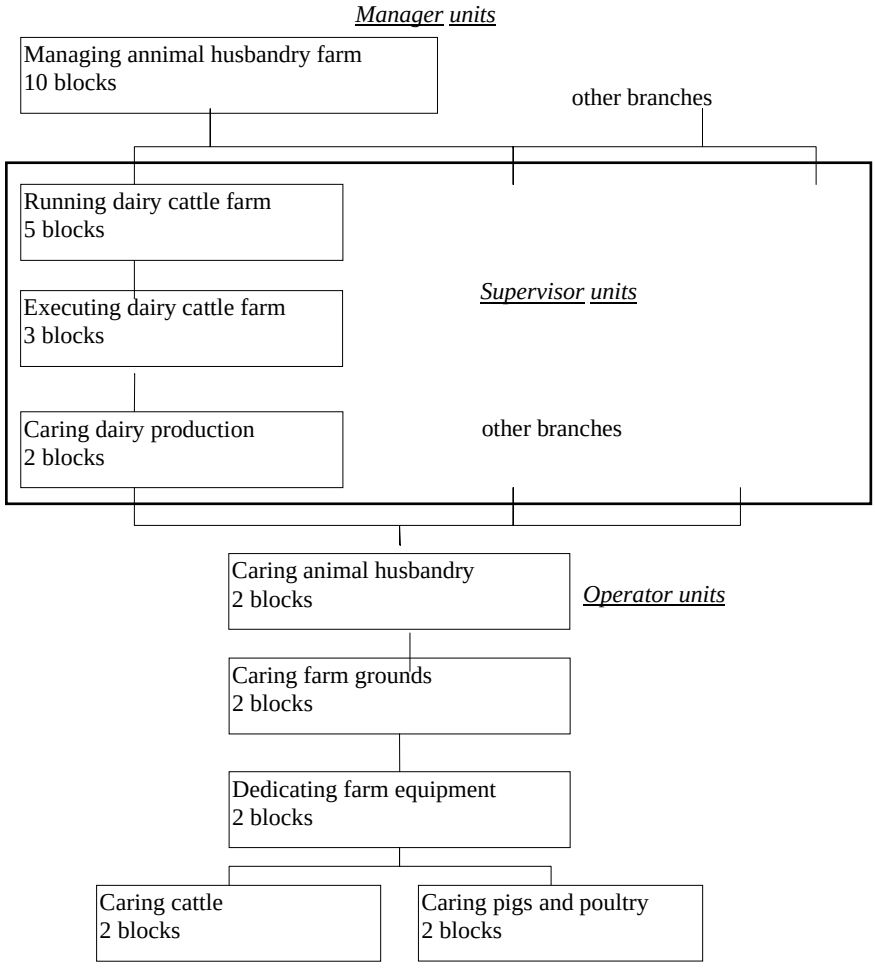
The verbs used to sequence units in the QS.

QS level	verbs in QS units	frequency in the core[a]
Entrant	assisting	3
Operator	using caring maintaining making operating dedicating executing supporting	1 17 5 1 1 7 1 1
Supervisor	caring maintaining executing steering preparing work processing running supporting	15 3 27 1 5 17 2
Manager and Specialist	caring	1
	executing	17
	preparing work	1
	processing	2
	running	4
	organising	1
	supporting	4
	guiding	16
	administrating	4
	managing	8

[a] Frequency of verbs from units in the core of 50 full qualifications from the core and specific divisions of the QS. Because of inclusiveness, some units repeat in the full qualifications at higher levels these units are counted at the lowest level where they are used. Here a particular unit may appear in several full qualifications, and then the frequency of the verb increases due to the use of a singe unit.

Annex 6.5 Sequence of occupational units in full qualifications

A string of 9 occupational units in the core of three levels of Animal husbandry (Review DC '96, page 17).



Annex 7.1 Core programs of QS and examination and total programs

In § 7.2.1 has been described that for each division s Animal husbandry, Food technology and Green room, potentially nine full qualifications are selected. Each square in a matriced below refers to the source documents of one full qualification. For each division is referred to:

- The examination programs until 1990-1992
  - Day release courses in SSAVE **(first column)**:
    - the S-SAVE courses have a 'opleidingsleerplan', and
    - the SSAVE-B and SSAVE-A courses have 'examination programs', which are sometimes:
      - Centrally Designed and Confirmed (CDC), or
      - Locally Designed and Centrally Confirmed (LDCC)
  - Apprenticeship scheme **(second column)**: the primary, secondary and tertiary courses have a 'totaalprogramma' and these totalprogram's have been designed by the national bodies for the apprenticeship scheme and are centrally confirmed by the Minister of LNV.
- The attainment targets in the Review DC '94 **(third column)**.

The reference to the examination, total, and core programs in Animal husbandry		
S-SSAVE program veehoudewrij Source: opleidingsleerplan 1989, page 55 and 66 Pages: 2 Weight: 50 With reference to profiel 1989 page 12-13	Primary program rundveehouderij Source: VOLLT totalprogram 1989, page 3-9 Pages: 7 Weight: 50	Operator: attainment targets veehouderij Source: Review DC '94: page 143-146 Pages: 4 Weight: 50
SSAVE-B program rundveehouderij Source: CDC rundvh 1989, II, 1-6 Pages: 6 Weight: 23 Source: CDC economy 1988 Pages: 5 Weight: 10 Source: CDC engineering 1989 Pages: 2 Weight: 10 Source: LDCC soil sc. Dokkum Pages: 2 Weight: 7	Secondary Program medewerker land en tuinbouw op middenkader niveau Source: VOLLT totalprogram 1989, page 3-7 Pages: 5 Weight: 50 with reference to: VOLLT totalprogram 1989, pages 8-12	Supervisor: attainment targets melkveehouderij Source: Review DC '94: page 147-150 Pages: 4 Weight: 50
SSAVE-A program rundveehouderij en weidebouw Source: CDC rundveehouderij en weidebouw 1989, page II, 1-6 Pages: 10 Weight: 23 Source: CDC economy 1988 Pages: 5 Weight: 10 Source: CDC engineering 1989 Pages: 4 Weight: 10 Source: LDCC soil sc. Hengelo Pages: 1 Weight: 7		Manager/Specialist: attainment targets veehouderij en management Source: Review DC '94: page 167-168 Pages: 2 Weight: 50

(Annex 7.1, second page)

The reference to the examination, total, and core programs in Food Technology		
	Primary program produktie Source: LSBL Primary opleiding B page 19-23; Pages: 4; Weight: 50	Operator: attainment targets levensmiddelentechnologie Source: Review DC '94: page 172-175; Pages: 4; Weight: 50
SSAVE-B program levensmid-delentechnologie Source: LDCC Ede; Pages: 6; Weight: 50 With reference to LDCC Delft and Alkmaar; Pages: 20	Secondary Program: alg. levensmiddelentechnologie Source: LSBL Voortgezette opleiding A, page 25-32; Pages: 8; Weight: 50	Supervisor: attainment targets levensmiddelentech-nologie Source: Review DC '94: page 177-179; Pages: 3; Weight: 50
SSAVE-A levensmiddelentechnologie Source: LDCC Ede; Pages: 7; Weight: 50 With references to LDCC Bolsward and Boxtel, 47 pages:		Manager/Specialist: attainment targets levensmidelentechnologie en produkttechnologie: Source: Review DC '94: page 187-188; Pages: 2; Weight: 50

The reference to the examination, total and core programs in Green Room		
S-SSAVE program groenverzorging Source: opleidingsleerplan en beschrijvend document 1989; Pages: 3; Weight: 50	Primary program opleiding tuinonderhoud Source: VOLLT: tot.opl. prog. 1989; Pages: 3; Weight: 50	Operator: attainment targets groene ruimte Source: Review DC '94: page 294-296; Pages: 3; Weight: 50
SSAVE-B program aanleg en onderhoud Source: similar to SSAVE-A; Pages: 7; Weight: 45 Source: similar to SSAVE-A; Pages: 1; Weight 5	Secondary Program: opleiding groenvoorziening/groenverzorging B Source: Eindtermen VOLLT, 1989; Pages: 59; Weight 42 Source: LSLL praktijktentamen onderdelen 1986; Pages: 2; Weight: 8	Supervisor: attain-ment targets klein groen Source: Review DC '94: page300-303; Pages: 4; Weight: 50
SSAVE-A program aanleg en onderhoud Source: LDCC A&O 't Vanck 1992; Pages: 7; Weight: 45 Source: LDCC soil science Rijswijk, 1989; Pages: 1; Weight: 5	Tertiary Program: opleiding opzichter uitvoerder groenvoorzieningen Source: OUGV, Frederiksoord, 1990, page 17-41 Pages: 25; Weight: 40 Source: VOLLT 8909, practical examination 1989, pages: 6 and 12; Pages 2; Weight 10	Manager/Specialist: attainment targets groenbeheer Source: Review DC '94: page 324-325 Pages: 2 Weight: 50

Annex 7.2 Comparison of five taxonomies

Five taxonomies were compared for the measurement of transfer potential.

- Six levels of behaviour for the cognitive domain: knowledge, comprehension, application, analysis, synthesis and evaluation, form the basis of the taxonomy of Bloom (1956). This part of the taxonomy is often used, but the levels overlap and for vocational education the cognitive approach is not broad enough. For the affective domain Bloom added later on five categories: receptivity, responsiveness, appreciation, organisation of values and incorporation of values.
- The taxonomy of Simpson (1967) is a psychomotor supplement to the taxonomy of Bloom for the cognitive and Bloom (or Krathwohl) for the affective domain. The levels in the psychomotor hierarchy are perception, readiness (mental, physical and emotional), guided response (imitation, and trial and error), mechanism, and complex open response.
  The hierarchy of Simpson suits performances, which require mainly physical action. The three domains together yield a complete taxonomy, but it is difficult to apply for the classification of qualifications.
- The taxonomy of De Block (1973) is a classification with three dimensions: a) behaviour in the learning process, b) objectified content and c) levels of transfer. The levels of behaviour are knowledge, comprehension, application, and integration. The levels of content are: facts, concepts, relations, structures, methods and attitudes. The levels of transfer are within a discipline, between disciplines and over disciplines.
  The taxonomy links to the learning process and id suitable for the design of educational programs. He is not directed to vocations. How to classify a qualification to a cognitive, affective or psychomotor domain?
- The taxonomy of Gagné and Briggs (1974) is based on five categories of capabilities: a) intellectual skills, b) cognitive strategies, c) verbal information, d) motor skills and e) attitudes. A sub-division is made of the category a): discrimination, concrete concepts, rules, defined concepts, and higher order rules. The taxonomy has been used frequently for assessments on educational objectives; the disadvantage is the stress on cognition and the relative limited attention for the affective and psychomotor domain.
- Olbrich & Pfeiffer (1980) designed a classification for vocational education. The taxonomy does not discriminate cognition, affections and psychomotor actions are fully integrated elements of a performance. Olbrich & Pfeiffer make a division in two domains: a) acting and b) sight.
  The taxonomy is relevant for the research question; the available source material however is vague and applies to an industrial context.

The taxonomy of Olbrich & Pfeiffer has been chosen.

Annex 7.3 Modified taxonomy of Olbrich and Pfeiffer (1980)

The elaborated taxonomy of Olbrich & Pfeiffer (1980) with the minimum requirements for SSAVE-levels based on the description of EU-levels (§ 7.2.3).

Required at level 2	**Required at level 3**	Required at level 4

Attainment levels for **enacting** (Olbrich and Pfeiffer)

Action Level	1. Execution	2. Control	3. Organisation	4. Communication	5. Responsibility
1. Observe single acts	1.1: observe signals and transform into a single action	1.2: collect relevant information about proceeding a task	1.3: work under supervision	1.4: *take instructions from a discussion on progress of work*	1.5: *act based on regulations*
2. Do subsequent acts	2.1: utilise more sources of information to do a task	2.2: integrate signals for the correction of a current task	2.3: *self-employed execution of work after instruction*	2.4: utilise support from colleges and superiors	2.5: support interventions with process data
3 Practice structures of acting	3.1: *approach and execute work in a logic way*	3.2: *apply quick and precise corrections at work*	3.3: **self-employed planning and preparation of work**	3.4: **discuss progress of work with colleges and superiors**	3.5: **share the responsibility for the work with colleges**
4 Integrate alternative action structures	4.1: **choose the setting and correction of work**	4.2: **plan the operational production process**	4.3: plan and assign tasks at tactical level	4.4: co-operate and communicate the organisation of the production process	4.5: bear the final responsibility for the production process

Attainment levels for **cognition** (Olbrich and Pfeiffer)

Action Level	1. Insight	2. Learning	3. Utilisation	4. Reflection	5. Disposition
5. Know elementary facts	5.1: reproduce concepts, facts classifications and criteria	5.2: learn under guidance	5.3: *utilise supplied learning aids*	5.4: *supply theoretical explanations for practical cases*	5.5: *have interest in practical application of theory*
6. Grasp sense, goal and coherence	6.1: *connect methods, rules and principles with practice*	6.2: *create an environment for own learning*	6.3: **look up information**	6.4: **connect information from different sources**	6.5: **receive motivation from process and content of learning**
7. Apply principles and patterns	7.1: **apply rules and principles in practice**	7.2: **utilise experiences for enhancement of own performance**	7.3: utilise own experience in the use of information sources	7.4: assign theoretical views to comparable cases	7.5: have the attitude to improve own learning
8. Value complex issues	8.1: see through patterns and methods	8.2: organise own learning	8.3: assess critically about alternative knowledge sources	8.4: choose theories and methods for screening problems	8.5: enjoy learning as a value of it own

Study subjects (process decomposition diagrams, analogue Annex 5.2)

1. Plans	2. Reports	3. Production factors: admin.	4. Production factors: concrete	5. Production technology	6. Context
• strategic • tactical • operational	• account • evaluation	• labour • finance	• land • machinery • buildings	• production technology	• objects beyond the occupation

Annex 7.4 Relative vales of scores of verbs at decision level 2

Levels of mastery are assessed with the taxonomy of Olbrich and Pfeiffer (Annex 7.3). Fifty attainment targets or comparable units are assessed in three divisions at three levels in three pathways. Verbs are assigned to one of four levels of performance (observe, do, practice, or integrate) or to one of four levels or cognition (know, grasp, apply, or value). The table lists the relative frequency distribution of the scores at the assessors' decision level 2 (see Figure 7.2). The assessors are students didactics/teacher trainees/our desk study. The n of assessors varies between 9 and 1.

Animal husbandery:

	n/n/n	observe	do	practice	integrate	know	grasp	apply	value
Operator	6/2/1	5/15/10	37/33/50	34/7/16	3/9/2	4/14/2	10/6/12	10/15/8	1/1/0
Supervisor	5/1/1	0/10/0	10/18/14	29/18/18	21/24/30	7/6/0	14/6/4	11/8/28	9/10/6
Manager	4/1/1	1/0/0	15/10/4	24/22/8	32/26/34	2/6/0	6/10/0	11/6/44	9/20/10
S-SSAVE	6/1/1	4/19/2	46/6/48	20/24/8	3/20/0	21/22/18	3/2/24	7/4/0	0/4/0
SSAVE-B	5/1/1	1/2/2	7/6/28	26/0/26	21/6/18	24/44/6	7/10/14	11/24/6	3/8/0
SSAVE-A	5/4/1	5/6/4	13/19/22	16/7/18	20/10/30	31/16/10	7/15/10	8/15/4	1/12/2
Prim-AS	5/1/1	1/8/0	18/24/32	28/10/14	3/6/2	41/22/50	6/10/2	2/12/0	2/8//0
Secon-AS	4/4/1	4/5/4	20/16/24	36/21/34	12/18/12	9/11/4	10/5/18	10/14/4	2/9/0
Terti-AS		-	-	-	-	-	-	-	-

Food Technology:

	n/n/n	observe	do	practice	integrate	know	grasp	apply	value
Operator	6/5/1	8/6/0	43/46/46	41/22/32	1/2/0	4/7/4	6/4/6	2/11/12	0/2/0
Supervisor	5/5/1	4/4/0	28/38/34	25/19/32	14/8/0	4/14/0	15/5/16	10/11/18	2/1/0
Manager	7/5/1	5/1/0	19/14/10	18/12/28	13/12/10	7/8/2	14/10/18	18/36/32	8/7/0
S-SSAVE		-	-	-	-	-	-	-	-
SSAVE-B	6/4/1	0/0/0	4/10/0	13/8/16	0/1/0	50/51/2	17/14/58	15/17/24	1/0/0
SSAVE-A	6/4/1	0/1/0	10/6/0	10/1/0	0/0/0	51/46/36	12/31/30	17/17/34	1/0/0
Prim-AS	7/5/1	2/0/38	16/8/12	7/1/0	2/0/0	51/52/46	10/20/4	12/19/0	1/0/0
Secon-AS	6/5/1	0/0/12	4/4/0	8/5/0	2/1/0	65/62/60	4/18/20	17/10/8	0/0/0
Terti-AS		-	-	-	-	-	-	-	-

Green Room:

	n/n/n	observe	do	practice	integrate	know	grasp	apply	value
Operator	4/3/1	2/1/0	42/56/66	38/5/10	1/4/0	8/9/10	11/17/6	2/6/8	1/1/0
Supervisor	5/3/1	4/1/0	32/14/28	37/31/28	10/15/20	3/4/0	10/6/0	6/23/24	2/6/0
Manager	5/3/1	0/0/0	3/0/8	44/5/28	33/29/34	1/0/0	11/4/4	2/25/26	6/37/0
S-SSAVE	6/3/1	1/4/18	40/43/50	14/1/4	5/3/0	30/22/8	5/17/8	6/9/12	1/2/0
SSAVE-B	9/3/1	0/0/4	29/23/30	16/10/22	2/0/0	35/41/28	8/5/14	12/21/2	0/0/0
SSAVE-A	9/3/1	0/0/4	29/21/30	16/13/22	2/2/0	35/37/28	8/3/14	12/21/2	0/3/0
Prim-AS	6/3/1	1/1/4	40/41/30	23/0/22	0/0/0	26/33/28	6/3/14	6/23/2	0/0/0
Secon AS	4/2/1	3/0/18	14/5/42	28/24/22	12/12/0	13/9/2	12/18/6	12/28/10	9/3/0
Terti AS	4/3/1	1/0/0	15/6/18	22/3/8	5/19/2	36/17/16	8/22/46	11/15/10	2/18/0

Annex 7.5 Relative frequency distribution of scores of study objects

Study objects are assessed with the distribution in the process decomposition (Annex 7.2). Fifty attainment targets or comparable units are assessed in three divisions at three levels in three pathways. Nouns are assigned to one of six areas of acting (planning, reporting, equipment, administration, production, or context). The table lists the relative frequency distribution of the scores at the assessors. The assessors are students didactics/teacher trainees/our desk study. The n of assessors varies between 9 and 1.

Animal husbandry:

	n/n/n	plans	reports	equipment	administ.	production	context
Operator	6/2/1	0/6/2	5/11/8	15/9/0	6/2/28	48/38/60	25/34/2
Supervisor	5/1/1	14/28/10	2/22/2	6/18/8	4/12/8	38/4/58	34/16/14
Manager	4/1/1	39/30/52	14/8/8	2/8/2	12/42/14	18/2/18	16/10/6
S-SSAVE	6/1/1	4/30/0	45/22/4	22/26/14	3/0/0	23/8/68	4/14/14
SSAVE-B	5/1/1	12/20/0	4/44/10	6/26/20	7/0/6	42/10/56	30/0/8
SSAVE-A	5/4/1	1826/8	4/11/6	5/15/20	2/5/8	47/28/50	23/14/8
Prim-AS	5/1/1	0/4/0	0/14/2	20/16/44	5/22/4	42/36/44	32/8/6
Secon-AS	4/4/1	14/31/8	9/16/14	6/13/24	6/10/6	32/24/48	34/5/0
Terti-AS		-	-	-	-	-	-

Food Technology:

	n/n/n	plans	reports	equipment	administ	production	context
Operator	6/5/1	0/2/0	1/4/2	7/6/24	2/1/8	65/70/64	25/17/2
Supervisor	5/5/1	6/46	1/5/2	2/4/2	4/2/10	62/66/68	26/19/12
Manager	7/5/1	15/3/0	1/4/0	3/5/6	3/2/0	40/74/92	36/13/2
S-SSAVE							
SSAVE-B	6/4/1	0/0/0	0/0/10	2/0/14	3/1/0	21/48/66	75/52/10
SSAVE-A	6/4/1	0/1/4	11/1/2	12/1/20	0/5/2	62/59/54	14/35/18
Prim-AS	7/5/1	2/0/0	17/2/8	8/020	2/3/0	59/44/60	12/52/12
Secon-AS	6/5/1	0/2/4	4/0/0	9/0/2	2/0/0	79/52/62	5/45/32
Terti-AS							

Green Room:

	n/n/n	plans	reports	equipment	administ.	production	context
Operator	4/3/1	2/0/0	39/4/4	39/5/22	1/1/4	8/47/56	11/43/14
Supervisor	5/3/1	3/11/8	31/9/16	40/1/8	11/4/0	3/41/62	11/35/6
Manager	5/3/1	0/15/24	3/20/20	48/1/4	36/17/12	1/0/34	12/47/6
S-SSAVE	6/3/1	3/0/0	39/0/8	15/0/8	5/0/0	32/51/60	6/49/24
SSAVE-B	9/3/1	1/3/0	30/1/4	18/0/8	3/1/0	40/49/88	9/47/0
SSAVE-A	9/3/1	1/3/0	30/1/4	18/0/8	3/1/0	40/51/88	9/44/0
Prim-AS	6/3/1	1/0/0	39/1/4	25/5/16	0/3/10	28/56/66	7/34/4
Secon-AS	4/2/1	3/21/6	16/7/10	35/2/0	15/10/0	16/22/78	15/39/6
Terti-AS	4/3/1	2/22/8	16/1/4	25/4/6	6/1/4	42/31/74	10/41/4

Annex 7.6 Scores of levels of mastery in the desk study

Scores in the desk study for 50 items in each of the programs mentioned in Annex 7.1 with the 40 fields (1.1 up to 8.5) of the taxonomy of Olbrich and Pfeiffer (Annex 7.3). Required fields of transferability for EU-level 2, 3 or 4 (§ 7.3.2).

O&P	**Animal husbandry**								**Food technology**						
	S-S	S-B	S-A	PA	SA	OP	Sup	Man	S-B	S-A	PA	SA	Op	Sup	Man
1.1		1			1	1					15	6			
1.2	1		2		1	2					4				
1.3						2									
1.4															
1.5															
2.1	1	5	2		4	2	1				2		1		1
2.2	4	3	3	7	2	4	2						7	4	1
2.3	17	6	5	9	2	15	1	1			4		12	9	
2.4					2	4	3						1	1	
2.5	2		1		2			1					2	3	3
3.1	1	2		2	1				8				1	1	
3.2		1	3	2	6	5							10	5	11
3.3	2	10	4	3	1	2	3	3					2	2	2
3.4	1		2		8		3						3	5	
3.5					1	1	3	1						3	1
4.1		3	7	1	2	1	6	4							4
4.2		3	4		1		1	1							1
4.3		3	4		3		6	7							
4.4							1	3							
4.5							1	2							
5.1	9	3	4	6	2				1		23	30			
5.2															
5.3															
5.4			1	19		1			10	18			2		1
5.5															
6.1		7	3	1	8	5	1		19	15	2	10	1	4	5
6.2	12														
6.3					1								1		
6.4			2			1	1						1	4	4
6.5															
7.1		3	2		2	4	13	19	12	17		4	6	9	13
7.2															
7.3								1							
7.4							1	2							3
7.5															
8.1			1				3	4							
8.2															
8.3															
8.4								1							
8.5															

O&P	Green room								
	S-S	S-B	S-A	PA	SA	TA	Op	Sup	Man
1.1	4	2	2	2	7				
1.2	3				2				
1.3	2								
1.4									
1.5									
2.1	1				6	1		1	
2.2					2		1	3	
2.3	24	15	15	28	9	8	28	6	1
2.4							1		
2.5					4		3	4	3
3.1	2	1	1		2		3	4	
3.2		2	2		1		1		1
3.3		8	8		8	4		4	6
3.4							1	5	6
3.5								1	1
4.1						1		10	5
4.2									2
4.3									4
4.4									4
4.5									2
5.1	4	14	14	2	1	8	2		
5.2									
5.3									
5.4				7			3		
5.5									
6.1	2	7	7		3	1	3		1
6.2									
6.3	1								
6.4	1			11		22			1
6.5									
7.1	3	1	1		5	5	4	8	9
7.2									
7.3	2								
7.4	1							4	4
7.5									
8.1									
8.2									
8.3									
8.4									
8.5									

Key for the table scored with the taxonomy of Olbrich and Pfeiffer

1.1 up to 4.5 are levels of mastery of performance
1.n up to 4.n about levels: observe, do, practice, and integrate
n.1 up to n.5 about fields: execution, control, organisation, communication and responsibility
5.1 up to 8.5 are levels of mastery of cognition
5.n up to 8.n about levels: know, grasp, apply, and value
n.1 up to n.5 about fields: insight, learning, utilisation, reflection, and disposition.
See Annex 7.2 for the taxonomy and Figure 7.2 for the algorithm to score.
The required fields of transferability are described in § 7.2.3.

Scores of study subjects

Scores in the desk study for 50 items in each of the programs mentioned in Annex 7.1 with the 6 fields (1 up to 6) of the taxonomy study subjects (Annex 7.3).
The required fields to cover broad subject areas are defined in § 7.2.3.

Animal husbandry									
	S-S	S-B	S-A	PA	SA		OP	Sup	Man
1	0	0	4	0	4		1	5	26
2	2	5	3	1	7		4	1	4
3	0	3	4	2	3		14	4	7
4	7	10	10	22	12		0	4	1
5	34	28	25	22	24		30	29	9
6	7	4	4	3	0		1	7	3

Food technology									
		S-B	S-A	PA	SA		Op	Sup	Man
1		0	2	0	2		0	3	0
2		5	1	4	0		1	1	0
3		0	1	0	0		4	5	0
4		7	10	10	1		12	1	3
5		33	27	30	31		32	34	46
6		5	9	6	16		1	6	1

Green room									
	S-S	S-B	S-A	PA	SA	TA	Op	Sup	Man
1	0	0	0	0	3	4	0	4	12
2	4	2	2	2	5	2	2	8	10
3	0	0	0	5	0	2	2	0	6
4	4	4	4	8	0	3	11	4	2
5	30	44	44	33	39	37	28	31	17
6	12	0	0	2	3	2	7	3	3

Key for the scores with the taxonomy for broad study subjects (Table 7.2).

1. plans
2. reports
3. production factors: administration
4. production factors: equipment
5. production technology
6. context