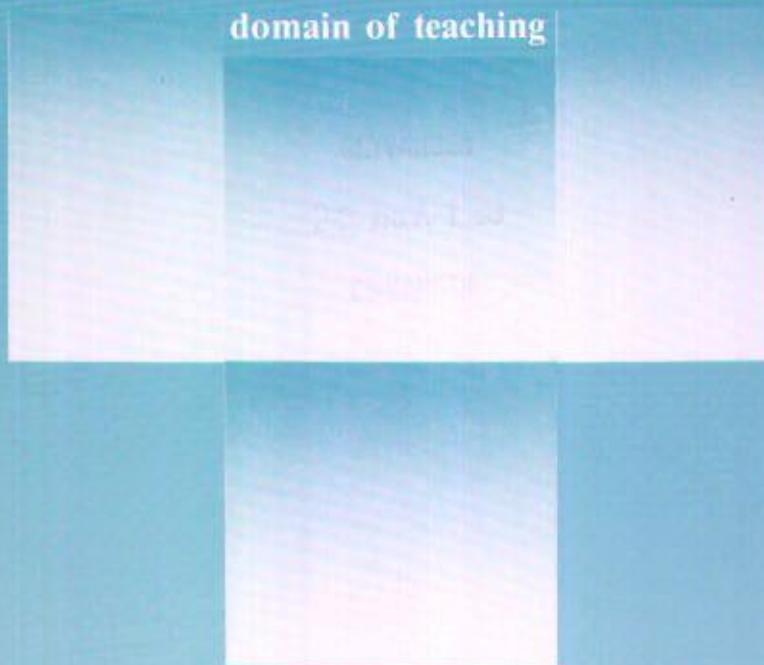


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TEACHING AS ACTING

A reconstructive study of an action theoretical approach to research and development in the domain of teaching



D. Beijaard



STELLINGEN

1. Onderzoek gericht op verandering van het onderwijsleerproces kan er niet aan voorbij, dat de hoofdbetrokkenen in genoemd proces uiteindelijk zelf hun situatie definiëren.
2. De opvatting dat het werk van instructeurs op agrarische praktijkscholen van overwegend repeterende aard zou zijn berust op een misverstand en is uit oogpunt van sociale waardering verwerpelijk.
3. Handelingstheorieën vormen een waardevol referentiekader voor het doordenken van problemen betreffende verbetering van arbeidsefficiëntie en beroepssatisfactie in het leraarschap.
4. Het gegeven, dat de veranderingselasticiteit van mensen grenzen kent, heeft consequenties voor de invoeringsstrategie van grootschalige veranderingen in het onderwijs, zoals de vorming van Agrarische Opleidingscentra en de invoering van een agrarisch educatieve kwalificatiestructuur.
5. Precisering van de begrippen 'gedrag' en 'handeling' in concreet empirisch onderzoek is uiteindelijk een methodologisch probleem.
6. Onvoldoende gelegenheid binnen de lerarenopleidingen voor het verwerven van bekwaamheid op het gebied van onderwijskundig onderzoek staat haaks op het streven naar professionaliteit van de docent, met name wat betreft diens inbreng in kleinschalig veranderingswerk.
7. Wat betreft de relevantie van onderwijswetenschap is onderzoek naar de vooronderstellingen en routines van de onderwijskundig onderzoeker minstens zo belangrijk als onderzoek naar die van de onderwijsgevende.
8. In het streven de sociale status van het leraarsberoep te verhogen dienen grondige analyses van de historische ontwikkelingen, de huidige maatschappelijke context en de dagelijkse werkelijkheid van dit beroep een belangrijke plaats in te nemen.
9. Vanuit onderwijsecologisch standpunt bezien lijdt het wetenschappelijk onderzoek naar functies, dysfuncties en nonfuncties van het gezin als basaal leermilieu aan bloedarmoede.

10. Vanwege de geografische positie van de Waddeneilanden, alsook door hun grootschalige toeristische bedrijvigheid, zijn leraren en met name leerlingen aldaar in meerdere opzichten benadeeld in vergelijking met collega's en leerlingen van de vaste wal.
11. In hun analyserende interpretatie van het onderwijzen als een complex handelingsfenomeen dienen onderzoekers wel te beseffen dat H₂O door dorstige of zwemmende mensen in de leefwereld gewoon als water wordt ervaren.
12. Spelverruwing, supportersverdwazing en het randgebeuren rondom het moderne voetbal in het algemeen stempelen deze tak van sport tot een negatieve illustratie van Huizinga's uitspraak, dat al de grondtrekken van het spel reeds in dat der dieren verwezenlijkt zijn.

Huizinga, J., *Homo Ludens. Proeve eener bepaling van het spel-element der cultuur*, Haarlem, 1958.

Stellingen behorend bij het proefschrift van D. Beijaard,
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Wageningen, 21 november 1990.

TEACHING AS ACTING

**A reconstructive study of an action theoretical
approach to research and development in the
domain of teaching**

CENTRALE LANDBOUWCATALOGUS



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TEACHING AS ACTING

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approach to research and development in the
domain of teaching**

ONDERWIJZEN ALS HANDELEN

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theoretische benadering van onderzoek en
ontwikkeling in het domein van het onderwijzen**

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To Doety and Frank

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PREFACE AND ACKNOWLEDGEMENTS

From 1984 until 1987 I undertook a research and development project concerning practical teaching in the eleven Dutch centres for practical agricultural education. This project was based on action theoretical principles and highlighted the practical output, i.e. a research-based in-service programme for the teachers involved.

The present study must be seen as a reconstruction of the project mentioned above. It deals with the theoretical side of this project. As such it attempts to contribute to recent discussions about scientific approaches to teaching.

For the greater part this study has been accomplished in my spare time. First of all, therefore, I want to express my gratitude to my wife Doety and our son Frank for their patience and willingness to let me do this task.

I gratefully acknowledge the helpful comments and ongoing support of Jaap van Bergeijk, who encouraged me to continue and complete the work. We often discussed aspects of teaching and teacher education concerning, for example, the problematic relationship between theory and practice and the connection between research and development in the domain of teaching. Aspects like these also underlied Jaap van Bergeijk's dissertation published in 1971. Obviously, the themes for study have remained the same; the perspectives from which to study these themes altered in the course of time.

Similarly I would like to thank John Peters for his constructive critique on the various versions of this publication. In my period as a student I had the opportunity to cooperate with him and, through that, I became interested in the domain of teaching in general and the application of action theoretical insights in research on teaching in particular. The present study can be seen in a direct line with this period.

I am also indebted to several other people. From a methodological point of view Lammert Postma has given me useful suggestions that fit with my theoretical stand and, consequently, contributed to a more coherent action theoretical view.

As a student Reinouw Kingma participated in the aforementioned project. She has executed a substantial part of this project on which the present study reflects. This, of course, also applies to all the instructors, students and other helpful people during the preparation and the execution of the project under consideration.

I acknowledge the rapid way in which Wout van den Bor, Fred Goffree and Herman Koningsveld have read the manuscript.

This publication has been written in English, because of the international concern of its object. Appreciation is extended to Juliet Millican for preventing me from making serious language mistakes and for reminding me of relevant rules in English.

Last but not least I acknowledge the patience of Ria Beerens who showed great responsibility and care for the typing and the layout of the manuscript. Through her this publication has finally become what it is.

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Wageningen, september 1990
Douwe Beijaard

GENERAL INTRODUCTION

For a long time now the gap between the theory and the practice of teaching has been of great concern to investigators, teacher educators and curriculum developers. They reflect on questions like: how educational reality can be understood and described adequately and, subsequently, how justice can be done to both theory and practice, how students can best be prepared for their future teaching profession and on which conditions innovations can be implemented most successfully. For those who are occupied with didactics, these and other questions are continually matters of concern and deliberation. Partly because of that, during the last two decades many educational developments have taken place. Several of these developments will be outlined below. Aspects of them are elaborated in detail in the theoretical part of this study.

Research approach

In research on teaching there is a growing dissatisfaction with the 'standard image of science' which until recently has predominated (Koningsveld, 1976). Partly as a result of the work of Dunkin and Biddle (1974) and Gage (1978) the process-product paradigm which is based on this image has, among other things, made way for the 'teacher thinking' paradigm (cf. Ben-Peretz et al., 1986). This paradigm emphasizes teachers' interpretations of their personal reality, i.e. cognitions or subjective theories, and has been inspired by developments in cognitive psychology, which - in line with the older tradition of the psychology of thought (Lowyck, 1988, 4) - views human (cognitive) functioning as the construction of a unique reality through gathering and processing complex information. There is also a noticeable tendency to approach teaching from an integrative theoretical perspective, which better enables an investigator to study the complexity of everyday teaching practice (cf. de Corte and Lowyck, 1983; Lowyck, 1984). The underlying starting-points of this approach are - often implicit, but in some studies emphatically explicit - of an action theoretical nature.

The impact of research results

From an innovation-theoretical perspective, studies within the process-product paradigm have led to disappointing results. According to Wardekker (1981a and 1981b) this is, among other things, due to its specific conception of practice

and the practice-directedness of research: practice is similar to a practice constructed by theory ('empirics') and innovation primarily consists of the application of scientifically gained theory. Research on teaching which reduces teaching to partial aspects and external observable behaviour, isolated from the context and underlying cognitive processes, minimalizes the teacher as being an active, autonomous person who possesses individual knowledge and uses this knowledge in a continually changing context (cf. Wardekker, 1986; Clandinin, 1986). On behalf of a successful implementation of innovation, it is a prerequisite to acknowledge teachers as professionals who possess knowledge unique to their profession. It is assumed that a better understanding of this knowledge leads to a more adequate implementation of innovations (Clandinin, 1986, 9). Considerations like these contributed to the rise of the 'teacher thinking' paradigm. However, they might have a more complete theoretical basis in an action theoretical point of view.

A methodological point of view

Partly in connection with the developments described above, there is a tendency to reconsider the concepts 'theory' and 'practice' as well as their relationship. Until recently, theory was associated with the investigator and practice with the teacher. This discrepancy has become less stringent due to the attempts of investigators to examine and present teachers' concerns in their own terms and in the way they carry out and present their work, for example by making use of accounts, portrayals, biographies, etc. (cf. Elbaz, 1988). In this context the distinction between fundamental or theory-oriented and applied or practice-oriented research is also important. It is increasingly acknowledged that this distinction does not view two kinds of research in opposition to one another and that, independent of this distinction, theory almost always plays a part in research (see e.g. Creemers and Hoeben, 1984). Other scientific contrasts which are increasingly seen as less opposed to one another are for example: nomology versus hermeneutics (van Strien, 1986), quantitative versus qualitative research (Hetebrij and Wardekker, 1986) and prescription versus description (Lowyck, 1988). Debates about these methodological issues may not be reduced to debates inherent in scientific traditions alone. Which aspects of these distinctions are emphasized in a research project depends largely on the research problem and, beyond scientific traditions, an investigator's vision on man and the goal of science (see also Wardekker, 1986). In reality most investigators, who like teachers are social actors and part of the same social reality, share much in common with regard to these visions. Along with the acquisition of knowledge they are, like teachers, occupied with both education and educational improvement. Basic notions like these underlie an action theoretical approach to teaching.

Teaching and teacher education

Everyone who followed any teacher education up until the late seventies, will undoubtedly remember that the emphasis was often placed on the consumption of theory and the learning of teaching skills. Generally, teacher educators had little or no eye for the psycho-social complexity students were really confronted with. Influenced by studies like those of Lortie (1975) and Zeichner (1981/1982), this situation has undergone a change. At this moment teacher education to a large extent makes an appeal to the research skills and the reflecting abilities of students (cf. e.g. Korthagen, 1983; Vedder, 1984). Joyce and Weil (1980; 1984) also contributed to 'new perspectives' on teacher education. Their description of a number of teaching and learning strategies inspired the reconsideration of conceptions about flexible teaching (see also Lowyck, 1986b). Gradually preservice and in-service didactics began to develop which was strongly student-centred and increasingly abandoned the concept of training based on behaviouristic foundations (cf. e.g. Peters, 1985; Floden, 1985). Teachers who are trained themselves will also train their students. It may be assumed that this vicious circle threatens the quality of the teaching and learning situation and, in the long-term, influences one's (work) satisfaction negatively. Strictly speaking, a training conception does not stimulate one to strive for other goals like happiness and social adaptation in any well-considered way. Yet goals like these are very urgent in the complex society of the present day. An education concept, preferably based on action theoretical principles, can try to meet these goals and help to avoid the negative aspects inherent in a training concept. In connection with this it should be noticed that the societal appreciation for the teacher profession has decreased, while, on the other hand, increasingly higher demands are put upon a teacher's competency. The improvement of teachers' expertise is necessary in order to meet new, sometimes contradictory demands and problems. There are new demands, such as the contribution of education to human welfare, the pace of technological developments and the realization of educational innovations. Problems are connected with fusions between schools, the growing commercialization of education in separate institutions, the increase of industrial education, retrenchment policy, etc. As a result of these problems the relative autonomy of education and teachers' degrees of freedom are increasingly put under pressure (cf. Beebe, 1987; van der Dussen, 1987). In connection with one another, action theoretical concepts like subjectivity, intentionality, reflexivity and context are useful concepts to understand and describe teachers' professional tasks.

Changes in the perception of teaching

In addition to the preceding developments, it is also necessary to describe developments concerning the perception of teaching in general. These perceptions have a bearing upon economic, social and professional imperatives (cf.

Hooghoff and van der Dussen, 1988). Some of these imperatives might be a challenge on the one hand but they also imply a dangerous alternative on the other, particularly when a general consensus about these imperatives is lacking. Some developments in the perception of teaching have a bearing upon the following features (cf. e.g. Gevers, 1988; Lourié, 1988):

- education primarily has to serve students, hence teachers are there for them too; implicitly this conception argues for a (greater) autonomy of education versus an adaptation to societal demands connected with future, particularly technological developments; concerning these developments many uncertainties exist;
- a tendency is noticeable towards an inductive way of learning-to-teach, while, on the other hand, others perceive a knowledge basis as an important prerequisite for functioning adequately as a teacher;
- teaching is increasingly conceived as a profession in order to legitimate a standardization of this profession in terms of what a teacher should know and be able to do, while others - in connection with the preceding tendency - associate teaching competency with learning to be yourself and, on that basis, to be another, i.e. student;
- the teacher is an outstanding example of a person who permanently has to educate himself, respectively a social actor who should share his experiences with those of others;
- the teacher is no longer the central person who possesses the knowledge and from whom (alone) this knowledge can be learned; his role in education is changing with the emphasis on qualities like guiding, counselling, advising, etc; also books and written materials are losing their central role.

These and other developments, of which some have already been mentioned, necessitate a reconsideration of teacher education and of perspectives on teaching in general. It is assumed that through a broad theoretical perspective, i.e. an action theoretical perspective, several of these contextual features can be made visible. This is inherent in the concept of action. An analysis of this concept shows that actions are related to and limited by the context. Along with other features, cultural-historical ones are part of this context and of a spatiotemporal nature. In the study of teacher actions, therefore, the cultures of teaching (cf. Feiman-Nemser and Floden, 1986) as well as their genesis can - in principle - be explored. It is assumed that teachers do or do not incorporate new developments in their own teaching cultures.

This study links up with the five developments or changes outlined above. It attempts to realize a double objective, namely:

- 1) showing how a research and development project was executed that has been based on action theoretical principles; this project lasted from August 1984 until August 1987 concerning teaching in the eleven Dutch training centres for practical agricultural education;
- 2) realizing a theoretical surplus value of the above-mentioned project in order to contribute to an action theoretical approach to research and

development in the domain of teaching; as such earlier used concepts and starting-points will be refined, adjusted, extended or relieved at paradigmatic level.

For the purpose of the latter, reconstruction or theoretical reflection is used as 'method'.

This study consists of three parts. The *first part* deals with the problem, the objectives and the theoretical background of the study and contains two chapters. In chapter 1 an account is given of the reason for this study. As was stated above, a double objective is aimed at. Essential is that through reconstruction insight can be gained into the extent to which an action theoretical approach to research and development in the domain of teaching can succeed in bridging the gap between theory and practice. This reconstruction takes place at paradigmatic level; empirical findings and experiences will be used as supporting materials.

Object of reconstruction are important starting-points and key-concepts that underlied the previously executed project. An explicit description of these starting-points and key-concepts takes place in chapter 2, preceded by some action theoretical notions of a more general nature. At paradigmatic level - and related to the domain of teaching - these starting-points and key-concepts refer to theoretical as well as methodological and methodical aspects. Relevant questions for reconstruction are formulated at the end of chapter 2. In order to answer these questions an outline is given of concrete aspects on which the reconstruction focuses in particular.

The *second part* of this study encompasses four chapters and deals with considerations concerning the designing and the execution of the project under consideration. Chapter 3 emphasizes interpretation theories used to determine what had to be investigated and how this could be completed in conformity with the action theoretical starting-points. It is explained that the objective of the project under consideration fits into perspectives that focus on bridging the gap between didactical theory and practice.

Methodological and methodical considerations underlying this project as well as research results are presented in chapter 4. In the project the emphasis was placed on research on practical teaching and student perceptions. The research on student perceptions should be seen as an important supply to the former which focused on understanding the complexity of teaching in line with developments in research on teaching.

In addition to descriptions of research results, interpretations of instructor reflections are described in chapter 5. Recommendations based on these interpretations on behalf of a didactical in-service programme, the practical output of the project under consideration, as well characteristics of this programme are also presented. Chapter 5 ends with an additional analysis of instructor reflections. Among other things, attention will be paid to some problems and perspectives concerning the interpretation of reflections in general.

In view of objectivity, reliability and validity, chapter 6 deals with a critical reflection on methodological and methodical aspects involved in the

three preceding chapters from an action theoretical point of view. These aspects are emphatically located within the hermeneutic or interpretative scientific tradition.

The *third part* of this study consists of chapter 7. In connection with the problem of this study (chapter 1), this chapter tries to answer the reconstruction questions, not in the sense of right or wrong but in an interpretative-evaluative sense. A description will be given of the suitability of the application of action theory in the domain of teaching, of the relationship between research and development and of methodological issues concerning understanding through interpretation. In addition, perspectives will be offered in view of an improved paradigm concerning research and development in the domain of teaching. These perspectives can be seen as alternatives to encountered problems during the reconstructive activity.

Because of the double objective of this study and for the sake of clarity, I see it as important to provide the reader with the main line of approach of this study. To summarize, this can be formulated as follows:

- action theory was consulted for the designing and the execution of a research and development project concerning practical teaching in agriculture;
- this theory possesses implications for the way one sees the relationship between theory and practice;
- on the basis of action theory it appeared to be possible to formulate starting-points and key-concepts which were relevant for the designing and the execution of an empirical research and development project;
- these starting-points and key-concepts will be reflected on in the present study;
- for this purpose relevant aspects of the design, the execution and the results of the project under consideration are used as illustration materials;
- in this way I want to contribute to an (improved) action theoretical paradigm concerning research and development in the domain of teaching.

Finally, this study can contribute to recent discussions about scientific approaches to teaching in general.

PART I

PROBLEM, OBJECTIVE AND THEORETICAL BACKGROUND

1 RECONSTRUCTION OF A PREVIOUSLY EXECUTED PROJECT

From August 1984 until August 1987 I executed a research and development project with regard to practical teaching in agriculture. This project set out to formulate a research-based didactical in-service programme. A prerequisite for the development of such a programme was, that the investigator tried to achieve a broad understanding of the research object. For this purpose I was inspired by action theory in particular and developments at paradigmatic level regarding research on teaching in general.

In the project mentioned above, the emphasis was primarily on a practical output. The present study, therefore, highlights the theoretical side of that project. It should be seen as a reconstruction of the previously executed project in order to contribute to an action theoretical approach to teaching at paradigmatic level. Section 1.1 briefly outlines some backgrounds concerning the development of this approach in the domain of teaching. Attention will also be paid to the central problem of this study, which encompasses the relationship between theory and practice from an action theoretical point of view. Section 1.2 gives an overview of the project under consideration by explaining the different project phases. It is assumed that this section contains sufficient background information for the reader to understand the object of this reconstructive study. Both the objective of this study and reconstruction (as a method) are explained in section 1.3. In section 1.4 it is argued that a paradigm emphatically needs to be connected with other levels of science, including a vision on man and on the goal of science. Furthermore, this section clearly explains the core of the reconstructive activity, namely the relationship between action theoretical starting-points on the one hand and the domain of teaching on the other.

1.1 Background and problem

Since 1980 I was involved in several projects regarding research on teaching. In efforts to understand and describe everyday teaching, attention was first paid to the planning of lessons (Peters and Beijaard, 1982a). The first research project was located within the 'teacher thinking paradigm', in which the teacher as a subjective theorist is the leading metaphor for the subject under study (cf. Ben-Peretz et al., 1986).

Based on the critical reflection of underlying theoretical and methodological assumptions (Peters and Beijaard, 1982b) a second research project was started, though within the same paradigm. This project emphasized the planning

and execution of lessons, including similarities and discrepancies between both lesson phases (Peters and Beijaard, 1983). Increasingly teaching was seen as a complex activity. In a third research project, therefore, teaching was defined in terms of an interplay between intentionality and complexity, embedded in a historical and societal context (Peters, Postma et al., 1983). In this study the teacher's reflections were seen as a part of his didactical professionalism, a function of his intentionality, and a source of information for the investigator (cf. Peters, 1984a and 1984b).

To summarize, the brief outline above may be represented as an investigator's learning process characterized by replication and continuity. In a certain way this process can be compared with, as Lakatos (1970) calls it, being at work in the context of a research programme (1). In this research programme - to which many other investigators also contribute(d) - an important progress was made in the development of theory. With reference to the three research projects I participated in, this progress resulted in a view on teaching as acting, though primarily inspired by theoretical elements based on research on 'teacher thinking'. Studying teaching as acting implies the incorporation of the teacher thinking paradigm in a broader, more complete view, which does not reduce teaching to merely cognitive aspects: besides teachers' thoughts and the conative aspects involved, observable behaviour and the context also play a part (cf. Lowyck, 1984; Clark, 1986). Such an integrated (action theoretical) view on teaching can enable one to portray teaching more accurately in all its irreducible aspects.

The research and development project under consideration here, must be understood in relationship to the developments described above. The project, which lasted from August 1984 until August 1987, was based on concepts of an action theoretical nature regarding the teaching of skills by instructors in the eleven Dutch training centres for practical agricultural education. The objective of this project was formulated as follows (Beijaard, 1984a):

- 1) making a systematic inventory of the (individual) didactical knowledge the instructors possess;
- 2) developing a didactical in-service programme for instructors.

This objective found its origin in the next problem: generally, the instructors are highly qualified and experienced in their fields of specialization, but most of them did not receive any adequate teacher training (Beijaard, 1984a) (2).

The project's primary task was to contribute to the improvement of the instructors' teaching capabilities, though an attempt was also made to contribute to the development of theory. However, many theoretical aspects remained implicit because of a lack of time and the primary need for a practical result.

This present study, now, should be seen as an illustration of and a theoretical reflection on the project mentioned above; special emphasis will be placed on the approach to teaching and the arrangement of the total project. With

reference to these aspects, the central problem of this study is twofold and can be formulated as follows:

- to what extent did I, with the help of an action theoretical approach to research and development, succeed in *bridging the gap between theory and practice*?
- which results of, and experiences with research and development may lead to *adjustments or refinements of an action theoretical paradigm* concerning research and development in the domain of teaching?

This twofold problem will be translated into more concrete questions and aspects for reconstruction at the end of chapter 2 (section 2.3).

The problem of this study implies that the antithesis between pure nomothetical and pure idiographic scientific activities is relativized; in a certain way the application of action theory implies a reconciliation of both types of scientific activities (cf. also van Strien, 1986). Traditionally, however, nomothetical as well as idiographic scientific activities are related to two traditions in social sciences, namely the empiric-analytical and the interpretative approach. Both traditions define 'theory' and 'practice' as different from one another. Moreover, in both the relationship between 'theory' and 'practice' is a problematic one (cf. Wardekker, 1986). It can be concluded - with regard to developments in educational thinking during the past decade (Miedema, 1986) - that scientific knowledge has, in principle, no absolute priority over everyday knowledge: both kinds of knowledge are considered to be theories and both should be related to one another because of the reflexivity of the 'everyday subject'. As a consequence, Miedema (1986, 15) states that practice must make use of theory and in turn to correct this theory.

Certain developments, during the last fifteen years particularly, have led to (renewed) social-scientific attempts to take into account what really matters in practice. An action theoretical approach to teaching, for example, can be seen as such an attempt to meet the reality of practice.

1.2 Overview of the project under consideration

In The Netherlands there are eleven practical training centres for agricultural education. These centres were founded around 1960 and may be characterized now as complex institutes with different goals and tasks; each institute represents one or more agricultural disciplines. They provide practical educational programmes for students from regular lower, secondary and higher agricultural schools, and students from Wageningen Agricultural University and the Veterinary Faculty of Utrecht State University. Furthermore, they offer training programmes to teachers, employees from trade and industry and students from foreign (mostly Third World) countries. Some training centres also support or participate in development projects in the field of agricultural education.

The establishment of practical training centres has been based on a well-intentioned policy. Concentrating sophisticated and up-to-date equipment in the practical training centres allows the regular agricultural schools to meet practical training only with a standard set. As a consequence of this policy, the training centres do substantially contribute to agricultural innovations. Moreover, it guarantees that relatively expensive equipment is indeed frequently made use of as learning materials.

The training centres train students in executing practical agricultural activities. They are instructed by experts according to the basic principle 'learning by doing'. In general instructors, who have different tasks and functions in the internal and external organization of the centres, are - as was stated before - highly qualified with substantial experience in their fields. Most of them, however, did not receive adequate teacher training. Until recently they could only develop this side of their profession by observing lessons and talking with colleagues during their first months as instructors at the training centres. For this reason, a didactical in-service programme, the practical output of the project under consideration, was in great demand (Beijaard, 1984a and 1985). Figure 1.1 shows that the project had several phases with the emphasis on research. An explanation will be given below.

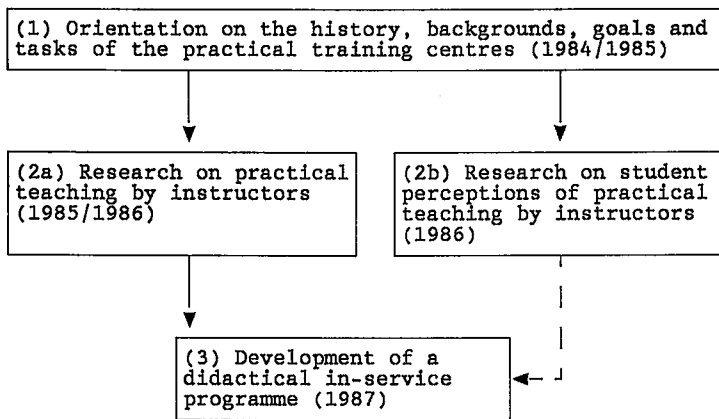


Figure 1.1 Activities and their relations of the project under consideration (see also Beijaard, 1987b).

Phase 1: Orientation

The project was started with a visit to the eleven practical training centres. These visits resulted in qualitative descriptions of each centre, based on conversations with key-persons with the aid of a checklist, the reading of (internal) documents and rough observations (Beijaard, 1984b). A more integral description resulted in a first project report (Beijaard, 1985). This report

describes the centres' historical features, the essence of practical agricultural education, aspects of the teaching and learning situation, how this situation is evaluated, the centres' organizational structure related to the educational policy of the government, in-service training facilities and activities. The report ends with a summary of the problems the centres are confronted with and emphasizes some future perspectives. In general, this orientation study was necessary, because the training centres were not well known by the investigator and never had been the object of educational research before (3). Moreover, it was assumed that such a study helps with the construction of adequate research methods (particularly for project phase 2a).

Phase 2a: Research on practical teaching by instructors

By using a combined set of methods and techniques (open structured interview, observation, retrospective interview, logbook keeping), research was carried out on what instructors think and do regarding their practical teaching. Attention was also paid to contextual influences (task environment). This research, which lasted almost two years, was based on action theoretical notions. The collection of ecologically valid data was of a great importance. The participants (n = 29), who had to be experienced instructors, were selected at random; they represented all the practical training centres and the types of courses these centres offer. The analysis and interpretation of the data resulted in a second project report (Beijaard, 1986). This report consists of a 'theoretical' and a 'practical' part. The theoretical part describes action theoretical considerations, didactical theory and methodological perspectives. The practical part contains a description of the influences of the instructors' task environment on practical teaching, aspects concerning the process and structure of practical teaching, and the quality of the instructors' reflections on these aspects. As a result of this integrated analysis and interpretation, several recommendations could be given for the development of a didactical in-service programme.

Phase 2b: Research on students' perceptions of practical teaching

Conversely it was also necessary to know how students perceived practical teaching to find out what congruences and discrepancies existed between instructors' reflections and students' perceptions. Besides, it was supposed that this research phase could complete the 'picture' of the object under study. This side of the project, being of a quantitative nature, lasted almost a year. After a preliminary study of the problem, students of regular secondary and higher agricultural schools (n = 381), the most important target-groups of the practical training centres, were asked to fill in a structured questionnaire (with a scale ranging from 1 to 5) at the end of their one-week-visit to a centre. The questionnaire consisted of items concerning practical

lessons attended, learning effects, the organization of the visit as a whole (conditions, the organization of the programme, the stay in the boardinghouse, etc.), and the connection between the students' 'own' schools and the practical training centres (preparation for a visit, the involvement of students in making up the programme, etc.). The findings, described per item and cluster of items, resulted in a third project report (Klingma, 1986; 1988).

Phase 3: Development of a didactical in-service programme

The recommendations that resulted from phase 2a, strongly determined the objective, content and total arrangement of the in-service programme. Other sources which were consulted are:

- literature about the preservice and in-service training of teachers, including adult education;
- results of a comparative study of practical teaching by instructors in comparable institutions in The Netherlands, the United Kingdom and Germany (4);
- teacher training experiences of our Department and personal experiences as a teacher trainer.

Based on these sources a handbook was developed (Beijaard, 1987a). It describes aspects of micro-teaching, the Dutch agricultural education system, the instructors' task environment, conditions for teaching and learning and the teaching process itself (planning and execution of lessons as well as reflection on both). The theory involved and the instructors' own educational practice are linked by many exercises. In addition, parts of the theory involved consist of research results (phase 2a and 2b). The first time the handbook was made use of, was during the in-service training course which started in September 1987. Based on experiences of trainers and trainees an updating of the handbook took place in 1988. It has been estimated that per year about 75 handbooks are needed to meet the in-service needs of the practical training centres, which implies, among other things, that these centres are confronted with a significant number of personnel fluctuations.

1.3 Objective and method

In The Netherlands the study of education faces several internal problems, which are inherent in its objective (cf. Vos and Lagerweij, 1987). One of these problems is connected with the discrepancy between fundamental (theory-oriented) and applied (practice-oriented) research. Their coherence seems to be a difficult one. As a consequence of this discrepancy, the relationship between theory development and the contribution to the solution of practical problems in education is also problematic (Creemers and Hoeben, 1984; Vos and Lagerweij, 1987). Wardekker (1986) states that these two sides of the same problem are based on a false distinction between 'theory' and 'practice' as a

result of internal problems of scientific or research traditions. Both science and education are societal institutions, they originate from the same societal tradition and partly have the same aim, namely augmenting the rationality of man. For a more adequate image of man and a description of 'theory' and 'practice', educational investigators should incorporate or consider the question of man's freedom and determination in their scientific discussions and research programmes. By doing so, a different light is thrown on the problem mentioned above.

In the project under consideration, expression was given to the relationship between theory and practice on the basis of action theoretical notions; these notions imply a certain view on man and have consequences for what should be understood by 'theory' and 'practice'. Neither are absolute entities, but presuppose each other and originate from the same basis (Wardekker, 1986).

The application of action theory has consequences for the designing and the execution of concrete research. For the research and development project under consideration these consequences led to several starting-points which will be described in chapter 2. By means of *reconstruction*, which emphasizes the phases 2a and 3 of this project (see figure 1.1), these starting-points will be tested on their tenability. By doing so, this study attempts - as was stated before - to contribute to an action theoretical paradigm with regard to research and development in the domain of teaching. This attempt will be supported by concrete aspects of the design of the project under consideration, the execution of the project and the project results.

Reconstruction (as a method) is generally described in terms of levels. In this context, for example, Korthals (1987) makes a distinction between horizontal and vertical reconstruction. Horizontal reconstruction sees theories and their development as a result of conceptual analysis. Such an analysis cannot proceed without reference to a concrete object or domain. In the present study, for example, theory development is not something apart, but belongs to a domain (i.e. teaching). In that way it is avoided that conceptual analysis becomes a merely speculative concern. With 'vertical reconstruction' Korthals refers to the development within a domain as the object of reconstruction (for example changed perceptions of the way teachers should be educated). Both kinds of reconstruction lead to the development of theory, though from different perspectives.

Parts of Korthals' (1987) view on reconstruction are derived from Habermas' (1984) 'theory of communicative action'. Habermas writes about reconstruction in terms of a function of the argumentation theory; within this theoretical context systematic questioning plays an important part (5). In connection with Korthals' notion of horizontal reconstruction, I prefer to interpret reconstruction as an activity in terms of conducting theoretical research.

Hetebrij (1983), for example, describes theoretical research as a form of research along with empirical and methodological research. By means of reconstruction, experiences with and results of the research and development project under consideration will be confronted with the theoretical and

methodological starting-points that underlied this project and which are described in chapter 2. Theoretical research, therefore, may also be seen as a form of theoretical reflection or as an *interpretative evaluation* which, among other things, results in new theoretical insights or modifications of existing theory. As such, it is assumed that interpretative evaluation offers fruitful suggestions for further research and development (de Groot, 1975, 33). However, this is not a specific characteristic for this study, but a characteristic of evaluation in general: the work goes on, the spiral keeps on turning.

According to Hetebrij (1983, 48) reconstruction consists of prescriptive and descriptive elements; he also writes that reconstruction can be considered as construction in the sense of correction. The existence of prescriptive and descriptive elements, for example, is demonstrated in the study of van Oers (1987), who did theoretical research on didactical implications of the action psychological concept of 'activity' related to concept-building by students. Prescriptive elements are involved as a consequence of 'van Oers' vision of man'. Descriptive elements are involved when arguments are given regarding the presentation of the study, the starting-points, the choice and use of supporting literature, the decisions made and relations laid. Aspects like these are not of an absolute nature, but accessible for discussion (van Oers, 1987, 369).

To summarize, I formally prefer to define reconstruction (as a method) in terms of a theoretical activity of the investigator. With regard to a certain domain, this activity takes place systematically and consists of prescriptive and descriptive elements. Like any scientific or research method, reconstruction also has its limitations (cf. Korthals, 1986). Firstly, a scientist's or investigator's ability to gain objectivity is bound: like a 'layman', reality appears to him in an intuitive way. For this reason, working systematically and being explicit about choices made are of paramount importance. Secondly, the discovery of intersubjective ('universal') processes and structures of reality depends - in the last instance - on objective developments in the reality, not on (the attitude of) the scientist or investigator.

1.4 Levels of reconstruction

Hetebrij (1983) identifies three methodologies, which are interrelated and, therefore, called levels of methodology. The middle-level involves the methodology of research programmes. At this level Hetebrij consulted Lakatos (1970), though replaced the latter's 'hard core' by the concept of 'theoretical orientation' which contains the central assumptions and concepts of a research programme. A theoretical orientation consists of a core part, which focuses on the research domain and exists and functions independently of the investigator, and an interpretative part, which concerns the process of interaction between investigator and research domain. In general, a research programme broadly describes properties of the research domain in terms of

suppositions and, by doing so, it may be used as an instrument for the further development of theory. So far as the heuristics of a research programme also encompasses rules for the development of theory, positively as well as negatively, these are indicated by the concept of 'knowledge ideal'.

A research programme also includes theories as specifications of its theoretical orientation. In connection with this, Hetebrij makes a distinction between 'core theories' and 'interpretation theories'. Together they shape one theory within the same 'knowledge ideal'. Other rules, connected with theories but not making demands upon them and which focus on the designing of research projects, not necessarily need to belong to one research programme. Rules like these are referred to as research methods.

To avoid science resulting in would-be science, Hetebrij (1983) introduced an 'upper level' of scientific traditions in which fundamental or basic discussions take place. A scientific tradition is defined as a part of the scientific praxis and characterized by notions of an orientating nature with regard to theoretical and methodological aspects. Based on these notions, conceptual problems are formulated which are connected with the theoretical orientation and methods of research programmes. A scientific tradition shapes the context in which research programmes originate, compete and relieve one another. In imitation of Giddens (1979), Hetebrij gives three examples of such traditions, namely: the empiric-analytical, hermeneutic and critical tradition.

Besides a methodology of research programmes and scientific traditions, a methodology of empirical research is also necessary (third level) to contribute to the development of theory or growth of knowledge. For this reason, the process of interaction between the theoretical orientation of a research programme and an empirical research project is of a great importance: "a research programme with a theoretical orientation, knowledge ideal and methods, guides the development of theory and prevents investigators from being drowned in a chaos of largely contradicting data based on experiences" (Hetebrij, 1983, 148).

To summarize, the three levels of methodologies (scientific tradition, research programme and empirical research) are strongly interrelated. However, this three-level-methodology is of a scientifically internal nature: it is unclear how this methodology is checked or influenced by the society in which it has its origins and functions. The internal nature of Hetebrij's methodology can be criticized when knowledge is used to solve societal or practical problems, and when this knowledge is handled critically (6). To solve this problem and to aim at educational science as a science of full value, Vos and Lagerweij (1987) propose to introduce educational practice as a fourth level. However, they do not elaborate their proposal sufficiently.

A better attempt has been undertaken by Wardekker (1986), who defines research programmes as parts of broader, more comprising societal programmes. Already in his earlier work he criticized the use of theory as an absolute entity and, as a consequence, the use of empirics as practice constructed by theory (Wardekker, 1981b). Moreover, to Wardekker (1981a) the hard core of a research

programme contains normative as well as descriptive elements; as such a hard core connects scientific activities with desired outcomes for a society.

In addition to the work of Hetebrij (1983) I want to refer to the study of Wardekker (1986) and highlight several details. According to Wardekker, scientists generally agree on the objective of educational science, namely: the improvement of the quality of education and of educational science by striving for rationalization. However, they differ in their opinions concerning the content of these and other concepts because of the use of different conceptual systems of meaning. Problems of this nature cannot be solved without investigating the systems of basic notions, which Wardekker calls traditions. In other words, the way in which concepts are established must be made legitimate. Science is not a goal in itself, nor a hobby estranged from life, and is not aiming at 'knowledge for its own sake'; it has a function to improve or augment the quality of life. People act to live; their actions are guided by systems of meaning. It is the task of science to examine these systems critically on their legitimacy and to give us rational legitimations for our actions. Hence, along with the acquisition of knowledge, science has a societal goal. In connection with this, Wardekker emphasizes that man possesses a certain freedom on the one hand and determination on the other. Consequently, notions regarding the subject-character of the individual also need to underlie the basis of the scientific enterprise and should be taken into consideration by social scientists. In his study, however, Wardekker demonstrates that these notions are understood differently (7). In connection with this, Schuyt (1986, 31 ss.) makes the following remarks with reference to an overview of the three scientific traditions mentioned before:

- the other's points of view are judged from the personal point of view; this leads to a clarification of one another's shortcomings, but these shortcomings cannot be understood fully because basic assumptions strongly differ; no common criterion exists and, through that, in their essence they remain concurring knowledge-claims;
- the critical nature of science is not inherent in one scientific tradition; on the basis of each tradition knowledge can be acquired which criticizes established ideas or conceptions;
- the central concepts of each scientific tradition like objectivity, experience, etc. possess a specific meaning belonging to these traditions; consequently, different points of view still become more incomparable.

Among other things, Schuyt (1986, 18) argues that scientific concepts which are used, should be analyzed and tested on their rightness in connection with underlying presuppositions.

In order to locate the differences of meaning of concepts in social sciences, Wardekker uses a modified version of the model developed by Hetebrij (1983). He makes a distinction between three levels of social sciences which must be considered as increasingly specified frameworks that define the meaning of concepts and, through that, determine what will finally be investigated by empirical research. At each of the three levels a 'choice' is made, not by the

individual scientist, however, but from the different attempts to define the object of science and the relationship between science and that object. The levels Wardekker distinguishes are summarized below.

- 1) At the most general level, the level of traditions, choices should be considered with respect to basic notions. These choices do not only refer to the principles and methods used in research. They primarily have a bearing upon the relationship between research and the improving or sociogenetic task of science, and hence upon the relationship between scientists and 'other people'. In short, at this level tradition defines how the task of science is conceived with respect to the sociogenetic development. The formulation of such a conception includes at least an image of man, regarding the relationship between freedom and determination of human actions, and an image of science, regarding the way in which scientific products contribute to development.
- 2) At the level of research programmes (or paradigms), of which traditions form the basis, further specifications are made of a decision taken earlier with respect to a research project. A research programme or paradigm primarily contains a view on its object and on methodological aspects regarding the way knowledge is acquired and tested.
- 3) At the level of empirical research the research programme is further specified in a concrete research question and in a methodic question concerning the data needed in order to answer the research question.

Essential to Wardekker's model is, that traditions not only exist in science; they also exist in education. Both kinds of traditions possess the *same societal basis*, or originate from the same societal tradition.

In educational science as well as in education the content of themes with which both are concerned is similar, for example knowledge, learning, development, rationality. In both institutions (science and education) the problems regarding freedom and determination of human beings play a part. According to Wardekker, educational traditions can also be conceived as being built up in a 'three-level-model'. In this sense there is a certain similarity between scientific and educational traditions, which - as was stated before - originate from the same societal tradition (basis). In educational traditions, however, the concept of research programmes is replaced by the concept of 'practical theories'. These theories can be seen as ideas or images of educational actors (teachers) about their educational practice. These ideas are shaped by the educational tradition, which functions as a framework, and they give direction towards the preparation or planning and execution of education (8).

The work of Hetebrij and Wardekker enables me to justify the submission of the relationship between theory and domain to a conceptual analysis. From Hetebrij relevant concepts are borrowed for the reconstructive activity, from Wardekker the idea has been adopted that the levels involved are increasingly specified frameworks. The work of the latter made me also more aware of the subject-character of the research object of the project under consideration (i.e.

practical theories of the subjects involved), and the historical and societal context in which this object, the research and investigator perspective are embedded. As a consequence, an explication of the vision on man and science involved becomes necessary (see also chapter 2, section 2.1). In this study this vision is no object of reconstruction as such, only at the level of the theoretical orientation so far as concepts are specifications of this vision. The submission of the previously used starting-points to a conceptual analysis is essential for reconstruction. They are confronted with the object theory acquired by way of designing, arranging and executing a concrete research project (see figure 1.2). A tentative result of this reconstruction has already been published (Beijaard, 1988 and 1990). By means of reconstruction, suppositions regarding properties of the research domain (teaching), and the way they are specified on behalf of a concrete research project (theoretical as well as methodological and methodical), are confronted with the results of empirical research (object theory regarding practical teaching in agriculture). As such, an attempt is undertaken to contribute to the further development of theory at programme or paradigm level. In this sense, reconstruction has also a critical function (cf. Hetebrij, 1983, 164):

- aspects of the theoretical orientation, which stayed implicit, will be made more explicit;
- specifications made will be reformulated on behalf of the design, the arrangement and the execution of a further research project, etc.; as a consequence, reconstruction is part of a cyclic process;
- suggestions for improvement or corrections may possibly result in a more adequate and elaborated theoretical orientation.

It should be noticed that the reconstruction aimed at in this study, is limited to and based on one research project (9).

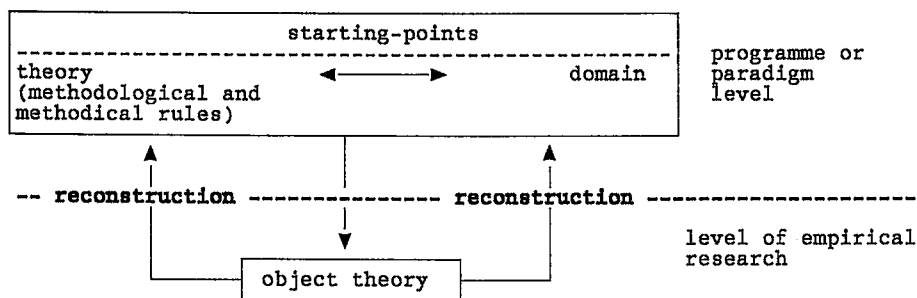


Figure 1.2 Object of reconstruction, including the levels involved.

2 THEORY INVOLVED AND FRAMEWORK FOR ANALYSIS

In the preceding chapter attention was paid to the relationship between theory and domain at paradigmatic level. This relationship forms the core of the reconstructive activity in this study and encompasses the application of action theoretical principles in research and development in the domain of teaching. The project under consideration was based on these principles.

This chapter starts with a description of general action theoretical notions in section 2.1. These notions stem from different sources as will be demonstrated in the next chapter (section 3.1.2). In the subsequent chapter it is argued that general or basic action theoretical notions have consequences for the formulation of theoretical as well as methodological starting-points and key-concepts at paradigmatic level, which are described in section 2.2. In summary, this level concerns:

- the complexity of teaching, i.e. the everyday teaching reality and not a reality constructed by theory;
- the personal or subjective theories of the practitioner;
- teaching and learning to teach in connection with the relationship between theory and practice;
- the research perspective serving practical relevance and development of theory.

These features have strongly influenced the design and the execution of the research on practical teaching in agriculture.

Finally, in section 2.3 definite research questions of the reconstructive part of this study are formulated; this section anticipates also the aspects on which the reconstruction focuses in particular. These questions and aspects for reconstruction should be understood against the background of the preceding section (2.2) in which relevant starting-points and key-concepts are described at paradigmatic level.

2.1 General action theoretical notions

Partly because of the influence of Soviet psychologists (see van der Veer, 1985) and a cognitive turn in social sciences as a consequence of new developments in cognitive psychology (cf. e.g. Mayer, 1981), investigators have become interested in applying action theoretical principles in concrete research on education, particularly in the field of learning (cf. e.g. van Parreren, 1979 and 1983; Pijning, 1978; van Parreren and Schouten-van Parreren, 1981; Nelissen and Vuurmans, 1983; van Oers, 1987). The major

research topics are: concept learning, psychomotor learning, mathematics, language, spelling, cognitive development, problem-solving and metacognition (de Leeuw et al., 1986, 28). However, it should be emphasized that action theory may not be conceived as a monolithic whole (van der Heijden et al., 1987).

The pluralism in action theory is demonstrated, for example, by Wigger (1983) who makes a distinction between analytical action theory on the one hand, and normative or rational action theory on the other. The first kind of action theory is, as it were and according to Wigger (1983, 14), a metatheory of empirical action theories which study and try to elucidate factual actions. The latter kind of action theory, which is of a normative or rational nature, focuses on the question how and under what circumstances an action is right or rational. Besides and in coherence with both the 'entrances', Wigger discusses the two points of view as being of a causal and intentional nature. A causal oriented theory derives elucidations from actions causally. The nature of these elucidations corresponds with the nature of those derived from such sciences as biology, chemistry, etc. (so-called natural sciences). In my opinion this conception of an action theory is a wrong one: under the influence of behaviourism investigators aim at lawlike knowledge and technical control over human actions. In turn these actions are reduced to external observable behaviour; in a causal oriented action theory the subjectivity of human actions is denied or disregarded. This subject-character, however, is emphasized by the intentional action theory. In this conception actions are not determined causally. Moreover, this conception calls for specific models to understand and elucidate intentions of acting subjects. An advantage of this approach is, that it enables an investigator to revert to knowledge which stays implicit in everyday actions (Wigger, 1983, 72).

Another demonstration of pluralism in action theory is given by Rappard (1987). He distinguishes a social as well as a personal action psychology. The social variant focuses on the social context of human actions, which can be specified into an interpersonal and a personal exceeding aspect, while the personal variant emphasizes mental states or the intentionality of the individual. Nevertheless, both variants share a common interest: conceiving the individual, who actively and intentionally strives for goals in a certain context, as a unit of analysis (Rappard, 1987, 27).

It is essential to mention that a choice made in favour of an action theory in general, and of an action theoretical approach to teaching in particular, is a choice which has noticeable consequences for the design and the execution of concrete research (cf. Assink, 1987). This choice is primarily based on a vision of man that results from a particular anthropological starting-point. By Procee (1987, 8) this starting-point is formulated in terms of "the competent operating and active subject." In addition to this description, the objective of science can be formulated in terms of improving one's competency to act (cf. also Wardekker, 1986, who speaks about the augmentation of rationality; see for further details section 2.2.3). These visions on man and science are supported in this study, though for a more detailed and complete

picture it is necessary to describe the most important features of a subject's actions. According to Nijk (1984) an action is characterized by (see also Beijgaard, 1987b):

- *subjectivity*: activities are attributed to individuals and, through that, personal;
- *intentionality*: activities are - though not always directly visible - of an intentional nature; intentionality refers to the knowledge one possesses and to the conative elements involved;
- *reflexivity*: people are cognitively related to their activities; it is this characteristic which makes it possible to speak about activities in terms of actions; because of several reasons, however, cognitive representations are not always necessarily adequate;
- *relation to and limitation by the context*: actions are always the result of interaction with the environment, but at the same time they mould this environment. Furthermore, possibilities to act are limited by conditions from the environment, one's own knowledge of what one is doing and one's flexibility within a given action repertoire.

As a result of these characteristics, it is obvious that it is only possible to understand (and elucidate) actions adequately in connection with the acting subject's willingness and knowledge. This statement implies that a subject's intentionality consists of cognitive and conative elements, which will be further explained in section 2.2.4. Figure 2.1 visualizes the basic features of an action in a certain way: in summary, intentionality and context interplay; both are mediated by reflections of a subject who is presupposed. In order to understand (and elucidate) actions completely, it is not enough to study their subjective side. This has to be supplemented with their external side in terms of objective conditions of acting and situational circumstances. Studying both sides of actions is of great importance and relevant to possible tensions and discrepancies between subjective intentions and objective consequences, between the meaning of an action for the subject and its objective meaning in the historical and societal context. By embedding an action in the historical and societal context, an action has an inter-subjective ('universal'), objective quality which enables one to judge and, eventually, to sanction an action. Consequently, an action can be seen as a unity of all these moments; understanding (and elucidating) an action adequately implies the integration of all these moments, including the meaning which another person ('interpreter') gives to the action of an acting individual. "Thus actions are (...) conscious and willing, which means goal-determined activities, that are executed by reasonable subjects who determine themselves on the basis of their knowledge under given natural and societal conditions as well as normative demands, and which have a bearing on other self-determined subjects" (Wigger, 1983, 128).

Self-consciousness and self-determination are concepts which play an important part in action theory. These concepts are also relevant in research on and theories of teaching behaviour, which is derived from personal traits, their history, the situation in which acting takes place and the behaviour of

others. These factors determine and influence behaviour. "However, it is always the subject's decision regarding the way he bears them upon himself, other people, the situation and - at last - upon the conditions of his acting, and to what extent he makes all these moments felt as conditions, thus making conditions of them" (Wigger, 1983, 130).

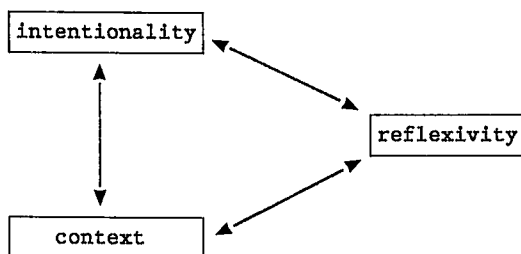


Figure 2.1 Basic configuration of an action.

The scientific basic notions mentioned above do have theoretical as well as methodological consequences at the level of the theoretical orientation of a research programme (see also section 1.4). A more precise formulation of these consequences is obstructed by the pluralism in action theory. Therefore, preference is given to a pragmatic solution based on a publication of Ulich (1980). According to Ulich all the action theoretical variants aim at the realization of one or more of the following features:

- bridging the gap between cognition and behaviour;
- starting from complex units of analysis, through which early (psychological) reductionism is avoided;
- emphasizing the complex, mutual relationship between the individual and his environment;
- cognitive representation of the coherence between behaviour, cognitions and situations.

A further specification of these features will be given in the next section concerning the underlying starting-points and key-concepts used for research and development in the domain of teaching. These starting-points and key-concepts are formulated at paradigmatic level and, hence, the object of reconstruction in this study. The basic notions described in this section (2.1) are no object of reconstruction. However, some reference to these notions is made regularly.

2.2 Starting-points and key-concepts

In this section starting-points and key-concepts are presented that underlied the research and development project concerning practical teaching in agricul-

ture. They are formulated in more detail than in the original publication (Beijaard, 1986).

2.2.1 Teaching as acting: the role of intentionality and complexity

Even today much research on teaching still consists of process-product studies, in which the effectiveness of a certain teacher characteristic is determined by measuring the learning results of students. Based on theoretical considerations regarding the implementation of innovation, these studies mostly led to disappointing results. According to Wardekker (1981a and 1981b) this is, among other things, due to these studies' conception of practice and practice-oriented research: practice is conceived as a theoretical construction ('empirics') and innovation is primarily the application of theory acquired by means of research. Generally, process-product studies reduce teaching to partial aspects and external observable behaviour, isolated from the context and underlying cognitive processes. Moreover, studies of this nature minimize the teacher as an active, autonomous individual who possesses his own knowledge and uses this knowledge in a continually changing context (cf. Clandinin, 1986). It is supposed that a better understanding of this knowledge leads to a more adequate implementation of innovation (10). Actually, process-product research is based on a double reduction (see also Schuyt, 1986, 110). Firstly, this kind of research strongly simplifies and transforms reality and expresses this reality in numerical abstractions. Next, conclusions drawn need to be incorporated into reality again. This demands a second simplification of reality in order to apply research results. Hence, it is not surprising that these results inaccurately link up with the 'living' reality.

In an action theoretical approach to teaching, however, the subjective side of behaviour is fundamental. This implies intentions, notions, beliefs, opinions, ideas, etc. which form part of the intentionality of an acting person. Along with conative elements, intentionality refers to the knowledge an individual possesses (11). Usually this knowledge is considered to consist of *intentions, cognitions and subjective theories*. These concepts differ from each other, though have in common that they can be represented cognitively. Ericsson and Simon (1984) define subjective theory as ordered above to intentions and cognitions. Subjective theory, which consists of intentions, refers to information representing a subject's goals and future images. Likewise, intentions are expressed in sentences with verbs like shall, will, must, etc. Subjective theory consisting of cognitions, however, refers to information based on representations of aspects regarding the present situation. Cognitions can be recognized in constructions which have a bearing upon the present tense and immediateness. If cognitions are considered to be similar to knowledge, then there is another reason to distinguish cognitions and intentions from each other: somebody develops intentions with the aid of his stock

of knowledge. Instead of subjective theory, this knowledge is also called practical theory (Wardekker, 1986; Weijzen and van Hunen, 1987).

Recent research on teaching shows that intentionality, with regard to its cognitive side, is a complex and stratified concept. Firstly, the concept's complexity is connected with the different ways in which cognitions and intentions, which form part of subjective theories, can be ordered (12). In this context their functions may be qualified as functions of a subject's reflections on his actions (cf. Peters, 1984a and 1984b). Secondly, the concept's stratification refers to the hierarchical organization and structure of intentions, cognitions and subjective theories in memory. Partly based on this, Peters (1984b) proposes to make the following demands upon the cognitive side of intentionality of a (didactically) acting person. Ideally, in his opinion there should be talk of:

- a storage of knowledge which is deductively articulated and sufficiently detailed to enable intentionality to direct thinking adequately;
- consistency of the deductive structure: a theoretical ordering is a prerequisite for adequate (controlling and interpretation) functions of reflection (see also note 12); intentionality, therefore, is also a criterion-instrument;
- representation, which means that one must be able to represent his intentionality cognitively;
- an empirical basis, which means that intentionality should be applied consistently and adequately while acting.

Among other things, these demands have consequences for the content and didactical arrangement of schooling activities for (prospective) teachers. Within an action theoretical perspective, these and other quality demands may be best realized by means of educational methods which stimulate the development of adequate action orientations. In imitation of van Parreren (1979) action orientations can - for the greater part - be defined in terms of a knowledge basis one has to possess in order to act adequately. The development of adequate action orientations calls for schooling activities of an inquiry-oriented nature: students, for example, critically need to examine their own professional actions, including the context in which they act (cf. e.g. Zeichner, 1981/82; Zeichner and Teitelbaum, 1982; Beijjaard and Goffree, 1986).

In an action theoretical approach teaching is considered to be an *intentional activity*, which presupposes a certain amount of rationality. However, an individual's rationality is always bound (cf. Shavelson and Stern, 1981) and more or less adequate in connection with acting. Rationality presupposes that an actor possesses knowledge of 'all' the available acting alternatives from which a deliberate choice is made. This presupposition is not a real one, because the knowledge one possesses is bound and because acting is always related to and limited by the context. To understand teaching well and as a meaningful activity, and to acquire a complete 'picture' of teaching, it is necessary to study teaching in connection with its environment. This mutual relationship between an individual and his environment is of a complex nature.

For this reason, the concept of complexity has been introduced (cf. Peters et al., 1983; Peters, 1984a and 1984b). This concept refers to aspects of a teacher's task environment (teaching and learning aids, the internal and external organization of the school, etc.), including characteristics of his own personality (backgrounds, previous education, etc.) (13). Also students play an important part. To summarize, *complexity refers to an educational situation which includes the teacher's personality, objective characteristics of the task environment and students*. As a consequence of this characterization of an educational situation, it should be emphasized that intentionality and complexity interact. As a result of this interaction, teaching and learning processes possess a certain degree of uniqueness. There does not exist, for example, an algorithm for the transformation of a teaching model to this uniqueness, which is, among other things, demonstrated in the study of Clandinin (1986) on images of teachers. As a result of this study it is emphasized that a teacher's knowledge is emphatically committed to personal experiences. This knowledge based on experiences forms part of a continually changing, dynamic practice, which is hardly modelled by 'objective' or scientific knowledge. Clandinin, therefore, speaks about practical knowledge containing a personal, professional, moral and emotional dimension, which is primarily expressed in practice.

The relevance of environmental influences on teaching has particularly been made clear by Lowyck (1984):

- teaching is an intentional activity, nevertheless the environment also exerts influence; as a consequence, the teacher is considered to be a dependent as well as an independent 'variable'; teaching, therefore, consists of self-steering and field-steering elements;
- teaching is a professional, or at least a semi-professional task; within a given educational context, spontaneous behaviour also forms part of this task;
- teaching is an activity with two sides: the teacher's intentional point of view on the one hand and acting directed towards students on the other, which 'endangers' intentionality.

Because of environmental influences, Lowyck (1984) concludes that teaching is characterized by:

- multi-dimensionality: different students, divergent reactions, activities and interruptions;
- simultaneosity: many occurrences at the same time;
- immediacy: the teacher has little time to think;
- unpredictability: it is impossible to predict what will occur with certainty, so that it is difficult to decide unequivocally;
- dependency on time: activities, decisions or events have consequences for following situations.

It should be noticed that these characteristics can undoubtedly be added to.

In this section little attention is only drawn to the role of accidental factors and routines. In coherence with self-steering and field-steering elements mentioned above, routines particularly play an important part.

Teaching routines - which can be made explicit through questions - reduce the role of field-steering elements on the one hand, and do increase the role of self-steering elements on the other. More detailed information about teaching routines will be given in section 2.2.2.

2.2.2 Planning, execution and reflection as an action unit

Teaching is considered to consist of the planning and execution of lessons and the reflection on both these phases. However, it should be noticed that the task of a teacher is a broader one. Within their schools many teachers are also occupied with organizational matters, the guidance of students, curriculum development, etc. Nowadays, we are increasingly aware that these form an important part of a teacher's profession (cf. Knoers, 1985 and 1986). Nevertheless the object of this study is restricted to *classroom teaching*.

Analogous to van Parreren's (1979 and 1983) action theory concerning learning processes, teaching is considered as a complex, compound action unit consisting of all sorts of partial actions which relate to each other hierarchically and sequentially in an actor's action structure (see also Broeckmans, 1987). With action structure van Parreren (1979, 5) means: "... the nature, cast and mutual coherence of the partial actions, aspects of the situation which influence the action and the way in which this influence asserts itself."

Actions may perform different functions. In connection with the goal of an action, van Parreren (1979 and 1983) distinguishes between *orientating, executing and controlling functions of an action* (14). The orientating function refers to the exploration of the situation on behalf of the identification of possibilities to achieve a goal. The executing function is directly pointed at the achievement of a goal. The controlling function implies a check on the achievement of a goal during as well as after the action. Like an orientation beforehand, an orientation afterwards also exists. The latter kind of orientation refers to reflection on a past action and the result of this action on behalf of a similar following action. As a result of learning processes the orientation, execution and control usually coincide, in the course of which an action gains an automatic character. Generally, this occurs on the basis of an 'abridged action structure'. With regard to research on teaching this notion helps us to explain the existence of teaching routines.

Actions always are the result of a person's interaction with his environment. In connection with this, van Parreren (1979 and 1983) makes a distinction between self-steering and field-steering actions besides spontaneous ones which are, indeed, also the result of a person's interaction with his environment (see also section 2.2.1).

Transferring van Parreren's distinction between the functions of actions to teaching, enables one to consider teaching as a complex, compound action unit which - in turn - consists of three complex partial actions. These are planning, execution and reflection, influenced by personal and environmental aspects. This is represented by figure 2.2, which is a modification of a

scheme developed by Pijning (1978 and 1987) (15). This figure emphasizes that the phases of teaching perform orientating, executing and controlling functions with respect to one another.

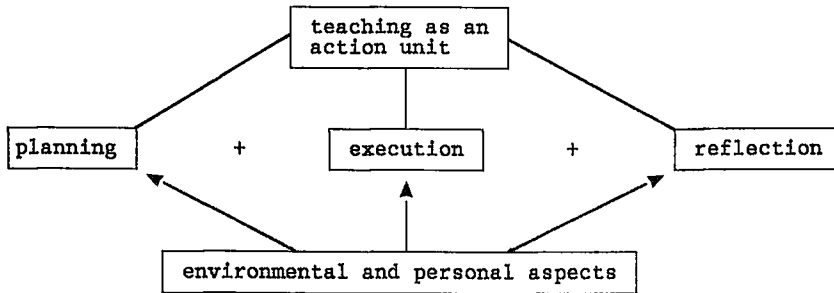


Figure 2.2 Representation of teaching as a compound action unit (planning is similar to orientation and reflection to control).

Planning encompasses the designing of a plan of action and can be considered as an anticipation on the execution of a lesson. Planning, therefore, is an activity directed towards the future. The *execution*, which is the core of an action, contains the realization of the designed plan of action. It should be emphasized that planning and execution as teaching phases have to be studied in connection with one another. This is because of:

- the existence of planning routines, which, in action theoretical terms, can be conceived as more or less automatic processes of an internal or implicit nature (more attention to planning routines will be paid at the end of this section);
- the incompleteness of planning: student activities, for example, are not totally predictable, and unexpected or unforeseen circumstances and events often lead to ad hoc planning during the execution (cf. Peters and Beijaard, 1983; Peters et al., 1983).

As a consequence, the connection between planning and execution shows congruences as well as discrepancies.

The third teaching phase, *reflection*, takes place during the planning and execution as well as after both of them. Reflection as a teaching phase particularly has a bearing upon 'looking back' afterwards. Lowyck (1986a) concludes that teachers rarely reflect systematically upon past events. Moreover, there is no clear distinction between planning and thinking afterwards: "Teachers very often think in terms of problems or tasks and are not able to use definite chronological segmentation of the reality" (Lowyck, 1986a, 176). Generally, teachers possess educational knowledge which is primarily expressed in teaching practice: speaking about this knowledge is not a usual or necessary part of a teacher's task. Perhaps this is one reason, among others, why teachers seldom, if at all, reflect systematically: "Reflection is (...) an ongoing part of practice" (Clandinin, 1986, 167).

Reflection as a teaching phase refers to the awareness of one's own thoughts and actions. Reflection is not so much a situational concern, though the situation mostly gives rise to reflection, but primarily has a bearing on the subject himself as the object of reflection (e.g.: "What did I do wrong, and why?") (Nelissen, 1987; see also pg. LOBO, 1982). It is important for a teacher to be aware of the underlying motives or reasons for his actions, to possess the ability to clarify problems, to estimate the size of these problems and to infer suggestions for possible solutions (cf. Clark, 1983). For this purpose teachers possess, ideally, a substantial amount of self-knowledge and skills to solve problems as a prerequisite for reflection. It is essential that reflection always involves learning in terms of changing or improving on behalf of future actions (see also Nijk, 1984).

In the rest of this section attention will be paid to the existence of (*planning*) routines. Weijzen and van Hunen (1987) speak about routines in terms of 'scripts' which a teacher uses in a more or less familiar situation. A script is, as it were, stored in memory and will be activated when one is confronted with a task. Situations of a problematic nature, which are new and for which no script is available, lead to the development of plans of actions which, ultimately, may shape a new script. From this point of view it is, according to Weijzen and van Hunen (1987, 228), incorrect to create an antithesis between teacher 'thinking' on the one hand and the use of routines on the other. Based on 'script' as a concept, this is a false contrast.

Westerhof (1984) interprets routines in a similar way: routines are activities which proceed outside of one's focal attention, and are activated by internal as well as external stimuli; in the cognitions of teachers these routines are present as mental images, plans of actions or scripts.

With regard to their genesis, routines may be interpreted negatively and positively (Ax, 1985, 159). The negative interpretation refers to a standardized behaviour due to a shortage of acting alternatives. As a consequence, teachers 'always do the same'. The positive interpretation, however, emphasizes that acting routinely is based on a conscious strategy to reduce the working pressure and, respectively, the complexity of the task environment. It should be obvious that acting routinely and acting characterized by reflexivity cannot be considered as opposites. It is legitimate, however, to assume that the ability to reflect is a prerequisite for the manoeuvrability of teaching in general and routines in particular. For this reason reflection has to be considered as an important part of building up an adequate (didactical) action repertoire.

2.2.3 Teaching competency and the improvement of teaching

Teaching can be considered as - at least - a semi-profession, which implies that many aspects of teaching can be learned or improved. The question concerning competent teaching, however, is not easy to answer, because this

question presupposes the availability of criteria regarding the quality of education. As such these criteria imply, themselves, normative choices. Soeters (1986 and 1987) distinguishes five approaches to competent teaching, namely:

- the behavioural approach by which teaching competency is connected with external observable behaviour in terms of effective teaching, the handling of teaching skills, active teaching, etc.;
- the cognitive approach by which teaching competency is connected with functioning on a high(er) level of cognitive development;
- the interactive approach by which teaching competency is determined by the establishment of interactions between the teacher and the students;
- the personality approach by which teaching competency is based on a humanistic view which allows students to learn, i.e. to develop their unique possibilities;
- the multi-dimensional approach which emphasizes - in contrast with the 'mono-dimensional' approaches mentioned above - that there is not one way of teaching which is the best: teaching competency is connected with the possession of a variety of teaching strategies.

Coonen (1987a) gives an extensive and detailed overview of available, mostly research-based knowledge concerning these approaches as well as other aspects related to teaching in general and teacher education in particular. His description of this knowledge regards the period between 1975 and 1987 and is based on Dutch, German, English and American literature.

Nowadays, teaching competency is conceived in favour of a multi-dimensional approach (cf. Lowyck, 1986b), which is strongly inspired by the work of Joyce and Weil (1980; 1984). In their view teaching competency implies flexible teaching; there is no 'grand theory', teachers should be able to handle a multi-dimensional repertoire of teaching strategies, such as: strategies for behavioural change, cognitive development, social development and personal change. The quality of flexibility as a part of teaching competency is also emphasized by Peters (1985).

In the enumeration given above, no explicit attention has been paid to an action theoretical approach to teaching. In section 2.1 it was emphasized that one's possibilities to act depend, among other things, on one's flexibility within a given action repertoire; flexibility also determines the quality of an action. Moreover, it is assumed that someone's competency to act also depends on the extent to which he has access into his own 'narrative potential', which van Strien (1986, 130) describes in terms of one's possibilities to narrate, enclosed in the culture in which one participates. The competency to act is, according to van Strien, connected with internal freedom, mental adulthood and self-realization. In connection with this I want to discuss three statements in the rest of this section.

1) Learning to teach or the improvement of teaching can be seen as an exchange between objective and subjective theory

By the 'epistemological subject-model' and those who base their vision on teacher education on this model, the structure of subjective theory is often considered as comparable with objective theory (c.f. e.g. Mandl and Huber, 1983; Corporaal et al., 1984; Kieviet, 1985). This model, which implies an approach along with action theoretical approaches (Ulich, 1980), assumes that a subject creates his own world in an active way by using his cognitive schemes. Moreover, it is presupposed that the subject possesses reflexivity and rationality (16).

My critique concerning the epistemological subject-model is threefold. Firstly, this model indicates that knowledge will be only represented if it is characterized by reflexivity and rationality; no explicit attention is paid to 'tacit knowledge' (Olson, 1984) or implicit knowledge involved in routines. Secondly, it seems to me that both objective and subjective theory are conceived as too symmetrical (see also Groeben, 1981). It is emphasized by many investigators on teaching (e.g. Bromme, 1976 and 1984; Creemers and Hoeben, 1984) that objective theory contains characteristics and properties which exceed subjective theory or convictions of individuals in practice. Objective theory or scientific knowledge is ordered more systematically and is of a more elaborated and developed nature than subjective theory, which often stays implicit and hardly reaches the surface (Creemers and Hoeben, 1984, 53). Thirdly, the epistemological subject-model implies the danger of a too one-sided emphasis on the influence of the individual on the environment. It cannot be denied that the individual's possibilities to act are also influenced by his social and material context.

It is also of importance to discern subjective theory in connection with innovation: by denying that subjective theory is disturbing and irrational (see also Wardekker, 1981b) and by connecting objective theory with subjective theory, a more successful implementation of innovation is - in principle - guaranteed. However, in my opinion objective and subjective theory may not be conceived as symmetrical to one another. I prefer to speak about two levels of knowledge. Between both levels a discrepancy does not exist, but they differ from one another due to the surplus value of objective theory. The most important function of information from objective theory may be described in terms of enhancing the 'practical wisdom' (Verloop, 1989, 18) of teachers by providing concepts and categories for observing and interpreting the classroom reality in a more systematic and detailed way.

2) Teachers should be well educated, not trained

The process of learning to teach or the improvement of teaching can be considered as a certain exchange between objective and subjective theory, taking into account the surplus value of objective theory which should be

utilized. An exchange process implies another concept of innovation than one based on training. Connected with research results, training demands that teachers accept conclusions they have not drawn themselves and which function as prescriptions. According to Floden (1985) this approach is problematic, because:

- conclusions drawn in existing (especially process-product) research rely on an overly narrow view of education;
- training based on research results tends to give teachers mistaken confidence in the certainty of the results; moreover, telling someone what to do creates the impression that the teller (investigator) knows what is the best;
- no research conclusion will be appropriate for all teaching circumstances;
- preservice preparation cannot hope to produce polished professionals.

Besides this critique on research-based training, Floden (1985) also criticizes the idea of training itself, which often occurs without taking cognizance of underlying reasons or motives. Firstly, as a consequence of learning a specific behaviour, on which teachers do not reflect, it is assumed that a teacher's interest in teaching decreases accordingly as he goes on to master that behaviour. Secondly, there exists a discrepancy between 'being trained' and 'teaching students', unless one considers that students also have to be trained. In connection with this, Lortie (1975) emphasizes that teachers often teach as they have been taught themselves. This is particularly dangerous when one is educated entirely on the basis of training principles.

As an alternative to training, Floden (1985) emphasizes that teachers should be well educated instead of highly trained. This implies, for example, that teachers should not accept research conclusions or objective theory groundlessly. These should be considered as suggestions for the improvement of teaching, in which dialogue or discussion and reflection play an important part. As a result of such a learning process, teachers can finally draw their own conclusions.

3) Knowledge transmission and reflection or learning to reflect are difficult to unite

Earlier in this chapter reflection has been described as a function of intentionality and as a teaching phase. Usually, however, reflection is further legitimized, particularly in the field of teacher preparation (cf. Korthagen, 1987). Learning to reflect provides prospective teachers the impetus to start, to profile themselves and to be able to change (Vedder, 1984). Generally, reflection enables one to increase the effectiveness of one's own learning. Such a view on education is, for example, shared by Harré et al. (1985) who, in their attempt to develop a general psychology of action, interpret the function of education as something like "breathing in the surrounding air; it is not like being pumped up like the tyre of a bicycle" (Harré et al., 1985, 72). For the realization of this function they refer to

conversations which take place in institutions, and to which the members of the staff contribute; it is from these conversations that students extract what they can.

Knowledge transmission seems to be in contrast with (learning) to reflect. Knowledge transmission implies the acceptance of 'merchandise', while reflection presupposes that this 'merchandise' is handled as a tool. This point of view is of a particular importance for the in-service education of teachers. In-service education is directed towards adults who are experienced in their fields. It is essential that they integrate new knowledge into existing knowledge based on experiences. This integration refers to learning processes of engaged, self-steering people. Reflection may be considered as an ability to realize this integration, or as an ability to make new and existing knowledge, skills, etc. cohere (see also Coonen, 1987b) (17).

I agree with Schön (1987, 157) that in the above-mentioned sense professional practice is learnable and coachable, but not teachable. The word 'learnable' dispatches those who overemphasize the mysteries of practice and scoff at teacher education by stating that teaching is the product of giftedness plus experience alone. The word 'coachable' refers to the willingness of both the teacher educator and the student to investigate the other's frame of reference, to reflect not only on concrete activities, but on the other's descriptions of these activities as well as reactions to these descriptions. Finally, the word 'teachable' dispatches those who utterly deny the mysteries of practice and think that it is possible to divide practice into components which can be delivered in courses dominated by forms of lecturing; teaching is neither a simple application of methods, nor grounded in a scientific base alone.

The illuminated statements above can be summarized by Fenstermacher's (1978) view on teacher education. In his opinion educating a teacher is not a matter of incalculating a knowledge base as such. Rather, to educate a teacher is to influence the premises on which a teacher bases practical reasoning about teaching in specific situations. These premises are derived, in part, from research results. Through reflection these premises serve to ground teaching competency with the teacher himself, not to determine this competency. In other words, there is no straight-line application of theory into practice as Fenstermacher (1986) argues in a more recent article.

2.2.4 Practice-oriented research: perspective and design

In the second project report (Beijaard, 1986) I described several dilemmas regarding the so-called antithesis between theory-oriented or fundamental and practice-oriented or applied research. This antithesis can be reduced to the antithesis between theory and practice, which is - as was made clear in chapter 1 and the preceding sections - rather a would-be antithesis, though

theory or practice can be expressed more indicatively in one or another research project.

In this study is argued that every research has, as far as is possible, to be based on theory ('body of knowledge'), though the investigator should be aware of the 'error of theory' (cf. Plooij and van den Dungen, 1985), that is the danger of an early reduction from theory. In connection with this, an investigator has to be aware of his starting-points at the level of the theoretical orientation and the interpretation theories, including the methodological and methodical rules, he makes use of (18). Interpretation theories give direction to the investigator's observations or perceptions and are made concrete in the formulation of research questions and the methods constructed for the collection of data. Moreover, interpretation theories also play a part when analysing and interpreting data (see also Stokking, 1984).

Like Wardekker (1981b) I object to research based on an absolute primacy of theory, because research of this nature leaves out the uniqueness and the normative aspects of practical situations, which are, in addition, dynamic and subject to change. However, I do not object to research guided by theory, because without a theoretical basis research has no critical function, the quality of the research is at issue and no contribution would be provided to the development (and testing) of theory. According to Creemers and Hoeben (1984) there is a 'movement away from science' when research is not committed to (any) theory. Generally, theory has a search-light function and research guided by theory provides the investigator's activities with a systematic character. Merely understanding ('Verstehen') or research without any theoretical basis does not manage this. In a certain way this view on research leads to a reconciliation of hermeneutics and nomology (see also van Strien, 1986, 62).

The project that was executed (see chapter 1) can - in imitation of Wardekker (1981a) and in conformity with its objective - be defined as a *theory-committed research project which had to be practically relevant and to yield theory as well*. By this, the project was emphatically located in a context of innovation (cf. also Postma and Wardekker, 1981). Though the transition from description to prescription seems to be a difficult one, I believe that scientifically gained, descriptive knowledge can be used as a framework to reflect on good practice as well as its theoretical shortcomings. In general, descriptive research results form an important source of inspiration for improvement or change and for stimulating the need of objective theory.

The most important methodological considerations that underlied the project that was executed are emphasized in the rest of this section. These considerations are connected with starting-points and key-concepts previously described.

1) Conformity with the situation in practice

Studying the complexity of teaching and the ambition to understand and describe this complexity is only possible by using a *complex research design*. Doing justice to the action theoretical starting-points mentioned above, such a complex research design should focus in an integrative way on the study of external teaching behaviour, underlying cognitions, intentions or subjective theories, including conative elements involved, and environmental influences. In imitation of Wilson (1979), who considers this approach to teaching as an interacting approach consisting of psychological and sociological angles, I prefer to speak about research that emphasizes cognitive processes, that focuses on environmental features and strives for the collection of ecologically valid data (19).

As a consequence, this integrated, many-sided approach to teaching within one research project implies:

- the development of a theoretical framework based on a holistic view and with a heuristic function for the development of research methods; a theoretical framework will also be helpful when analysing and interpreting data;
- the construction of a combined set of methods and techniques for the collection of data in order to achieve complete descriptions (the questioning of teachers, for example, is not enough, external behaviour should also be observed and questioned);
- the need for complex units of analysis, prestructured by theory, though open to do justice to own reality interpretations of the teachers involved in research and to leave room for idiographic descriptions.

The role of a holistic view is of a particular importance in this enumeration. With van Strien (1987, 7) I believe in a holistic approach as a fruitful strategy for research.

2) Understanding through interpretation

Within action theoretical research it is impossible to elucidate actions in a causal-nomological way, because an individual possesses the possibility to choose from alternatives to act and, by doing so, he provides himself with a freedom opposite to determination. Consequently, measuring in a behaviouristic sense is *not* possible (Charlton, 1987). As an alternative, an interpretative methodology is necessary. In this study a view on interpretation is held, which has to be distinguished from interpretation in terms of 'exploration' because of the heuristic use of a theoretical framework.

An interpretative procedure roughly consists of three phases (cf. also Kückeis-Stangl, 1980): the collection of information and materials (data), the analysis and interpretation of the data collected and the control of the interpretations made. It is of a particular importance that the investigator makes his procedure explicit (20).

In reality, interpretative research is of a qualitative nature, which is not necessarily opposite to quantitative research: qualities can also be quantified, dependent on the objective and the starting-points of the investigation and the underlying research tradition. Usually, however, the distinction between qualitative and quantitative research is reduced to a methodological debate (see also Hetebrij and Wardekker, 1986). It should be emphasized that many research problems, including problems related to educational theory, cannot be solved by using quantitative methods based on a strict empiric-deductive model: a rigid empiric-analytical, neopositivist or behaviouristic approach cannot fully take into account the multifaceted aspects of human actions in connection with all their environment-bound nuances (Neumann, 1987, 159) (21).

3) Objectivity and reliability

Though there does not exist a causal relationship between an individual and a generalized action structure, an action is in its versatility strongly bound by the context. This context, which is historically and societally embedded, consists of grown structures which reduce the scope of one's free choice to act (see for example the structural rules concerning interaction and communication). Thus, the 'objective structure' of the environment regulates one's action, though it has to be noticed that, due to man's ability to generalize and to objectivate, an individual also influences his environment. Nevertheless, interpretations made by the investigator have an objective character, provided that he chooses the situations for research well: one and the same action in different contexts leads to different meanings (Charlton, 1987). In considering uniqueness as a consequence of the interaction between complexity and intentionality (see section 2.2.1), it is possible to describe patterns of a general nature on the basis of rational reconstruction (see also Charlton, 1987; Neumann, 1987).

In connection with the *external reliability* of research results or interpretations made, it is essential that the investigator sufficiently explicates his procedure concerning methodological and technical aspects (for example: the way in which persons and situations are selected, what conditions play a part, etc.). The *internal reliability* is, among other things, increased by the use of more than one method and, as a consequence, more than one source of data. In literature this procedure is called triangulation (cf. van der Kley, 1982; Maso, 1984; Teunissen, 1985). Methodical triangulation, by which research methods and techniques complete and partly overlap each other, is a way to describe the social reality on different points of time and places.

Finally, on behalf of reliable research results it is important that an investigator illustrates his interpretations with the aid of primary data (such as statements of the individuals involved, descriptions of concrete events, etc.; see also Janssens, 1985).

4) **Ecological and theoretical validity**

Contributing to the solution of practical problems is one of the goals of practice-oriented research, which implies that practice-oriented research must have a diagnostic character. It is of a great importance, therefore, that priority is given to ecological validity, which means that research results primarily represent the natural context from which they are derived. According to Peters and Postma (1985), ecological validity refers to the issue of whether the methods used succeed in inquiring about a real educational situation, under the circumstances inherent in the research situation which always distorts reality (cf. Lowyck and Broeckmans, 1985). Moreover, it is also important to determine whether the research situation is indeed representative. For this purpose communicative and action validation, for example, are two possibilities for checking and rechecking.

Ecological validity primarily implies the study of teachers and their teaching in a natural environment. If situations are selected well, then it is possible to proceed from case studies to statements of a more generalized nature. As a consequence, ecological and external validity are not opposite to one another: ecological validity can be seen as a specific form of external validity.

Based on the definition of practice-oriented research, theoretical validity also plays a part. Again according to Peters and Postma (1985), theoretical validity refers to the issue of whether the methods used inquire about aspects or parts of the theoretical framework that is involved in research.

Generally, ecological validity demands participation by the investigator; theoretical validity demands distance and conducting research by way of a 'scientific detour' (see also van Strien, 1986). Both come together when the investigator interprets his research results by means of rational reconstruction. The scientific detour, however, though necessary to achieve insight into natural contexts, must lead back to practice in order to help people master their situation more competently.

5) **Cognitive representation**

People are, by way of reflexivity, cognitively related to what they do. Hence, actions are accessible by analysing their reflections whether given spontaneously or evoked by questions of the investigator. In this context particularly, questions concerning the 'why' of acting are important. In general, asking 'why-questions' and giving answers to them belong to the very general, reflective practices of man.

The ability to reflect can be considered as a function of one's intentionality. In connection with this, 'why-questions' have a critical and clarifying function, particularly when they lead to the explicitness of unarticulated, forgotten or routinized reasons or motives that underlie acting. Mostly the answers to 'why-questions' can be reduced to a cause or occasion and a consequence or goal (Maso, 1984, 107).

Generally, the 'why-question' is directed towards the content of one's intentionality and, therefore, towards one's rationality too, though intentionality and rationality need not be the same (for example: an intentional action does not need not to be rational or reversed). It is assumed that the analysis of teacher reflections gives insight into the quality of the teachers' intentionality in connection with their teaching activities and task environment.

It may not be concluded that teacher reflections are only an intellectual or cognitive concern. Brand (1984), for example, argues that - though within a causal perspective - an action has a mental antecedent. This relationship in itself, however, does not guarantee the execution of an action. A person must also be moved to act. In other words, there must also be a noncognitive or conative feature. Brand's study deals with the fact that the initiating mental event has both cognitive and conative features like desires, as a type of preferring. With regard to their role in actions, Brand (1984, 121) believes that conative features like desires form or generate intentions, though intentions may not be reduced to desires. Moreover, desiring is not a necessary condition for intending. Theorizing about the conative side is, however, according to Brand, at this moment a speculative concern: there exists only out-of-date literature, for example referring to motivational theories (Brand, 1984, 237). Until further notice, therefore, it can be concluded that conative aspects are also involved in actions and, probably, that actions cannot begin without conative features. Moreover, it is assumed that conative features are expressed in underlying reasons or motives mediated by (teacher) reflections.

Speaking action theoretically, reflections are present in actions. According to Rotenstreich (1985) it is most apt to connect reflection with one's attitude. Reflection is a configuration of cognitive as well as conative elements and amounts to turning one's thoughts or attention to the act, content and validity of thinking.

Rotenstreich's (1985) analysis of the concept of reflection highlights the following features:

- 1) in its function reflection is of an instrumental nature and consists of two components:
 - directed towards the past and, subsequently, of a corrective nature;
 - directed towards the future and, usually as a result of correction, characterized by planning and anticipation;
- 2) the foci of reflection are time-oriented in terms of dimensions of time, but the reflective attitude is above time, because it wavers between the two dimensions;
- 3) reflection serves an objective; it is activated because of this objective dependent on its focus or subject-matter represented in intentionality.

Generally, one can conclude that reflection appears in a two-fold way: as an element present in different attitudes and as an attitude of its own. The different functions of reflection presuppose the ability to concentrate on a certain object, theme or situation. By that, concentration amounts to identification. Moreover, reflection presupposes a carrier, i.e. subject, and a

context which can be made visible in a person's responsibility for his actions.

2.2.5 Students act too

In section 2.2.1 students were referred to as a part of the educational situation. However, a teacher always directs his (planned) actions towards students. Moreover, a teacher also interprets and reflects on the intentionality of students; he also reacts on the actions and reactions of students. Briefly, teaching has to be considered as an activity in which at least two people are involved. In his analysis of the concept of teaching, Fenstermacher (1986, 39) calls this relationship an ontological dependency, a notion which helps us to understand the tight connection between teaching and learning. Without the concept of learning, there would be no concept of teaching, though the dependency does not work in reverse. This notion of an ontological dependency, which is not of a causal nature, makes teaching a special profession in comparison with, for example, the profession of an agriculturalist who ploughs, sows, grows crops, etc. As a consequence, the intentionality of a teacher contains at least one more or another ingredient than the intentionality of an agriculturalist. This ingredient implies that a teacher has to possess other knowledge of social relations, or knowledge of his own situation in the social world. In other words, a teacher's profession demands other (and extra) competencies.

In order to understand teaching completely, an investigator should not confine himself to a 'monologic' research model. In such a model the investigator only focuses on the teacher's intentionality and actions in connection with his task environment. Research has also to be done on the intentionality of students, that is their perceptions concerning the teaching and learning situation. In other words, teaching in general, and acting in particular, is always of a 'dialogic' nature, involving at least two people. Students cannot be reduced to being an objective part of a teacher's task environment like, for example, learning materials are.

Recent research on student perceptions shows, that students are easily able to inform an investigator adequately about the teaching and learning situation, including the interacting processes this situation involves. Créton and Wubbels (1984), for example, made use of students' answers to questionnaires in the guiding of prospective teachers (see also Vonk, 1982). In the same way questionnaires are used to determine the effects of innovations in education (cf. Kuhlemeier, 1983; Dekker et al., 1985).

2.3 Questions and aspects for reconstruction

In connection with the problem of this study stated in chapter 1, section 1.1, the following research questions for reconstruction are relevant:

- 1) To what extent may teaching be understood from an action theoretical perspective?
- 2) In which way is it possible to give research-based suggestions for the augmentation of teachers' rationality or professional competency?
- 3) To what extent is understanding through interpretation an adequate way to approach the complexity of teaching?

These questions imply theoretical as well as methodological aspects and will be answered in chapter 7.

It is relevant to make concrete on which theoretical and methodological aspects the reconstruction focuses in particular in order to answer the questions mentioned above. To summarize, these aspects refer to:

- theory-guided research located in the discrepancy between reduction of the teaching reality on the one hand and the aim of leaving the complexity of this reality intact on the other (chapter 3);
- a holistic and integrative approach to teaching by studying external observable behaviour, underlying cognitions, intentions or subjective theories, including the conative elements involved, and environmental influences in connection with one another (chapter 4);
- the study and diagnosis of teacher reflections in view of the augmentation of teaching competency (chapter 5);
- the role of the investigator and the procedures for scientific criteria followed (chapter 6).

These four aspects represent what has been essential in the research and development project under consideration.

PART II

AN ACTION THEORETICAL RESEARCH AND DEVELOPMENT PROJECT ON PRACTICAL TEACHING IN AGRICULTURE

3 HOLISM AND THE DEVELOPMENT OF A HEURISTIC MODEL

The aim of the research and development project under consideration was to understand the complexity of practical teaching in agriculture and to contribute to the improvement of this teaching (Beijaard, 1986). This occurred in conformity with the starting-points described in chapter 2, which underlied the project mentioned above.

In what way has this aim been made concrete? This question refers to the interpretation theories used, including methodological and methodical rules for conducting empirical research (cf. Hetebrij, 1983; Stokking, 1984; Wardekker, 1986). This chapter pays particular attention to important interpretation theories used. As a result of these theories a model could be developed to study practical teaching in agriculture. Methodological and methodical aspects involved will be discussed in subsequent chapters.

Section 3.1 gives a description of the historical perspective of the project under consideration. An investigator who uses action theory as a basis for research and development should - as a consequence of the starting-points in chapter 2 - learn from history. Successively, therefore, developments in research on teaching, aspects of the concept of action as such and (frequently used) general didactical models and theories are described. This enumeration culminates in the present discrepancy between didactical theory and didactical practice. This historical perspective is necessarily restricted, though hopes to give sufficient information about co-determining backgrounds of the project under consideration.

In section 3.2 attention is given to the way holism as research principle was made concrete. A (tentative) solution could be found by applying system theoretical insights. In conformity with system theory, reality has been reduced in a certain way and is presented by a model. As regards content, this model was developed with the help of didactical theory and results of a preliminary investigation (Beijaard, 1985). The results of this preliminary study are summarized in section 3.3. The model itself will be presented in section 3.4. Likewise, shortcomings of this model and the way these were solved are the object of discussion.

Aspects of this chapter will be reflected upon in section 3.5. This reflection will emphasize the relevance of theory for the designing and the execution of research. Special attention is paid to the relationship between theory and practice. It is argued that research should do justice to both.

3.1 Historical perspective

Research on teaching originates from different perspectives. In this section these perspectives are called research programmes and related to the scientific traditions they are part of.

3.1.1 Research programmes and scientific traditions with regard to teaching

Shulman (1986) describes five major research programmes or paradigms with regard to teaching in the period between the publication of the second and the third handbook of research on teaching (edited respectively by Travers, 1973, and Wittrock, 1986). Scheme 3.1 outlines these programmes according to their central organizing research topics, prototypical designs and methods, and the types of findings they generate. The 'Third handbook of research on teaching' contains review articles of each research programme.

It should be noted that the research programmes represent American research on teaching. In the Dutch speaking countries three research programmes or paradigms are usually distinguished, namely: process-product research, research on teacher thinking and action theoretical research. Until recently, this distinction was crossed by the methodological discussion between practice-oriented or applied research on the one hand and theory-oriented or fundamental research on the other. This discussion refers to three underlying research traditions, namely: the empiric-analytical, hermeneutic or interpretative and critical tradition (see also Giddens, 1979; Smaling, 1987).

The connection between research programmes and research traditions is illustrated by scheme 3.2. Attention will be paid to this relationship below and demonstrated on the basis of concrete *empirical research*. Like Shulman (1986) I want to highlight research topics, designs and methods, and types of research results, but with particular regard to Dutch speaking countries.

	empiric-analytical tradition	hermeneutic or interpretative tradition	critical tradition
process-product research	x		
research on teacher thinking	x	x	
action theoretical research		x	(x)

Scheme 3.2 Outline of the relationship between research programmes and research traditions involved in research on teaching in the Dutch speaking countries during the last decade.

Research programmes:	research topic	design and method	research results
1. process-product research	the relationship between what teachers do in the classroom (the process of teaching) and what happens to their students (the product of learning).	using categorical observation scales and control of 'context' variables in existing classrooms ('natural').	descriptive or correlational quantifications of performed teaching behaviour or sequences of teacher actions and student reactions.
2. time and learning	the key mediators of teacher behaviour to be identified in the activities of students with the emphasis on deriving teaching effectiveness from the engaged time a student is working.	testing achievements of students based on specified conditions regarding the content or subject-matter a student is working on.	judgements of a student's task engagement and measurements of the time (Academic Learning Time variable)..
3. pupil cognition and the mediation of teaching	the way students make sense of the teacher instruction they encounter in the classroom.	reports or accounts of students' thought processes based on interviews, stimulated recall, etc. during as well as after instruction, and monitoring student achievement based on a conducted experiment.	aspects of teaching and the teaching situation (mental and social mediations) in terms of perceptions, attributions etc., or representations of effects of achievements at the level of strategies, attentional focus, broad schemata, etc.
4. classroom ecology	searching for personal meanings of the participants by taking into account complexity and paying attention to unobservable processes like attitudes, feelings, etc.	understanding and interpretation based on participative, open-ended observations ranging from, e.g., a micro-analysis of interactions during one lesson to the macro-analysis of an entire school over a longer period of time.	representations of the social reality in the form of descriptions of cases regarding the social order in collective life, historical changes, etc.
5. teacher cognition and decision making	understanding teaching (more adequately) by studying the way teachers judge and make policy, solve problems and make decisions during the preactive as well as the interactive phase of teaching.	using thinking-aloud techniques while lesson planning and stimulated recall techniques with reference to video- or audio-taped lessons, including 'policy capturing'.	teacher cognitions in terms of beliefs, intentions, images, etc. and (mathematical) models of teacher cognitions.

47 Scheme 3.1 Overview of features of research programmes or paradigms of research on teaching distinguished by Shulman (1986).

Process-product research is of an empiric-analytical nature. This kind of research has been abandoned more and more because of its low impact on educational practice, its specific view of reality and its usually rigorous reduction of this reality. Nevertheless, research of this nature still occurs. Tomic (1985), for example, studied teacher behaviour in connection with student achievements in order to identify effective teaching behaviour. This study forms part of a more encompassing classroom environment study and is preceded by the work of Krammer (1984), which emphasizes the connection between teaching behaviour and lesson-book, and followed by the work of van der Sijde (1987), which describes the training of teachers and experimental research. Tomic's study fits exactly into the first research programme of scheme 3.1. Tomic tried to contribute to a teacher training programme on the basis of positive correlations between categories of teaching behaviour and scores of students. Tomic (1985, 2) himself concludes that his work is widely based on American literature and that only a little research of this nature is done in The Netherlands. A similar process-product study was executed by Westerhof (1989). Essential in his research is the relationship between categories of teaching behaviour and the learning gain of pupils in view of teacher effectiveness. Westerhof legitimates this kind of research on teacher effectiveness as an alternative to problems concerning the development and implementation of curricula. Another example of process-product research is the study of Veenman and Cras (1982) who investigated the increase of active learning time in classrooms (see paradigm 2 of scheme 3.1).

The work of the authors, quoted here and only used as examples, demonstrates the application of a certain way of empiric-analytical thinking and fit into related research programmes distinguished by scheme 3.1. In The Netherlands investigators have also published work around these paradigms (cf. e.g. Veenman, 1980a and 1980b). Moreover, paradigms have been referred to in discussions between advocates and opponents. This, for example, occurred with reference to a proposal of de Corte and Lowyck (1983) in favour of a reorientation in research on teaching. On the basis of research programmes located within the empiric-analytical tradition, this proposal has been particularly criticized by Veenman (1983) and Creemers (1983). This discussion can be seen as an example of leading investigators who dispute from different paradigms (and underlying research traditions) with own theoretical concepts and methodological rules for doing research.

It can be concluded that there exists - as is formulated by Verloop (1989, 22) - a legitimate place for process-product research as a source of information for teacher education. However, one should be aware of the limitations of this paradigm, i.e. its strict confinement to behavioural aspects of a teacher's functioning and the suggestion that, in the end, an encompassing theory can be formulated from which prescriptions for teaching could be derived.

During the last decade there has been a growing interest in *research on teacher thinking*. Among others, this interest was inspired by American studies of Clark (1978) and Yinger (1977 and 1978). In imitation of the cognitive

psychology, these authors conceived teachers as information processors who decide, judge and solve problems (cf. Shavelson and Stern, 1981). Nowadays (anno 1990) it may be concluded that the teacher thinking perspective focuses on a broad spectrum of subjects. Major themes, for example, are teachers' belief systems and thought processes, their personal and professional knowledge in action, and relationships between espoused theories and theories-in-use, ideals and actual behaviour. Much of the research considers the role and significance of contemplation in teaching through investigations of reflections 'in' and reflections 'on' actions from different theoretical concepts and by using different research methods and techniques. In The Netherlands the tendency exists to avoid early reduction by theory as a result of considering teaching as a process of problem solving or decision making; the reconstruction of the structure of teacher thinking in semantic networks is also seen as insufficient. In general, each view implies only a certain view on teaching: the temptation to fit teachers into a theoretical model would again become too great!

One of the underlying ideas of the teacher thinking paradigm concerns the description of what is in the teacher's mind while he plans his lessons. Studies of lesson planning or the preactive phase of teaching were undertaken, for example, by Lowyck (1979), Bromme (1981b), Peters and Beijaard (1982a), Ax (1985) and Stegeman and Westra (1985). In most of these studies ethnographic methods and techniques like 'thinking-aloud' and protocol analysis were used. The latter two studies can be considered as exceptions. Ax (1985), for example, used a detailed questionnaire with prestructured answers in favour of a statistical analysis and external validity. In principle, the study of Ax is of an empiric-analytical nature in contrast with the others, which are of an interpretative nature and in which usually a small number of teachers is involved with the emphasis on ecological validity. Results of studies of this nature, based on a rational reconstruction of teacher cognitions, are usually, among other things, descriptions of planning styles and considerations concerning teaching components and the upbuilding of lessons (see for detailed information about research on teacher planning: Clark and Peterson, 1986). According to Tillema (1983) teachers handle 'top down' as well as 'bottom up' strategies while they plan their lessons. The studies of teacher planning, in which investigators generally aim at ecologically valid research results, also made clear that teacher planning partly occurs routinely. Since then the genesis of teaching (planning) routines has become an important focus of attention (cf. e.g. Bromme, 1982; Peters, 1984b; Lowyck, 1984).

It has been found that during the planning of lessons much stays implicit. Moreover, planning is always of a tentative nature: among other things, the limits of planning have a bearing upon students, who cannot be planned, and conflicts and other unexpected events during the interactive lesson phase (see also Becker, 1984a and 1984b). For this reason, Peters and Beijaard (1983) also studied the execution of lessons or the interactive phase of teaching (see also Stegeman, 1986). Attention was paid to congruences and discrepancies between the preactive and interactive phase by audio- and videotaping both

lesson phases and using introspective techniques like 'stimulated recall' (see also Ericsson and Simon, 1980). Their integrative descriptions were validated communicatively. The major findings of this study can be summarized as follows:

- during the interactive lesson phase other elements play a part than those during the preactive phase, respectively elements upon which another or bigger accent is placed, though both lesson phases are not two subsequent activities: during the interactive phase teachers frequently plan (again) (ad hoc planning);
- teachers differ in their patterns of teaching, from teaching based on trial and error behaviour to reflective teaching.

The research project discussed here, was replicated and extended by Peters et al. (1983) by emphasizing teacher reflections. Teaching was defined as consisting of a preactive, interactive and postactive phase; hence, reflections on reflections, referring to the intentionality of teachers, also became the focus of attention.

Within the teacher thinking paradigm some other theoretical perspectives also need to be mentioned. Westerhof (1984), for example, considered teaching in terms of classroom management related to students' learning profits. Classroom management manifests itself during the interactive phase. By monitoring teaching and describing underlying cognitive processes, Westerhof argues for redefining the teacher's task in reaction to goal-rational teaching models. Westerhof's view implicitly implies critique on much research on teacher thinking. In a certain way he is right: To what purpose is research done? How can descriptive research results be made prescriptive, or how can knowledge and insights gained be made useful for practice again? Moreover, sometimes it is suggested that developed concepts and ways of thinking are insufficiently based on empirics. Creemers (1984 and 1986) pointed out that theory should not only be developed but also be tested.

A final perspective that is described here concerns attempts to study teacher cognitions in order to identify good teaching (Corporaal et al., 1987; van Hunen, 1987; see also Corporaal, 1988) and to identify differences between expert and novice teachers (Boei and van Hunen, 1988). In these studies the repertory grid method is used to locate constructs (prospective) teachers have in their mind about the quality or aspects of teaching. Based on quantifications, results are placed into categories which represent 'shared dimensions'. Generally, the repertory grid method is frequently used for research on implicit theories. By this method a person's idea about the field under study is described with the help of constructs consisting of contrasting poles (e.g.: concrete-abstract). By using this method a high value is placed on depicting teachers' implicit theories as much as possible in their own terminology in order to minimize distortions caused by the investigator. Studies of this nature tell us what is important to teachers, for example their interactions with students (Corporaal et al., 1987, 75), or that novices resemble experts more than they differ from experts (Boei and van Hunen,

1988). In practice, research results like these can be helpful to guide (prospective) teachers. Also in the novice-expert studies one might recognize an implicit or intrinsic tendency towards the understanding of 'good' teaching or of what really matters in educational practice. This also applies to the studies of Buitink (1986 and 1988) concerning developments in student-teachers' subjective theories or practical knowledge. He conducted 'experiments', namely by questioning student-teachers at the beginning and at the end of their course by means of the stimulated recall technique in order to identify changes in their subjective theories or practical knowledge, either in a reflective or non-reflective way. A study with a comparable aim was undertaken by Verloop (1989) who did research on the improvement of student teachers' interpretative abilities and, therefore, Verloop's study can be characterized as a 'teacher thinking study'. His research project, however, strongly differs from most (descriptive and qualitative) studies on teacher thinking. His study shows much similarity with the classic experimental research design, including the involvement of a control group, and might be seen as an intervention study with the help of video materials that represent two educational theories. Among other things, Verloop found significant influences of these 'treatment materials' on interactive teacher cognitions. Consequently, he argues for developing similar materials for other educational theories as an alternative to traditional information transmission in teacher education. In the opinion of Verloop a body of theoretical knowledge is an essential quality of teaching as a profession.

So far particularly Dutch studies with regard to research on teacher thinking have been quoted. The proceedings of the International Study Association on Teacher Thinking (editors: Halkes and Olson, 1984; Ben-Peretz et al., 1986; Lowyck and Clark, 1989) show that research on teacher thinking has become an international concern. Concerning the current state of affairs Clark (1986, 13) writes: "The emphasis has moved from hypothesis testing about cognitive processes to (...) interpretative analysis, in which we become more explicit about the role of the investigator in making sense of his or her experience (...). We have begun to adopt the canon of disciplined subjectivity in place of the myth of scientific objectivity." Nevertheless, the following critical remarks need to be made.

- The metaphor an investigator uses strongly determines which teaching aspects are emphasized. This does not correspond with the desire to portray teaching in all its irreducible aspects instead of reductionistic analysis and technical prescriptiveness (see also Clark, 1986); the metaphor an investigator uses limits his interpretative power.
- The conception of the teacher as a subjective theorist is, at this moment, the leading metaphor. One may wonder if this metaphor is able to prevent a one-sided cognitivism, in which influences of the task environment as well as tacit knowledge and routines stay - at least partly - invisible for the investigator.

- The research on teacher thinking is characterized by a diversity of methodology, in particular with regard to the collection and analysis of data, and pluralism of nomenclature (cf. Clandinin and Connelly, 1986). Moreover, according to Weijzen and van Hünen (1987) many investigators neither elaborate their theoretical basis from a cognitive psychological perspective nor demarcate their concepts sufficiently, for example: which knowledge of teachers is aimed at? Do investigators want to study procedural, declarable, everyday knowledge or practical knowledge? What is understood by thinking processes and structures and how are these two related to one another?
- The thoughts of teachers are emphatically connected with the subject-matter they teach. Despite this, little or no attention is paid to this side of teacher thinking. Shulman (1986) interprets this aspect of teacher thinking as a promising challenge for research on teacher thinking which may not be avoided.
- The emphasis is placed on understanding and description. How can research results be made useful for practice again? Besides, as was previously stated, the testing of developed theory hardly occurs. As a consequence, one of the tasks of the teacher thinking paradigm should concern halting the 'uncontrolled growth' in the number of studies in favour of consistency of theory development and practical relevance.
- The research on teacher thinking is teacher-centred, though much of what is in a teacher's mind can only be understood by also investigating what is in the mind of students. Much of what teachers think is shaped by or derived from what is in the mind of students.

Many of these problems concerning research on teacher thinking are affirmed by Lowyck (1988): "(...) the divergency of approaches in research on teacher thinking - as often happens to complex human affairs - is much higher than one could wish and troubles our understanding of the phenomenon. We do not have the description of the teaching complexity (as advocated by our hypothesis), but an enormous range of individual perceptions of the teaching complexity. The vagueness of the conceptual framework, the babel of unclear, idiosyncratic definitions, the proliferation of models, the isolation of the paradigms, and the suggested incompatibility of the quantitative and the qualitative methodology, all hinder the consolidation of thousands of research outcomes. And, how can we further the understanding of teaching in its complexity, if the concepts of teaching are apparently more complex than the teaching reality itself. Or how can practical advice be deduced from a mix of not compatible information" (Lowyck, 1988, 7). In this quotation the lack of conceptual consistency, for example with regard to the definition of 'thinking' and 'acting' (D.B.), and the lack of practical relevance of research results are criticized.

Several of the enumerated problems can be solved within the teacher thinking paradigm itself (see also Elbaz, 1988, who reviews directions in which research on teacher thinking is developing from certain perspectives: the

language investigators use to examine and present the concerns of teachers in their own terms, focusing on the teacher as a subject, and the various forms in which investigators on teacher thinking carry out and present their work). The solution of other problems demands the incorporation of the teacher thinking paradigm in a broader, more complete conception. Impulses to such a conception were already given by investigators quoted before. Peters and Beijaard (1983), for example, embedded teaching in a historical and societal context. As a consequence, along with the subjective side of teaching the objective side should also be studied. In a later research project (Peters et al., 1983) teaching was defined as the result of the interaction between intentionality and complexity. In fact, these considerations imply an integrative approach to teaching (see also Lowyck, 1984) focusing on observable behaviour, underlying cognitive processes and environmental influences by using more than one method of an ethnographic nature (22). Such an integrative view on teaching exceeds a strictly cognitive approach. In a certain way this can be called an *action theoretical approach to teaching*. This approach differs from what most investigators on teacher thinking understand by an action. Most of them see actions as similar to observable behaviour. They acknowledge a direct relationship between thought and action, but as two separate domains: it is assumed that thoughts direct actions. In action theoretical studies, however, thought and action are usually seen as inseparable and part of the same event (cf. also Tabachnick and Zeichner, 1986).

The study of Broeckmans (1987) concerning the process of learning to teach and talking over lessons taught, for example, is emphatically based on action theoretical principles. This, in part, also applies to de Jong's (1988) development of and research on an organizational model of student teaching in Dutch elementary schools, and to the study of Corporaal (1988) concerning student-teacher cognitions and their implications for teacher education. As to their execution these studies are predominantly inspired by cognitive psychology, in their perspective they pretend to be action theoretical. Like Broeckmans in particular, I also applied action theoretical principles in the research and development project under consideration (Beijaard, 1986), which carries me back to the problem of this study concerning the contribution to an action theoretical paradigm with regard to research and development in the domain of teaching (see also Beijaard, 1988 and 1990).

Generally, as a result of the explanation given above the following conclusions can be drawn.

- Research on teaching in The Netherlands occurs from different paradigmatic perspectives, which do not relieve each other, though concur on several theoretical, methodological and methodical aspects.
- The impression exists that particularly methodical considerations cross the distinguished paradigms, their connection with an underlying research tradition seems to be a stronger one.
- The connection of research programmes with research traditions often stays implicit in descriptions of empirical research projects. This particularly

has a bearing upon research based on the process-product paradigm; in research based on the other two paradigms, many investigators try to justify their choices at the level of research traditions.

- In one research project elements are sometimes expressed which belong to two research programmes and, consequently, to more than one tradition. In this context the question regarding the compatibility or incompatibility, of which an investigator is sometimes not fully aware, becomes relevant. For this reason it is important to build up a consistent theory at paradigmatic level, which - in turn - will be helpful to individual investigators. It might be preferable that the distinguished paradigms do not relieve one another or cohere into one 'grand strategy', as Shulman (1986, 33) writes, because ... "there exists no particular sequence or order of approaches that is generally optimal", though he believes that the conception of a grand strategy might be heuristically useful.

During the last decade there has been - along with the studies explained above - a growing interest of Dutch investigators in certain aspects of the teacher profession or teacher education in general. Much of this research, however, does not strictly fit into the distinguished research programmes. Nevertheless, several of these studies, concentrated in research topics, need to be mentioned, because - more or less - they contain theoretical or methodical elements which may be helpful to contribute to the goal of this study. For this reason, I refer to the following research topics.

- 1) From an interactionistic perspective, which means elucidating behaviour as a result of the interaction between a person and his situation, V. Peters (1985) made a quantitative inventory of *situations which teachers experience as problematic* at the level of general secondary education. This resulted in groups of situations with regard to disturbing student behaviour, the influences of working circumstances on teaching, factors concerning the leadership of a school and the government, the cooperative behaviour of colleagues, the lack of learning aids and materials and professional teaching aspects occurring at home. Generally, the results of Peters' study argue in favour of enlarging the view of prospective teachers (for example with regard to tasks at the level of the school organization). Implicitly it can be concluded that a teacher's work satisfaction is a prerequisite for the quality of education. In this context situational circumstances play an important part.
- 2) Based on a study of literature, Veenman (1982) has summarized many *initial teacher problems*. The most important problems concern, in order of frequency: maintaining order, motivating students, knowing how to deal with differences between students, judging student achievements, making contacts with parents, insufficient or a lack of learning aids, knowing how to deal with individual student problems, lack of time as a result of the demands of the teacher profession. Particularly the maintenance of order is, as was

demonstrated by Créton and Wubbels (1984), increasingly perceived as a problem for new teachers. As a result of research on this problem, they modified an existing model of interpersonal behaviour, in order to help new teachers to develop their relationship with students.

- 3) Social inequality as well as inequality between sexes are not caused by education, though education does contribute to the reproduction of these inequalities by way of *actions and expectations of teachers*. Jungbluth (1982), for example, interviewed over 1,000 teachers who represented the last two classes of primary education, junior vocational and general secondary education. Among other things, the research results made clear that teachers do stereotype girls: they make less high demands upon girls, nourish less high hopes of girls' ambitions and stimulate girls to possess qualities like patience and care. Although these stereotypes possess positive aspects, they bring about adverse effects. The reproduction of inequality between sexes is influenced by factors like a teacher's political preference, age and types of schools. In a later study, Jungbluth (1985) connected the teachers' role in primary education with over-achievement and under-achievement in relationship to pupils' social classes. Special attention was paid to teacher expectations, which indeed appeared to be embedded in a cultural and societal context, and to underlying processes and mechanisms. Among other things, it could be concluded that teachers possess common sense theories regarding a pupils' intellectual climate at home. To a certain social background belongs a certain possibility to develop talent, through which the circle is made vicious: in education clear traces of class distinctions are present. Generally, students who finish their educational career unequally often received unequal education. This conclusion is shared by van der Kley (1983), who executed qualitative research of an interpretative nature on interactions between pupils and teachers in three first classes of primary schools. With reference to teacher education, van der Kley recommends paying more attention to teachers' perspectives in order to gain insight into *role-confirming aspects of a teacher's attitude and the influence of his images on interactions with pupils*. Moreover, teachers should be confronted with their own and one another's teaching practice to become aware of effects of their own actions. This conclusion is supported by Smits (1985) who investigated teacher expectations expressed in communications with students. These communications may unintentionally result in kinds of self-perceptions which can be disadvantageous for students about whom teachers have low expectancies. As a result of attribution processes these students tend to express stronger feelings of low competence than students about whom teachers have high(er) expectancies.
- 4) In order to investigate the *career development of teachers*, Prick (1983) consulted over 2,000 teachers in general secondary and junior vocational education by means of a questionnaire. Based on correlations between job

satisfaction, orientation of the teachers involved and the experience of the so-called midlife crisis, it can be concluded that a teacher's career development in general and the midlife crisis in particular, manifest themselves differently from those in other professional groups. The midlife crisis generally concerns teachers more than anyone else. Moreover, the teacher profession is increasingly put under pressure: teachers are confronted with new demands and educational changes on the one hand and a decreasing respect by students in particular and society in general and a lack of rest on the other. In this context attention should be paid to the phenomenon of 'burnout', which may be considered to be the most important factor to elucidate teachers' lack of motivation (cf. van Ginkel, 1987), and to the teachers' workload (cf. ISVA, 1987; Hamers and van Dongen, 1989). In general, the studies quoted here do have consequences for school management and the internal and external organization of schools, including governmental policy.

- 5) A dominating opinion is that prospective teachers must be able to think about the way they function, judge themselves and learn from their experiences. For this reason alternative education models have been developed to *reach prospective teachers to reflect* (cf. Korthagen, 1983; Vedder, 1984). It is assumed that teachers who possess a reflective attitude will continually be engaged on their own professional development. Usually, the implementation of the alternative models is intensively guided by research with methods like logbook keeping, interviews and learner reports. Generally, reflection as a result of a learning process has consequences for the organization, for the didactical arrangement of teacher education as well as for the teacher educators themselves.

The research topics enumerated above need to be seen as a selection of main topics. They confirm the complexity of teaching as well as the involvement of a teacher's personality.

3.1.2 The concept of action

The renewed interest in the concept of action partly originates from an increasing disagreement with the empiric-analytical research tradition which has predominated until recently. In this section some historical sources are described with regard to theoretical as well as methodological aspects of acting. Without pretending to be complete, some basic features are demonstrated from a historical perspective. These features are derived from thoughts about education within the hermeneutic tradition ('geisteswissenschaftliche Pädagogik'), from H. Roth's description of the development of 'mature' actions and from the Soviet-Russian socio-cultural-historical theory. The latter two kinds of thinking can be interpreted as anthropological perspectives on learning (see van Bergeijk, 1979).

1) Thinking and acting in the hermeneutic tradition

Wulf (1978) starts his description of the hermeneutic ('geisteswissenschaftliche') tradition by noticing that it can be seen as a reaction to the traditional, normative science of education. Blankertz (1977) rejects - quite rightly - such a scientific view; according to him a normative conception of science is unscientific, because it demarcates norms and values negatively.

Early and leading persons of the hermeneutic tradition are Nohl, Litt, Spranger, Weniger; they were influenced by the work of Schleiermacher and Dilthey (see Wulf, 1978, 15). In The Netherlands, Kohnstamm and Langeveld, among others, gave expression to this tradition (see Deen, 1969). Langeveld (1950), for example, has written about the phenomenon of education expressed in actions of man. According to him, there is always a moment of thinking involved while acting, which is remarkable in comparison with 'merely behaving'. An action can be seen as a form of human activity: by acting man always tries to achieve a goal (see also Langeveld, 1971). Three kinds of thinking moments present in actions can be distinguished (Langeveld, 1950):

- functional thinking referring to actions which pass away smoothly and which demand little or no correction (acting occurs, as it were, without thinking);
- instrumental thinking referring to the use of our thinking ability to achieve a desired result;
- theoretical thinking, which means 'thinking about' referring to a higher level of thinking to enable one to correct his instrumental thinking.

These different kinds of thinking are culture-bound, have a historical basis and are embedded in a societal context (cf. Klafki, 1973).

In fact the educational reality can be considered as a complex reality. Flitner (1963) made clear that, in order to understand (in 'geisteswissenschaftliche' terms: 'Verstehen') this reality completely, it is necessary to integrate at least four perspectives with regard to mankind, namely: the biological, historical-sociological, culture-philosophical, and personal perspective. The biological and historical-sociological perspective approach the educational phenomenon, as it were, from outside; the culture-philosophical and personal perspective approach this phenomenon from inside. This distinction corresponds with the issue of determination and freedom, which has become - again - of current interest (see also chapter 1; Wardekker, 1986).

It was Klafki (1973), for example, who emphasized that elements of theory are present in every educational practice even if one is not aware of these (education is guided by rules). So, concepts like 'subjective theory' or 'practical theory' are also not new, including several methodological rules to study these theories in connection with the complexity of everyday reality. These methodological rules are emphasized by the concept of 'hermeneutics' as scientific method. Its task is twofold: the immediate understanding ('Verstehen') of the educational reality as a significant whole on the one hand, and the analysis or reconstruction (through interpretation) of meaningful historical sources on the other (cf. Wulf, 1978, 31).

Finally, in the context of this study it should be noticed that in the hermeneutic tradition educational practice was considered as a societal praxis, though an elaborated theory of society was missing (Wulf, 1978, 57). In later years this theory has, partly, been provided by the critical theory. This was necessary, because the hermeneutic tradition pretended to be a theory of practice as well as a theory for practice. Nowadays, many theoretical as well as methodological aspects of this tradition are recovered in many educational studies of an ethnographic nature. Erickson (1986), for example, discusses the methodology of these studies under the heading "Qualitative methods ...". In section 3.1.1 examples of this kind of research are given relating to teaching.

2) Roth's anthropological perspective on learning

From an anthropological perspective it is important to answer the following question: what should one be able to do and know as a prerequisite for his personal and responsible participation in society and which personality traits are involved? Roth (1966), for example, tried to answer this question in his attempt to develop a pedagogical theory of personality.

According to Roth one cannot speak about man without speaking about the world he lives in. 'World' means everything man gets into contact with: things and people, nature and culture, society and state. Changes inside man himself are influenced by thoughts, needs, experiences, age, etc. But the outer world also changes, partly through man himself. The concept of action includes, according to Roth, all man does to keep this situation ongoing (see figure 3.1). By acting man tries to equilibrate the inner and outer world, which can be characterized as a dynamic, continuing process. Both 'worlds' can throw one off balance.

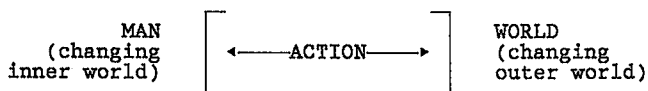


Figure 3.1 Relationship between man and world mediated by action (Roth, 1966, 368).

In imitation of Freud, Roth introduced the concept 'id' to refer to desires, needs, feelings and states of mind, which are experienced from the inside of man. Another part of the inner world is 'ego'. As a consequence, man has to act in a double way: he ('ego') has to be occupied in 'id' (internal acting) as well as in the outer world (external acting) (see figure 3.2). Internal and external acting demand one's awareness of the inner and outer world. This makes it possible to distinguish between self-consciousness, which is inner-directed, and consciousness of the world, which is outer-directed.

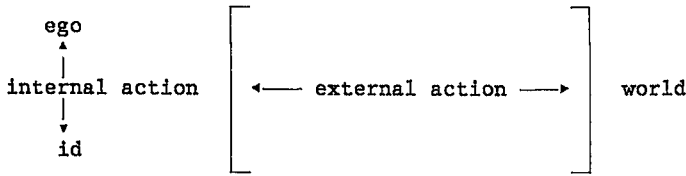


Figure 3.2 Internal and external action and their relationship (Roth, 1966, 369).

Along with directions, levels of consciousness can also be distinguished, namely: the unconscious level (physical processes like reflexes), the subconscious level (processes of which one becomes conscious afterwards, for example when having followed a wrong route, or automatic processes, such as going upstairs and reading a letter at the same time), the co-conscious level (knowledge which is always reproducible and easy to remember, for example when I was born), and the clear conscious level (actual knowledge). The latter two levels are the area of 'ego', the core of our personality; the first two levels belong to the area of 'id', in which processes come about which are regulated but not initiated by 'ego'.

To summarize, according to Roth (1966) all actions originate from and are wanted by 'ego'; they can be called intentional actions. Such an 'adult' (mature) intentional action - as distinguished from an underdeveloped, failing and short-circuiting action (see for these Roth, 1971) - comes about and elapses according to six phases:

- 1) genesis: a disturbance of the equilibrium occurs, 'ego' tries to redress the balance by internally or externally directed activities;
- 2) clarification: explaining and gaining insight into the nature of the disturbance;
- 3) planning: anticipating a solution to redress the equilibrium by making an action scheme with the use of knowledge one already possesses;
- 4) deciding: making a (normative) criteria-based choice in favour of a certain action scheme;
- 5) execution: realizing the action scheme, while there are tensions between willing and being able to, beginning and achieving;
- 6) feedback: learning from experiences and, eventually, storing these new insights on behalf of a following intentional action.

However, these phases do not usually occur independently and interfere while acting. According to Roth (1966, 388) all these phases are at least rudimentary present in every action. Roth himself considers these phases as an ideal-typical presentation of an 'adult' (mature), human action.

The ability to execute an 'adult' intentional action presupposes that one should be, according to Roth, equipped with strengths and capabilities as a result of growing and learning processes. For this purpose Roth distinguishes

six systems, namely: perception and orientation, temper and needs, appreciation, performance, learning, and control.

The essence of Roth's analysis is that an adult person can be seen as an active individual who is responsible for his own actions. In this sense actions include thinking, willing and appreciation, which are always connected with matter (contents). The speculative nature of Roth's analysis particularly concerns the appeal he makes to Freudian and neo-Freudian studies.

3) The Soviet-Russian socio-cultural-historical theory

During the last decade there has been a growing interest in learning by acting based on Soviet-Russian action psychology. Vygotskij can be considered as the most important representative of this school of thought (23). This psychological tradition in learning has particularly been introduced in The Netherlands by van Parreren (1979, 1981 and 1983) and Vos (1976).

Examples of recent publications about the socio-cultural-historical approach to learning in The Netherlands are those of van der Veer (1985) and van Oers (1987) (24). This approach is put into practice particularly in instruction in arithmetic for pupils in primary education and in ideas about 'developing education'. Generally, it can be concluded that learning by acting is not merely a synthesis or integration of connectionistic and cognitivistic learning principles (cf. Wardekker, 1986; van Oers, 1987).

The socio-cultural-historical school considers man as an individual who achieves goals in an active way. He attributes sense to his personal existence (intentionality), is stimulated but also limited by his relation to objects and to people in the world around him (determination). As a consequence, a deterministic vision on man is not possible, though actions are regulated due to the fact that they are embedded in a historical-societal context and because acting is always social acting. In his essence man is someone who makes sense and can only be understood in connection with the world of objects and other people (van Oers, 1987, 17).

Education serves one's emancipation. In literature this goal is often formulated in terms of contributing to the augmentation of rationality or reasons and motives that underlie actions (see also section 2.1; Wardekker, 1986).

'Activity' and 'action' are fundamental concepts in the socio-cultural-historical view on learning. 'Activity' refers to a qualitative description of behaviour and encompasses external observable behaviour (material acting) as well as internal, cognitive processes (mental acting) (Leont'ev, 1979 and 1980). This view is in contrast with, as van Oers (1987) calls it, 'being activated' which refers to the extent to which a student is active (cf. for example the conception of 'learning by doing' as an elaboration of the modern, western cognitive psychology). Being activated is usually meant quantitatively. The qualitative principle of activity concerns the upbuilding, dynamics and qualitative development of an activity in connection with the situation. It is acknowledged that norms and values also influence the

development of an activity. Hence, both a subjective dimension and a cultural-societal (objective) dimension are involved.

As a consequence of the different meanings of activity, van Oers (1987) argues that, in principle, cognitive psychology and action psychology are not compatible. Simons (1987), however, reproaches this statement; according to him van Oers' explanation is based on a narrow and dated version of cognitive theory. Simons argues that, particularly in a student's activity, learning results are considered to be based on qualitative differences. Though there are differences between both kinds of psychology, in Simons' opinion it is possible to integrate them, because in both the approaches developments occur in the same direction. However, van Oers (1988) resists an integration on behalf of an independent, internal and consistent development of both the theoretical orientations (25).

An 'action' can be seen as a concrete expression of activity. In its construction an action is determined by one's goal (self-steering) and the circumstances under which one acts (field-steering). Actions of two people with the same goal, therefore, may be different from each other. Along with situational circumstances this also depends on the underlying motives of the actor. More about the characteristics of an action has already been written in section 2.2.2 (for example the conception of action as a unity which consists of the phases orientation, execution and control). Moreover, actions can be divided into actions guided by theory on the one hand (acting deliberately, according to certain rules and based on a conscious relationship between motive and goal), and spontaneous actions on the other hand (actions steered by objects on which the actor does not orientate). The existence of spontaneous actions implies a rejection of a pure rationalistic vision of man (van Oers, 1987, 59).

Generally, the action psychology or theory sees learning as the result of acting. In this context it is possible to distinguish (van Oers, 1987, 61):

- learning in a microgenetic sense, which refers to the qualitative development of one action from a beginning to an end stage;
- learning in a curricular sense, which refers to a student's learning route through learning contents and the way these are brought into sequence, respectively the extension of the action repertoire with new actions.

In fact, learning can be considered as the internalization of actions, or acquiring new actions by 'interiorization'. As a result of interiorization processes, actions become 'operations' to enable one to act automatically or without any cognitive exertion. This can subsequently be used for new purposes, i.e. new actions.

Language functions as an aid to steer actions. By using language, acting becomes conceptual acting (handling and using concepts, which play an important part in our education and which people have in common). Generally, concept-building may be characterized as one of the most important learning processes in the school. In fact learning is similar to speaking about reality or certain objects in reality (van Oers, 1987, 100; see also van Oers and van Parreren, 1987).

Applications of action psychological or theoretical principles regarding learning, for example, are expressed in 'developing education'. In this kind of education the learning of highly qualified knowledge and insights is of a great importance. The student has to imitate an investigator's scientific way of doing research, and the learning process must be directed towards emancipation based on making sense of learning by the student himself. Concretely, attempts to realize learning processes of this nature are undertaken by means of types of cooperative learning (cf. e.g. Gudjons, 1987a and 1987b; van Oers, 1987). A prerequisite for cooperative learning seems to be a good relationship between teacher and students. It also makes high demands upon the teacher, for example in connection with intellectual imitation by students and the formulation of adequate 'context-committed' student tasks or problems to solve.

The applications of action theoretical oriented learning principles and their translation into didactics take place particularly in primary and general secondary education. However, attempts are also undertaken in types of vocational education. Söltenfluss (1983), for example, used action theoretical principles to connect work and learning to increase the effects of learning in the trade-committed or commercial area. Another illustration concerns the efforts of van de Lagemaat (1986), who used action theoretical principles in order to develop a didactical model based on exemplary learning. This kind of learning should protect students against an overloaded programme, which threatens their creativity and inventiveness. Applications in higher vocational education and at university level, for example, are illustrated by Widmann (1982) and Ebert and Hermann (1983). Generally, applying action theoretical principles in vocational education faces extra difficulties concerning the distinction between theory and practice. In principle, I believe that the concept of action and the underlying theory provide a promising perspective for vocational education.

3.1.3 Didactical models and theories

A theory can be described as a system of statements logically related to one another. According to Aschersleben (1983, 61), a didactical theory is a theory which:

- makes it possible to order and outline the educational complexity by reducing this complexity to essential aspects;
- stimulates rationality in educational reality to guide and control didactical intuition, and contributes to a critical attitude towards subject-matter and one's own teaching;
- provides a necessary basis for scientific research;
- only by a close interplay of theory development and research can positively influence educational practice.

Only through theory can didactics be upheld as a scientific discipline. To summarize, didactics is an aid to educational practice on the one hand and a

theory with which to criticize this practice on the other (cf. Gudjons et al., 1981).

Usually there is no clear distinction between didactical theories and models as is demonstrated by Blankertz (1977). However, the studies of Popp (1972) and Salzmann (1975), for example, show that it is legitimate to distinguish between theories and models. Both authors significantly contributed to the development of a theory of models by describing the characteristics and functions of models (26). According to Knecht-von Martial (1986) more analytical work still needs to be done in order to achieve a model-theoretical systematization. Her contribution to this purpose is based on the following general functions of, accordingly, *general didactical models* (Knecht-von Martial, 1986, 42 ss.):

- a theoretical function with regard to aspects represented by the model, including relevant norms, in order to demarcate the position taken;
- a technological function to make prognoses about the effects of educational measures;
- an analytical function referring to important educational categories;
- a planning function, closely related to analysis, though planning usually occurs beforehand and analysis as a function afterwards;
- a decision function, in turn closely related to planning, which affects the criteria on which didactical decisions are based;
- a research function to provide perspectives for research on education or educational conditions.

As a result of this enumeration, didactical models may be functionally defined as follows: "Didactical models (...) are designs, representations and reconstructions of educational reality. In addition, their functions should bear equally upon educational practice, i.e. teaching, and educational research, i.e. educational science" (Aschersleben, 1983, 65).

Knecht-von Martial (1986) has examined general didactical models with regard to their usage, theoretical assumptions and methodological rules. A summary of this analysis is given by scheme 3.3 (27). As a result of this analysis it can be concluded that didactical models are generally characterized by (Knecht-von Martial, 1986, 239 ss.):

- goal-determined perspectives: the central perspectives of models are determined by their objectives or functions (the system theoretical model, for example, aims at the development of an 'application theory' which will be helpful for lesson planning, etc.; see also scheme 3.3.);
- dependency on subjects: choices in favour of giving information on certain educational aspects depend on subjective moments regarding norms involved in theory (for example emancipation or the ability of self-determination as educational objectives) and methodology to develop theory (some authors, for example, consider science as a descriptive concern free from values, while others argue that norms and values should also be the object of science; consequently, research designs and methods of collecting data may differ);

Didactical model/theory	Function*	Theory involved	Scientific position/methodology
cybernetic-information theoretical didactics (Frank/von Cube)	<ul style="list-style-type: none"> - goal-rational planning - development and improvement of teaching strategies 	<ul style="list-style-type: none"> - education as a regulation process to provide a structure on behalf of organizing learning processes in terms of teaching strategies - learning is similar to behavioural changes as a result of reception, storage and processing of information (redundancy theory) 	<ul style="list-style-type: none"> - descriptive - free from values: decisions about goals form no part of science - theory development is of a technological nature
communicative didactics (Schäfer/Winkel/Biermann)	<ul style="list-style-type: none"> - analysis, planning and decision with regard to curricula - development of means to realize norms like emancipation, democratization and humanity 	<ul style="list-style-type: none"> - contents are determined by the parties involved and educational results are based on collective efforts - equivalence is a prerequisite for emancipation - action principles: symmetric communication, participation, critical attitude, non-authoritarian education 	<ul style="list-style-type: none"> - descriptive and normative (the legitimation of goals is also part of theory development) - 'technological' in the sense of searching for actions to achieve certain goals
teaching and learning theory: Berlin didactics (Heimann/Schulz)	<ul style="list-style-type: none"> - analysis (exploration of elements, relations and functions) planning (synthetic function) and decision (reflection while planning, based on a norm oriented engagement) - theoretical instrument as well as an aid to develop didactical competency 	<ul style="list-style-type: none"> - structure analysis consisting of 6 moments: intentionality, learning and teaching contents, organization of methods, dependency on learning and teaching aids, anthropological and socio-cultural determinants (first level of reflection, characterized by interdependence) - analysis of factors with regard to norms, facts and didactical forms which co-determine decisions (second level of reflection) 	<ul style="list-style-type: none"> - descriptive-empirical: development of a formal structure derived from educational reality - objectivity (eliminating subjective elements) and generalization
system theory (KBnig/Riedel)	<ul style="list-style-type: none"> - planning: the upbuilding of education in subsystems with own functions from the total system's perspective (actually, system theory is a planning theory) 	<ul style="list-style-type: none"> - description of education as a system from its central function: to enable students to learn - developing general educational goals as an orientation for planning 	<ul style="list-style-type: none"> - descriptive and normative (there are degrees in freedom to act) - starting from everyday observable phenomena, describing these unequivocally and illustrating concepts by concrete examples
education ('Bildung') theory (Klafki I) and critical-constructive theory (Klafki II)	<ul style="list-style-type: none"> - providing criteria on which decisions about goals and contents (and later also: methods and learning and teaching aids) are based 	<ul style="list-style-type: none"> - the concept of education ('Bildung') from which decisions are made concerning learning contents (with regard to norms underlying education) and (later) decisions concerning methodical matters 	<ul style="list-style-type: none"> - descriptive with regard to educational contents and normative with regard to criteria for deciding - historical-hermeneutic (Klafki I) and, as a result of adding ideology-criticism, critical-hermeneutic (Klafki II)

* The didactical models presented here have a heuristic function for designing research and, through that, they contribute to theory development.

Scheme 3.3 Outline of general didactical models according to their basic characteristics (see also Knecht-von Martial, 1986).

- openness depending on a spatiotemporal interval: generally, science is submitted to changes over time (compare for example developments in Klafki's work as a result of contributions of critical theorists) and may differ from place to place (for example caused by political systems which limit or stimulate the formulation of certain educational objectives); moreover, didactical models are always of a tentative nature, they are historically determined and bound, including the methodology involved (see for example Klafki's attempt to integrate methodological rules of the hermeneutic, politico-economical and ideology-critical as well as empiric-analytical positions on behalf of an 'open' critical-constructive science of education);
- pragmatism and relativism: among other things, models are characterized by representation and, therefore, by abridgement; the representation is determined by pragmatic variables and leads to an abridged presentation of the original; if this is correct, then descriptive as well as prescriptive theoretical elements, methodological rules, etc. are also determined by pragmatic variables; the pragmatic variables involved also demonstrate the models' relativity.

As a result of the enumerated general characteristics, it can be concluded that Knecht-von Martial has succeeded in contributing to the clarification of a model's meaning and, by doing this, to the theory of general didactical models.

Finally, it should be noticed that education is characterized by complexity which cannot be encompassed by one didactical theory or model (cf. Gudjons et al., 1981, 6). Furthermore, it should be concluded that (Knecht-von Martial, 1986, 254):

- the pragmatic nature and, therefore, the relativity of models imply moments opposed to dogmatism in the development of didactical theory: scientifically, concurring designs are probably more useful than an officially accepted one and, with that, a dogmatically handled theory;
- the models and theories differ from each other; judging them is only meaningful in connection with the question of whether they are consequently constructed on the basis of methodological rationality;
- the models and theories consist of subjective elements and are the result of theoretical choices, including choices with regard to norms and methodology; their (future) relevance can only be estimated in coherence with the history of science and cultural and political or societal developments.

In general, it is not desirable to aim at uniformity in all the didactical models and theories. Moreover, the discovery of similarities may not be a mere intellectual matter; they depend primarily on problems of the everyday reality of education.

The preceding pages of this section particularly refer to theory derived from German literature. Traditionally, the Dutch didactical models used in teacher education are strongly influenced by this literature (cf. e.g. van Gelder et al., 1979; de Corte et al., 1981). In the English speaking countries 'didac-

tics' as a concept is perceived totally differently from the way it is understood by the literature quoted previously. 'Didactical Analysis', for example, is referred to as a 'model of teaching practice' in the Anglophone literature (see also Lagerweij and Westerhof, 1974). As the result of different starting-points, the didactical conceptions summarized by scheme 3.3 are much more detached from educational practice than, for example, the 'theories of teaching' in the United States where these theories are usually developed in close connection with empirical research (see also scheme 3.1, section 3.1.1). An overview of the contents of many of these theories of teaching is, among others, given by Joyce and Weil (1980; 1984). They made an inventory of a broad arsenal of prescriptive and descriptive theories of teaching derived from various scientifically disciplined points of view. According to Joyce and Weil there is no unique or 'right' way of teaching. In their opinion a teacher should possess several teaching strategies in order to achieve the maximal development of students.

3.1.4 Discrepancy between didactical theory and practice: problem and perspective

Many teachers in practice reproach didactical theory as being too abstract and pluralistic in nomenclature. According to these teachers this theory provides little or no support for their daily activities, that is the analysis, planning and execution of education. In reverse, however, many theorists still judge their didactics as too practical and reproach practice as lagging behind the newest developments. Arguments like these do not contribute to bridging the gap between theory and practice.

In the preceding sections it has already been made clear that the gap between theory and practice is not a new problem. This core problem is virtually inherent in the striving for didactics as a scientific discipline, and affects all didactical models and theories. Didactics is a theory for practice, but at the same time this theory is alienated from practice. Consequently, teachers in practice are largely committed to (individual) experiences and the routines they have built up. In general, theory does not sufficiently reach practice and, in reverse, practice only marginally consults theory. According to Borsum et al. (1982) theory could make a start on behalf of a better relationship between theory and practice by making itself object of critical discussion.

Many causes can be indicated for the problematic relationship between theory and practice. Some of the main ones are summarized below.

- 1) A teacher's task is a very complex one and, therefore, hard to understand through one theory and to represent by one model.
- 2) Theories and models are mainly directed towards structures and components, so that the process character and the dynamics of education cannot be described adequately.
- 3) Theories and models insufficiently distinguish between prospective and experienced teachers. This applies in particular to lesson planning.

- According to Meyer (1980) too little attention is paid to the psychical and social complexity of planning which prospective teachers are confronted with. On the other hand, models for lesson planning provide too few suggestions for experienced teachers on behalf of their daily working situation.
- 4) Many didactical theories and models hardly provide concrete impulses for lesson planning. Didactical models are often nothing more than schemes to order or to make things problematic (hardly solution schemes!), in which the preparation of a lesson can be placed (cf. Klafki and Blankertz, 1977; Sixma, 1981). The steps to be taken in succession are usually missing.
 - 5) Most of the models are of a rough and general nature. Theoretically, however, statements are made about relationships between components which are barely empirically based. As a consequence, it is not possible to derive concrete decisions from these models (cf. Ax, 1985, 16).
 - 6) There is a multitude of didactical models and theories, which confuses teachers in practice. Prospective teachers are also confronted with this multitude of conceptualizations, which vary in their nature from general to specific (most specific models and theories are closely connected with subject-matter). Moreover, general and specific conceptualizations are not usually related.
 - 7) Prospective teachers often study theories and models which are remote from everyday problems in practice. Their learning processes in the schools also often occur apart from theory.

These and other problems have led to didactical 'movements' away from science, i.e. teaching according to 'recipes' (cf. Grell and Grell, 1979) and 'everyday didactics'. Both are the results of a general dissatisfaction with didactics (see also Aschersleben, 1983). Didactics seen in terms of 'recipes' for the practician has been substantially criticized. Actually, this development implies nothing more than a return to normative didactics which, as was stated previously, Blankertz (1977) rejected as being non-scientific.

The movement towards 'everyday didactics' is, more than teaching according to recipes, a return to subjective knowledge or knowledge based on experiences, which is considered to be of a greater importance than scientific or objective theory. This point of view, however, possesses a certain naivety. 'Everyday theories' are private theories and the results of reflection. Such theories need not be confronted with rational criteria, because they themselves do not pretend to be scientific. Consequently, the responsibility of every teacher is problematic. To exceed this dilemma 'everyday didactics' has to become 'fête-day didactics' ('Feiertagsdidaktik'; Meyer, 1980), a term which stands for general didactical models and theories like those illustrated in section 3.1.3. In other words, it is questionable whether the movement towards 'everyday didactics' really will lead to a stronger orientation on practice, though it is this perspective's merit that the attention has been drawn to the *subjective side of teaching in connection with everyday conditions*, or that it results in a renewed method of theorizing (Borsum et al., 1982, 69). At research level 'everyday didactics' is connected with action research (cf. e.g. Moser, 1977a and 1977b). This kind of research might be of immediate use

for practice, but scientifically one should, as yet, not expect too much from this approach. Action research does not strictly aim at the development of theory according to scientific criteria.

Nevertheless, the problematic relationship between didactical practice and didactical theory is primarily a concern of theory. Theory does not begin at zero but is affiliated with the insights and knowledge present in practice. This point of view implies the main goal of didactical theory: to help practice, for example by clarifying this practice and making proposals on behalf of changes or the control over practical problems. Didactics as a scientific discipline of education needs to be aware of its right to exist, which depends on its reflection on practice on the one hand and the feedback it provides to this practice on the other. The realization of this demands a theoretical conceptualization of didactics which better adapts to the complexity of everyday education. Consequently, this demands another research approach too, i.e. an approach which does more justice to reality.

During the last decade there has been a growing interest among teacher educators, curriculum developers and investigators in conceptualizations and programmes that focus on the development of teachers who possess skills and dispositions to inquire continually into their own teaching practice and into the contexts in which their teaching is embedded (cf. Zeichner, 1987). The research and development project under consideration fits into this perspective and is based on the conceptualization of *teaching as acting* (see also section 2.2). Through that it hopes to contribute to bridging the gap between didactical theory and didactical practice. A prerequisite for curriculum development based on action theoretical starting-points is an inquiry-oriented arrangement of the curriculum. This enables (prospective) teachers to make aspects of teaching subjects of problematic thinking, often associated with logbook reporting, or to inquire into knowledge and 'actions' encompassing both thinking and doing (cf. e.g. pg. LOBO, 1982; Oudkerk Pool, 1984 and 1987).

In this context particularly the work of de Jong (1988) is worth mentioning. De Jong argues for the development of action orientations, stimulated by certain educational methods, to promote an inquiry-oriented approach to learning to teach. He distinguishes four types of action orientations:

- norm-setting orientations which are often emotionally loaded and usually expressed in 'principles' or 'rules' that underlie actions;
- directive orientations which are the points a teacher uses for the planning and execution of lessons, taking into account that these differ from each other during both lesson phases;
- interpretative orientations which refer to knowledge or conceptions to enable one to explain states of affairs or provide actions with a rationale;
- procedural orientations which refer to a teacher's concrete action repertoire or teaching skills and are often of a routine nature.

Though there is no universal agreement about 'good teaching', de Jong (1988) writes that - when speaking about teaching as a professional activity - the enumerated action orientations need to be characterized by: legitimacy, ecological relevance, theoretical reference, instrumentality, consciousness and internal consistency (see also Peters, Postma et al., 1983). The former four characteristics are successively associated with the enumerated action orientations. The latter two apply to all four types of action orientations. Practically, these six characteristics can be seen as quality demands mediated by reflection; in turn reflection plays an important part in an inquiry-oriented teacher education.

In an attempt to bridge the gap between the theory and practice of teaching, Corporaal (1988) argues for the integration of objective and subjective theories. A teacher's 'personal practical theory' can be considered as a result of this integration process. According to Corporaal such a theory is more than an implicit or naive theory. 'Personal' refers to a teacher's stock of knowledge, connected with his situation and consisting of unique elements. This vision implies an action theoretical perspective on teaching and teacher education. In essence this perspective attempts to link theory and practice without ignoring the relevance of educational theory; teaching and teacher education on the basis of 'rules of thumb' or 'recipes' are rejected.

Impulses to action theoretical arrangements of curricula can be found in publications in which reflective teaching is encouraged (see also section 2.2). In connection with this Zeicher (1987) makes the following remarks:

- teacher educators often use the same labels, such as 'reflective teaching', and employ strategies which may appear similar on the surface, but differ in the way they work out; moreover, such strategies are only effective if teachers continue to be reflective outside their educational environment;
- reflective teaching should be incorporated into every aspect of the programme and may not be an isolated effort within an existing programme which remains unchanged; in this sense a supportive organizational context is also important.

These remarks can be seen as a challenge for research and development from an action theoretical perspective, namely: contributing to bridging the gap between didactical theory and didactical practice concerning the preservice as well as the in-service training of teachers.

3.2 Holism and system theory

In section 2.2 holism was described as an important perspective from which to approach teaching as a complex activity. This methodological principle can be conceived as a part of an action theoretical approach, i.e. the interaction between intentionality and complexity (28).

Basic features of holism are (Jeuken, 1976/1977; van Peursen 1976/1977; van Strien, 1987):

- primacy of totality: the whole is more than the sum of the parts; in reality this does not mean that something is added, but that one considers the same data in an other way and, through that, discovers factors (qualities, functions, etc.) which would not be apparent when describing only a sum of elements;
- parts are replaceable without harming the whole; consequently, variations are never isolated or singular, they form part of a complex;
- ethically it is disrespectful to reduce people to a small number of variables, particularly when ontological pretensions are associated with variables which are the result of an extreme reduction, because freedom, responsibility and uniqueness are basic for mankind;
- behaviour as a whole has priority over a molecular perspective on behaviour (see also note 28).

Through these main features holism actually protests against reducing operations, because these can lead to unwarranted simplifications, in which important characteristics of the research object are neglected, and may start from principles which do no justice to the complexity of reality. Heuristically, as is written by van Strien (1987, 14), such kinds of reduction are of a contraproductive nature.

One should, however, resist an extreme holism which does not accept any reduction or simplification and through which there is talk of a useless antisience (van Strien, 1987, 15). In the project under consideration (Beijaard, 1986) I attempted to solve this problem by means of system theory which realizes reduction in a certain way. Generally, a system theoretical approach has also become part of educational science (cf. e.g. Mesdam and Wielemans, 1978; van Bergeijk, 1982; see also scheme 3.3, section 3.1.3).

This solution in favour of system theory is not surprising. Many of its elements were already present in holism which reverts to a biological way of elucidating life on the one hand, and the historical-hermeneutic way of thinking (see also section 3.1.2) in its interpretation of unique phenomenon from an understandable context on the other (Jeuken, 1976/1977; van Strien 1987). The latter, for example, can be compared with the reading of a text in its context in order to understand this text completely. As a result of this better understanding of parts one better understands the context, which refers to the well-known hermeneutic circle.

What is actually meant by system theory? To answer this question it is necessary to define a 'system'. By van Peursen (1976/1977, 376) a system is defined as follows:

- a system is a set of mutually ordered elements;
- this ordering consists of a network of relationships, also called structure;
- such a set is dynamic, which means continually interacting with the environment;
- this interaction results in the maintenance or increase of the extent of ordering;

- the system developer's goal determines what will be the system and what the environment.

Additionally, according to van Peursen (1976/1977, 376) the goal(s) of a system may result in a differentiation of tasks, which, in turn, may result in subsystems that play a part within the system's goal(s). The elements a system consists of are the components for the upbuilding of the system.

From this definition the following basic characteristics of a system can be derived (Jeuken, 1976/1977; van Peursen, 1976/1977):

- the extent of ordering demarcates the deviding line between system and environment;
- a system is always an open system and, as a result of spatiotemporal influences, continually subject to changes (circumstances and objectives) and, therefore, of a dynamic nature.

The use of systems can be seen as a way of handling reality, though only through a growing-process. They depend on demarcation choices of the user, i.e. the investigator. They primarily tell something about his intentions and possibilities. Hence, knowledge gained according to systems does not strictly meet the demand concerning 'conformity with reality' (isomorphism), but particularly meets the 'benefit for a certain user' (de Zeeuw, 1976/1977).

To avoid using the concept of system improperly, de Zeeuw (1976/1977, 389 ss.) points out that:

- the demarcation of what is 'inside', which should be considered as a whole, is connected with what one is aiming at; a system demarcation has to be justified from this perspective;
- the demand concerning isomorphism with reality is not a realistic one, because it does not take into account one's goal(s) underlying the developed system (besides, with what reality if one considers that a system is a certain 'instrument' to explore or investigate this reality; the idea of growth and openness of a system, therefore, is very relevant).

When using a system there are always human values involved, dependent on one's goals. Therefore, I pragmatically prefer to use a system as a 'thinking instrument' which has a heuristic function to study reality. A system is not a phenomenon by itself which we encounter in reality. Moreover, its value has a bearing upon reducing complexity in a certain way, which is demonstrated in section 3.4 where the system will be presented that has been used in the project under consideration in order to study the complexity of practical teaching (see Beijgaard, 1986). Though isomorphism is not a justifiable demand, I have tried to involve results of the orientation study (Beijgaard, 1985) in the development of the system (see the next section). This contribution from practice legitimates - along with theoretical considerations - the variables chosen and presented by the system.

3.3 Contribution from practice

In this section I will describe the main results of the preliminary investigation (see figure 1.1, chapter 1; Beijgaard, 1985). Presenting these results is important for several reasons. Firstly, practical training centres are virtually unknown. An adequate research design requires a preliminary investigation which contributes to the development of research methods and to the organization of the research project. It also functions as a form of making acquaintance, which can be seen as an important prerequisite for full cooperation. Secondly, the development of a heuristic model, based on system theoretical principles, gains in content and clearness when it has a knowledge-basis which, though tentatively, approaches the ideal of isomorphism.

The orientation study is the result of an integral analysis of qualitative descriptions made of the eleven Dutch practical training centres (Beijgaard, 1984b). These descriptions were realized by means of:

- consulting written materials like annual reports, educational programmes, brochures and other relevant publications;
- verbally given information during conversations mostly with members of the boards of directors on the basis of points for attention which were formulated beforehand ('checklist');
- rough observations of practical lessons and a tour of the schools, boardinghouses, working-halls and farms.

On behalf of the integral analysis 'literature' has also been studied, though the number of publications about practical training centres appeared to be limited (29). Consequently, representatives of this type of education were requested to control and comment upon the text, of which a summary is given below in conformity with the division of the original project report (Beijgaard, 1985).

3.3.1 Main historical moments

Most practical training centres were founded around 1960 due to substantial changes in Dutch agriculture. Some of these changes were as follows (see also Osinga, 1969 and 1984):

- as a consequence of a continuing mechanization farmers became increasingly unfamiliar with modern skills;
- the scaling up, particularly in the field of intensive cattle-breeding, stimulated the introduction of automation;
- the increasing investments in their farms required the agriculturalists to possess an economic awareness;
- rational farm management became a prerequisite in connection with the handling of tools and implements to reduce expenditure and save time and energy.

The regular agricultural schools could not adequately meet these changes, so practical training centres were established. Supplementary to their education-

al programmes, students from regular agricultural schools were obliged to follow short practical courses at one or more practical training centres; in the beginning these centres also provided for the in-service training needs of farmers.

In recent years many developments have come about. Nowadays there are eleven practical training centres in The Netherlands. Together they form a vital part of the total agricultural education system. Along with the training of students in the execution of skills, they substantially contribute to the harmonious development of students' personalities. Nevertheless, the core of the education consists of teaching students to execute agricultural activities in a rational and appropriate way.

The original goal of the practical training centres - offering specialized, practice-oriented education - and their tasks changed in course of time; these changes were characterized by:

- courses of a longer duration with a considerable theoretical component, mostly offered to graduates from secondary and higher agricultural schools;
- a broadening of target-groups, nowadays consisting of students from regular agricultural education (including those from apprenticeships, craft schools, the agricultural university and the veterinary faculty of the State University Utrecht), employers and their employed from trade and industry, (prospective) teachers, individuals active in the field of extension and students from Third World countries (some practical training centres also support or participate in developmental projects in these countries).

These days the practical training centres can be characterized as complex institutions, each of them represents one or more agricultural disciplines, with highly specialized and skilled educational personnel. They complete and finish education received elsewhere, provide specialist courses linked up with general agricultural education and contribute to preservice and in-service teacher education. As such they are an integral and essential part of agriculture in general and agricultural education in particular.

The practical training centres possess sophisticated and up-to-date equipment, while regular agricultural schools are only provided with a standard set of equipment. This well-intentioned policy is partly based on financial reasons. Adaptations and innovations keep abreast of developments in trade and industry and the increasing number of students. Moreover, practical training centres substantially contribute to agricultural innovations. The courses are run by 'instructors', who have different tasks and functions in the internal and external organization of the centres. Generally they are - as previously stated - highly qualified with substantial experience in their subject area. Most of them, however, have not received adequate teacher training.

Currently the practical training centres are confronted with:

- indistinctness about the number of students expected in the near future; short-term facilities are needed, though in the long-term the situation is unclear;

- the establishment of comprehensive, region-bound agricultural education centres, which encompass several types of agricultural education and, consequently, influence the goals and tasks of practical training centres;
- problems in agriculture like the surplus of dung, milk-quota and the concern of the environment in general, which require a new approach by the agricultural population;
- the retrenchment policy of the government, which is an overall problem for education.

In addition to these aspects, it is important that attention is focused on an adequate allocation of tasks by practical training centres in close cooperation with regular agricultural schools (Beijaard, 1985, 34).

3.3.2 Practical agricultural education: general notions and backgrounds

The training of agricultural skills in centres has been legitimated by economic and pedagogic factors. The economic factors are connected with developments in the agricultural trade and industry after the Second World War. The pedagogic factors concern the harmonious education of agriculturalists by means of a well-balanced educational programme. Generally, an increasing shift occurred from the learning of manual skills to the learning of organizational, coordinating and planning skills.

Around 1960 this type of practical education had to be set, which evolved along the following lines (cf. Schroevers, 1966):

- the opinion of Dutch farmers about the objective of agricultural education in the field of professional skills;
- scientific research in agriculture;
- foreign experiences with similar types of education;
- experiences with training courses for professional proficiency in non-agricultural branches of industry.

Didactically, practical education was realized by means of instructional leaflets. Practical education developed a strong pre-programmed character influenced by the training of recruits and employees in the United States in the period leading up to the Second World War.

However, this character of education was soon criticized: the education of students seemed too rigid, with little room for students to develop their own possibilities or to make their own contributions. Moreover, this kind of education was based on the training of adults. Many practical training centres still use instructional leaflets, but these tend now to be of more open character.

Opinions about the nature of practical education substantially differ from one another. These different opinions can be summarized by two distinctions.

- 1) *The distinction between theory and practice.* According to many individuals involved, the meaning of teaching professional skills is derived from learning based on a series of actions: students know roughly what to do, but it is questionable whether they perform the necessary actions well.

This view on practical education has dominated for a long time. From this perspective it was considered that both knowledge and insights, nowadays emphatically conceived as prerequisites for acting practically, had to be learned elsewhere, i.e. in regular agricultural schools. These days, however, it is generally accepted that skills may not be reduced to the mere execution of work. Knowledge, insight and skills form an integral part of a teaching and learning situation, though their emphasis may differ and depend on the type of course or subject-matter.

- 2) *The distinction between education and instruction.* The latter is often connected with the solution of short-term problems. Instruction refers to well-described actions of a short duration, which have to be executed in order to achieve a certain goal. Nevertheless, the distinction between education and instruction seems to be a gradual one (30). Education encloses instruction, but is also a broader concept. Education encompasses closed as well as open teaching and learning processes, which are also co-determined by intentions of teachers and students.

Both distinctions have strongly influenced the discussion about the nature of practical education and, through that, the status of the practical training centres and the legal status of the educational personnel.

The practical training centres emphasize the learning in real situations (for example handling implements in the fields), or situations which approach this reality as closely as possible (simulation). Consequently, it is important that students do have the opportunity and ability to apply experiences gained in a more theoretical setting, i.e. the regular agricultural schools. The interaction of knowledge, insights and skills, therefore, has to be a shared responsibility of the two settings as is illustrated by figure 3.3. Both types of education serve the same purpose. From the perspective of a shared educational function - preparing students for functioning adequately in a (future) profession - practical training centres and regular agricultural schools should be fully aware of each others' curricula. The programmes of both types of education should be perceived as integrated wholes of theory and practice.

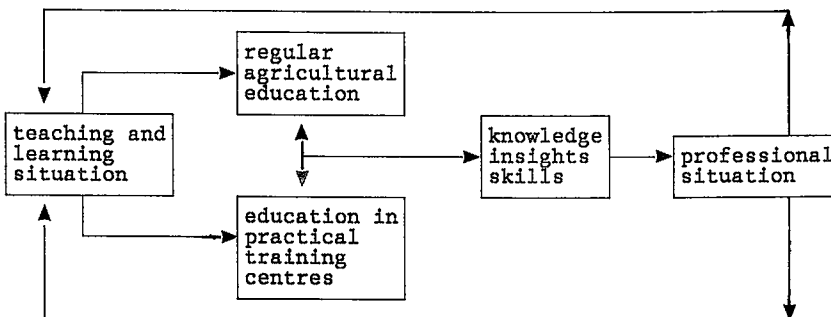


Figure 3.3 The shared educational function of practical training centres and regular agricultural schools (Beijaard, 1985, 46).

3.3.3 Some features of the learning and teaching situation

In practical training centres learning occurs according to the principle of 'learning by doing'. This applies to all the practical lessons. By doing, students acquire knowledge, insights and skills. In connection with pedagogical elements involved in practical education and an adequate relationship between regular agricultural schools and practical training centres, this description of learning by doing corresponds with the way Nijhof and Mulder (1986) define basic skills in order to determine goals of certain types of vocational education. According to them basic skills are broadly qualified elements which encompass knowledge, skills and attitudes. In this sense basic skills are transferable to allied professional situations and important in order to execute different tasks (Nijhof and Mulder, 1986, 31). Generally, it can be concluded that practical learning should not be reduced to psychomotor learning. The definition of Nijhof and Mulder is of particular relevance in considering a close connection between the curricula of regular agricultural schools and those of the practical training centres (see also section 3.3.2). Learning by doing is elaborated methodically by means of instructional leaflets, which vary nowadays from closed to open or from strongly pre-structured to almost unstructured (31). This differs per centre and depends on subject-matter. The centres also differ from each other with regard to their background philosophies concerning the confrontation of students with, for example, available learning materials. This means either starting from these materials, through which students are confronted with as many materials as possible (such as machines and implements), or starting from fundamental concepts underlying these materials. The latter approach argues for an exemplary way of learning. Through both approaches students' self-activity and independence are stimulated.

Teaching is to a large extent determined by the way learning processes are structured. Besides, the practical training centres differ from each other in the way they handle standardized didactical procedures. This varies from general didactical notions, with the emphasis on an instructor's own responsibility for his field of specialization, to teaching according to 'recipes', usually prescribed by others and fixed in so-called 'instructor-instructions' which can be compared with lesson schemes. Instructor-instructions imply advantages as well as disadvantages. Some advantages are as follows: new instructors particularly find them supportive, they guarantee uniformity in the approach of students and their learning results, implicitly control an instructor's teaching qualities (for example when many students fail) and guarantee students' safety and the careful use of implements and tools as well as in dealing with animals.

The implicit controlling function of instructor-instructions, however, may also imply a disadvantage. It is questionable whether this function stimulates the atmosphere. For this reason several practical training centres abandoned the idea of instructor-instructions in favour of a didactical prescription in principal themes. A further disadvantage of strongly prestructured instructor-

instructions concerns the negation of the instructor as a person, who is reduced to a mere executor of didactical rules and procedures mostly prescribed by others. This results in didactics of a normative nature which have long been rendered out of date (32). During recent years there has been a noticeable tendency towards instructor-instructions which only prescribe essentials. This can be seen as a compromise between advantages and disadvantages.

Instructors generally find it disadvantageous to teach relatively 'anonymous' groups of students. Usually they run short courses for the duration of one week. Consequently, it is impossible to build up a relationship with students. On the other hand, their teaching situation demands they possess a flexible attitude and the ability to meet learning needs at different levels.

3.3.4 Organizational structure and governmental policy

The initial pioneering phase (for most of the practical training centres around 1960) soon made room for a phase of differentiation as a result of growth and the increasing complexity of the internal and external school organization. This required specialization, coordination, rationality, structured leadership and communication. Currently the practical training centres have reached a phase characterized by consolidation, reflection and integration.

Though the practical training centres differ in educational and organizational complexity, it can be concluded that their internal as well as external organizational structure is of a complex nature. The educational personnel, for example, participates in all sorts of working-groups, committees, etc. The knowledge and experience of the instructors are often considered to be of a great importance outside of their own institutions.

Up to the middle of the seventies governmental policy was, for the greater part, directed individually (decentralization). After that the Ministry of Agriculture and Fisheries aimed at an increasing coordination and, through this, at the establishment of uniformity based on collective, legal regulations (centralization). One issue concerns, as stated above, the status of the practical training centres and the legal status of the educational personnel. Are they teachers or instructors? Do they teach in schools or in institutions? Up to the present, questions like these have not been fully answered.

3.3.5 In-service education facilities

Each day varying groups are taught which differ in age, previous education, backgrounds and experiences. Subjects often have to be taught at different levels. Pedagogically and didactically this demands that an instructor is inventive and flexible. He also has to keep in touch with new developments in

his field of specialization. Usually, there is little time for extra in-service activities.

Every new instructor has to go through a period of becoming acquainted with practical teaching, supervised by an experienced colleague. In reality the scope, intensity and duration of this period differ in each centre. This period could be elaborated more systematically by most of the practical training centres.

Since 1978 there have been some pedagogical and didactical in-service activities, organized by a committee consisting of representatives of the practical training centres and external consultants. An increase of these activities was in great demand. The project under consideration has served this purpose. A research-based curriculum was developed and implemented at the end of 1987 (see also figure 1.1, chapter 1).

3.4 Heuristic model for research on teaching

In this section a model will be presented which is partly based on developments, problems and perspectives described in preceding sections. The model hopes to do more justice to the educational reality from a holistic point of view. It is primarily a descriptive model which pays attention to teaching as such and to teaching in connection with influences from the task environment.

3.4.1 Presentation of the model

The model which served as a heuristic model for research on practical teaching (Beijaard, 1986), has been developed with the help of system theory. As previously stated a system is characterized by totality and interplay. A system scheme functions as a 'working instrument' and contains the essential elements of a system in a synthetic and well-ordered way. A system is, as it were, a comprehensive checklist of questions to study a reality (cf. Mesdam and Wielemans, 1978). A system is also characterized by the extent of its complexity, openness and the way it has been built up hierarchically. The model in this section represents a complex system consisting of interacting sub-systems.

Figure 3.4 shows the 'model of teaching' (system scheme) on which the research on practical teaching was based (Beijaard, 1986). In conformity with van Bergeijk (1982) this model can be subdivided into three sub-systems.

- 1) The *inner system* consists of four aspects derived from the teaching and learning theory of the Berlin didactics (Heimann et al., 1965; see also scheme 3.3) extended with 'interaction' as a result of critical conceptualizations of didactics (cf. Schulz, 1981), meaning teacher-student and student-student interactions.
- 2) The *outer system of the first order* consists of relevant features of the task environment in relationship with practical teaching as the object of

research. This sub-system has been derived from results of the preliminary investigation (Beijaard, 1985) of which a summary is given in section 3.3. The teacher himself also forms part of the task environment with regard to his backgrounds, previous education, etc. The four features, which in turn consist of many variables, co-determine the way the inner system functions. It should be emphasized that the outer system of the first order is related to the object of research. It will undoubtedly look different when it is related to another object within the teaching domain, for example the teaching of mathematics in general secondary types of education.

- 3) The *outer system of the second order* incorporates both the other systems. It acts upon the inner system through the outer system of the first order and, through that, it sets norms, limits and determines forms (cf. van Bergeijk, 1982, 25).

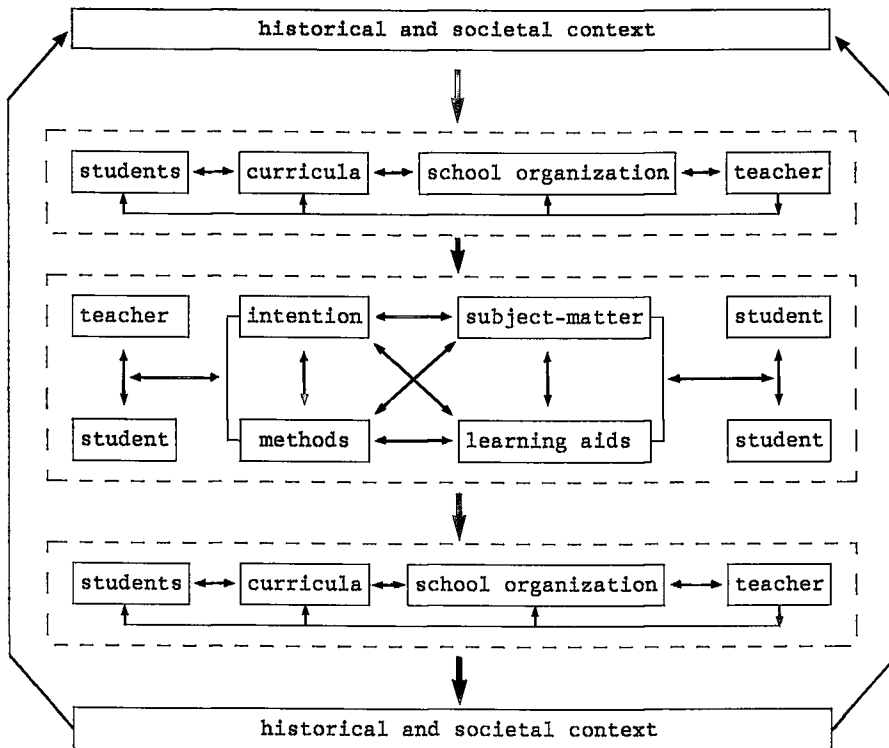


Figure 3.4 System model and sub-systems with regard to teaching.

The 'systems' presented by the model mutually influence each other. The inner system exerts an influence on the outer system of the first order, which, in turn, exerts an influence on the outer system of the second order, etc. In other words, the model is of a dynamic and cyclic nature. Returning to the

Berlin didactics (Heimann et al., 1965) it can be concluded that (see also scheme 3.3):

- the first level of reflection has been extended, though the anthropological and social-cultural determinants are involved in the outer system of the first order;
- the second level of reflection, the analysis of factors, belongs particularly to the outer system of the second order.

The teaching and learning theory of Heimann et al. has been chosen to serve as a basis, because it pretends to be close by practice, encompasses all important phenomena in education and, though that, it is doing more justice to a teacher's task. Moreover, this theory wants to be a help for the practitioner without being prescriptive based on criteria as regards content. It is a descriptive theory offering teachers and students necessary degrees of freedom to act and it is applicable to small teaching units like one lesson (see also Borsum et al., 1982).

The model (figure 3.4) demonstrates that teaching must be placed within a complex framework of factors, which interact in a complicated way. The research project under consideration was intended to systematize this complexity by means of the model as a 'working instrument'. This task has been accomplished from an action theoretical perspective. The emphasis has been placed on the smallest sub-system, respectively the inner system or the teaching and learning situation, and the outer system of the first order, respectively aspects of the task environment. Nevertheless, it is important to incorporate these two sub-systems into a historical and societal context, which will explain many findings about teaching within and influenced by a certain task environment. This has already been illustrated in section 3.3 with reference to the preliminary investigation (Beijaard, 1985).

3.4.2 Limitation and extension of the model

The model presented can be considered as a structural model. It is a way to give meaning to holism from a theoretical perspective. The construction of this model implies subjective choices concerning the selection of interpretation theories (system theory and the Berlin theory of teaching and learning) in order to give concrete form to the previously formulated knowledge ideal, i.e. understanding the complexity of teaching. Part of this knowledge ideal, however, also refers to the study of teaching as a *process*.

In chapter 2 teaching was defined as a compound action unit consisting of planning, execution and reflection. These three coherent parts of teaching were then defined as compound action units. On behalf of the research design the structural model was extended with a process model based on earlier described results of research on teacher thinking (and acting) (see section 3.1.1). Figure 3.5 represents this process model, including central points of attention.

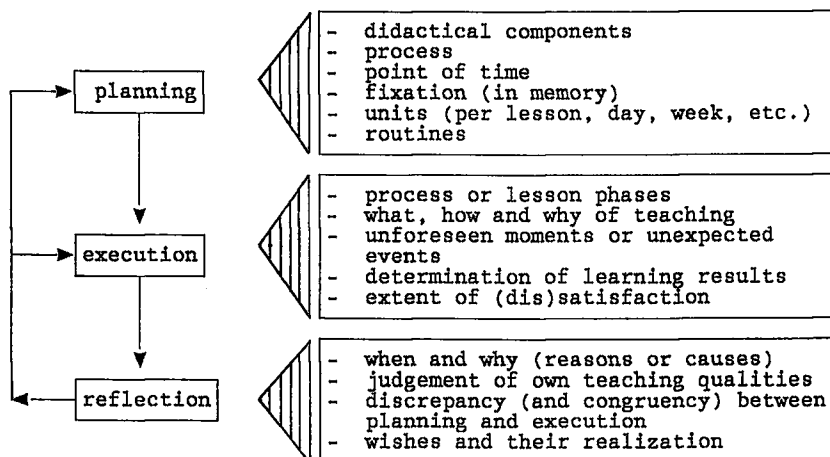


Figure 3.5 Process model of teaching and points of attention for empirical research.

In certain teaching aspects both models overlap. For the greater part, however, they have to be considered as separate from each other. In the research design the emphasis was placed on the study of teaching, respectively the execution of practical lessons, according to the inner system of figure 3.4.

3.5 Appraisal

Interpretation theories have been described in order to realize the transition from the theoretical orientation (and methodological rules) at paradigmatic level to the design and the execution of empirical research. By means of system theory I have attempted to give concrete form to the methodological principle of holism. Didactical theory has been used to determine what to investigate, including results of the preliminary investigation (Beijaard, 1985), with regard to structural components of practical teaching and aspects of the task environment. Important variables for studying the process of practical teaching could be identified by examining results of research on teacher thinking (and acting). In addition, the project under consideration was located within a historical perspective. This is of particular importance for the understanding of the starting-points in chapter 2 which can be seen as a new stage in research on teaching, though - as was previously stated - the concept of action itself is not a new one. This concept has, methodologically as well as theoretically, several sources.

The theory described in this chapter tries to meet several demands which are elaborated in chapter 2. To summarize, theory serves the following functions (see also van Strien, 1987):

- it facilitates the development of adequate research methods and techniques (search-light function of theory);
- it provides the interpretation process with a systematic nature.

It may be expected that theoretical (as well as practical) knowledge will benefit the quality of research results in comparison with, for example, an immediate representation of the reality. As a consequence, carrying out research guided by theory also enables an investigator to exceed and, if necessary, to criticize daily fixations.

With the help of theory an adequate and relevant reduction of the complexity is aimed at. Neither theory nor practice are served by mirroring this complexity. In connection with the problem and objective of the project under consideration (see chapter 1), both are equally important. Consequently, it was decided - in conformity with notions about practice-oriented research in chapter 2 - to choose a function of theory which leaves sufficient room for reality interpretations of the subjects involved. The theory helps, as it were, the investigator to focus his attention and to reconstruct these reality interpretations from the collected data. This reconstruction should not only take a theoretical perspective (see also Wester, 1987), but calls for an interplay between theory and practice, taking into account that practice is synonymous to reality. As such, theory helps to systematize practice, while practice contributes to the development of theory.

For the greater part this chapter explains *what* has been investigated. How this occurred with regard to research on external observable behaviour, underlying cognitive processes, including the conative elements involved, and aspects of the task environment has not yet been explained. This is primarily a methodological concern and will be elaborated in subsequent chapters. The adequacy of the decisions made in the chapter in question and, through that, the subjective elements involved, can only be discussed properly after presenting how the research project under consideration has been designed and executed and after presenting major research findings. This will occur in the next chapter. Until further notice, therefore, I am content with the remark that it is relevant to an investigator to make his frame of reference explicit. This must be seen as one requirement among others in order to guarantee the quality of scientific research.

4 STUDYING THE COMPLEXITY OF PRACTICAL TEACHING IN AGRICULTURE

This chapter emphasizes the research strategies, including the description of major findings, of the phases 2a and 2b of the project under consideration (see figure 1.1, page 12, and the explanation of these project phases in section 1.2). The central project phase (2a) concerns research on practical teaching. The starting-points of this phase were described in chapter 2. In chapter 3 this project phase was related to scientific traditions in general and paradigms of research on teaching in particular. Attention was also paid to the interpretation theories chosen. Chapter 3 ended with a structural and process model for the research on practical teaching.

The project phase 2b concerns the research on student perceptions and may be conceived as complementary to phase 2a. This corresponds with the underlying starting-points described in chapter 2. It is expected that the results of research phase 2b complete those of phase 2a and, as such, also have a validity function. Both project phases have been extensively reported (Beijaard, 1986 and 1987b; Kingma, 1986; 1988). In this reconstructive study certain aspects will be accentuated, for others I refer to the original publications.

For both project phases the research strategies can be placed under three headings: the research design, data collection and the processing of data (cf. also Smaling, 1987). In section 4.1 this will be done for project phase 2a. The research strategy of this phase is related to the interpretative or hermeneutic tradition. Determining the context of the research strategy of project phase 2b appears to be less clear. This phase, namely, contains strategic aspects of the empiric-analytical and the hermeneutic or interpretative tradition. Project phase 2b will be reported in section 4.2. Both project phases are discussed in section 4.3. A discussion of methodological issues concerning objectivity, reliability and validity is postponed until chapter 6, though many aspects concerning these issues are already introduced - implicitly and sometimes explicitly - in this chapter.

Finally, it should be noted that the study of teacher reflections also forms part of project phase 2a. However, these - because of their relevance to the reconstructive study - are the object of chapter 5.

4.1 Phase 2a: research on practical teaching

This section will deal with the strategy that was followed during research on practical teaching. The research strategy of this project phase differs from

the 'empirical cycle' of de Groot (1975), dominant until recently and consisting of the following phases: 'observation' (collecting and ordering of data; development of hypotheses), 'induction' (formulating hypotheses), 'deduction' (inferring testable predictions; operationalization of hypotheses) and 'evaluation' (of the results in connection with the hypotheses or theories). Van Strien (1975) calls this research strategy the 'predictive cycle' of scientific thinking (33). In fact, this strategy corresponds with scientific notions belonging to the empiric-analytical research tradition and is, according to Rink and Rijkeboer (1983), primarily theory-oriented, i.e. directed towards the testing of theory. In their opinion, social research has to contribute to the solution of practical problems and to the development of theory (see also van der Zee, 1983; Plooij and van den Dungen, 1985). Accordingly, social research needs other criteria. Many of these criteria are described below and in chapter 6, in which special attention is paid to relevant methodological and methodical aspects.

Major research findings are also described in this section. A description is given of task environmental influences, the process and structure of practical teaching. The section ends with several concluding remarks about project phase 2a.

4.1.1 Design: research questions and the way they were made concrete

The research design details the way in which one or more research questions are answered. A problem is given form by the design, which also explains how this problem can be solved on the basis of empirical findings (cf. Smaling, 1987, 299).

The questions of research phase 2a are based on the general problem explained in chapter 1. This problem can be summarized as follows: instructors of the training centres for practical agricultural education are highly qualified in their fields of specializations, but most of them, however, did not receive any adequate teacher training. Their teaching capabilities have been called into question (Beijaard, 1984a). The research objective, therefore, was formulated in terms of making a systematic inventory of the instructors' (individual) didactical knowledge. As such, an attempt has been made to link up with recent developments in research on teaching (see section 3.1). The starting-points and key-concepts in chapter 2 can be seen as a (tentative) result of this attempt.

With reference to the explanation in chapter 2, the research problem has been subdivided into four research questions which are presented and explained below.

1) In what way is teaching by instructors in practical training centres determined by characteristics of the task environment?

Relatively stable characteristics of the task environment - of which a teacher also forms part as far as this concerns his previous education, backgrounds, personality traits, etc. - strongly determine a teacher's task. Moreover, the task environment is characterized by a complexity which teachers routinely reduce (cf. Lowyck, 1984). Because of these two reasons it is important to investigate how teachers perceive their task environment and its influence on their teaching.

It is assumed that teachers interpret characteristics of the task environment and its influence on their teaching in their own way, dependent on their personal characteristics and the knowledge they possess. This knowledge, for example, may consist of theoretical knowledge, implicit or subjective theories and principles - which Bromme (1976) summarizes with the term 'everyday knowledge' - and practical knowledge, i.e. usually non-systematized knowledge based on experiences (cf. also Tillema, 1985). In this study different types of knowledge are defined something else. The most important are objective theory, i.e. scientifically gained knowledge, and subjective theory which refers to knowledge of the individual in practice. In literature this knowledge is often described as similar to practical theory (see e.g. Handal and Lauvås, 1987).

It is not sufficient to study the influence of the task environment on teaching by means of teacher perceptions alone. Observations of classroom teaching also need to occur in order to trace autonomous influences as well as influences which teachers do not represent cognitively. As such, a more complete 'picture' can be obtained. Moreover, observations contribute to the internal validation of cognitive representations.

The outside system of the first order in figure 3.4 (page 79) indicates which aspects of the task environment are assumed to influence teaching (in practical training centres) in an integrative way (see also Beijgaard, 1985).

2) What are the features of education in practical training centres in general and those of teaching practical lessons in particular?

Teaching is considered as a compound and complex unit of action that consists of planning, execution and reflection. For several reasons the investigation needs to emphasize the execution of lessons. Firstly, during lesson planning much remains implicit or occurs routinely. Secondly, lesson planning is always of a tentative nature.

The study of teaching calls for observations along with cognitive representations. Teachers reduce 'complexity' on the basis of (non-reflective) routines and much of their knowledge is, as it were, embedded in the practice of teaching itself. Hence, external observable behaviour should also be studied. With reference to these observations it is important to investigate a

teacher's underlying meanings behind what has been observed. Teaching in practice needs to be understood in view of a teacher's implicit or explicit goals. In this context one might speak about the articulation of 'tacit knowledge', that is to say the articulation of knowledge incorporated in teaching practice itself (cf. Olson, 1984).

It is assumed that - in accordance with the explanation of the preceding research question - observations and teachers' meanings about these supply one another; together these data sources also benefit the internal validity of the research results. Teaching features to be studied are expressed in figure 3.4 (the inner system; page 79) and figure 3.5 (process model of teaching; page 81).

3) What is the nature of intentions, cognitions or subjective theories expressed and mediated by reflections of the instructors involved?

It is assumed that teachers act intentionally, that is to say willingly and knowingly. Consequently, this enables an investigator to examine reasons or motives underlying actions and, through these, to gain insight into a teacher's intentionality (see also Lowyck, 1984).

Gaining insight into a teacher's intentionality is possible via reflections. For this purpose reflections can be seen as a source of information distinct from reflection as a teaching phase, i.e. answers to 'why-questions' after certain actions (reflections evoked by the researcher) and spontaneously given reflections. Both evoked and spontaneously given reflections may also have a bearing upon reflection as a teaching phase, which - in turn - has a bearing upon the planning and execution of lessons.

It was previously written that reflections are present in actions. As such, they are a function of intentionality, directed towards the past and the future, they are connected with one's attitude or ability to concentrate on something, they serve an objective and represent cognitive as well as conative elements. A subject and a context are presupposed (see chapter 2).

It is assumed that an interpretation of teacher reflections indicates how a teacher's intentionality has been built up and structured. In connection with observations, as is explained above, this assumes that it is possible to notice congruences and discrepancies between what teachers 'think' and 'do'. This refers to the distinction between internal (mental) and external (material) acting, though both ways of acting possess the same structure (Leont'ev, 1979 and 1980) and emphatically need to be considered as two sides of the same picture.

4) **Which suggestions for the development of an in-service programme can be formulated as a result of a coherent reconstruction of practical teaching?**

It is supposed that interpretations - in depth (per individual) as well as in breadth (across individuals) - lead to the construction of 'complete pictures'. These interpretations may contain several suggestions for the development of an in-service programme, in which the 'actor's point of view' (see also Smaling, 1987) plays an important part along with and in coherence with objective, scientifically gained theory.

In section 4.1.4 the research results regarding the first two questions will be presented. The results with reference to the latter two questions are described in chapter 5.

4.1.2 Data collection: the use of a combined set of methods and techniques

In conformity with Smaling (1987, 303) three aspects of the research strategy are connected with the collection of data: (1) gaining access, (2) developing and maintaining relationships and (3) methods and techniques used. These aspects of data collection are described below.

1) Gaining access

Gaining access into the field formed an important part of preparing the investigation. This preparation can be summarized as follows:

- sending a brochure to the principals of the schools and educational personnel to inform them about the project objective, backgrounds and procedure;
- paying visits to the practical training centres within the scope of the preliminary investigation and placing the results at their disposal (Beijaard, 1984b and 1985);
- being a member of a committee (CNP) which has been founded in order to look after the instructors' teaching qualities and to initiate and stimulate short running in-service schooling activities;
- developing a relationship with the centres' educational coordinators and playing an active role in their meetings, for example by working out and presenting an educational theme.

In the mean time the preparation of the research on practical teaching was ongoing, i.e. the study of literature and the construction of research methods and techniques. This lasted - including the preliminary investigation - for about a year (from August 1984 until September 1985).

2) Relationship with the informants selected

Relationships were developed along the following lines.

- Developing criteria for the selection of possible informants: they needed to teach practical lessons (eventually either besides, in connection with or prior to more theoretical lessons), to work minimally half-time as an instructor and to be appointed before the first of January 1985.
- Selecting the informants from a list of names compiled by the educational coordinators. On the basis of the earlier mentioned publications (Beijaard, 1984b and 1985) it was possible to select 29 instructors. They had to represent the eleven practical training centres as well as the different types of courses these centres offer (management courses for graduates from secondary and higher agricultural schools, apprenticeship courses, craft school courses, specialized courses for personnel from trade and industry, international courses and one-week courses for students from regular agricultural schools). The number of selected informants corresponded with the number of 'course-member weeks' (34).
- Asking the selected informants to cooperate. This request was accompanied by a description of the research objective and procedure, supporting instances and people, the phases of data collection, what could be expected by the instructors, the way they had been selected and why, and the guarantee of confidentiality when recording and processing the data (see also van der Zee, 1983; Emans, 1985).
- Informing the educational coordinators about the procedure followed in approaching the informants and asking them, if necessary, to answer informants' questions or to clarify any confusion. Finally, all the selected informants proved willing to cooperate (100% response).
- Determining a suitable timetable for the participants in consultation with the educational coordinators and tuned to the process of data collection. The informants had to be available for research purposes for a whole day, as explained below.

3) Data collection: methods and techniques used

A combined set of research methods and techniques was chosen in order to understand teaching as a complex activity. The reflection upon this choice and its consequences in connection with objectivity, reliability and validity of research results is in chapter 6.

According to Tillema (1985), methods and techniques for research on 'teacher behaviour' can be divided into the following two main categories.

- 1) Methods and techniques directed towards the analysis of a certain task, like the planning and execution of lessons, with the emphasis on (cognitive aspects of) acting. When an investigator, for example, is interested in the way a teacher functions, then he can make use of ethnographic methods such as interviews, questionnaires, logbooks and participant observation.

Through these methods an investigator is usually directed towards meanings teachers give to their actions. Methods like thinking aloud and retrospective techniques (e.g. stimulated or free recall) are also useful.

- 2) Methods and techniques directed towards a teacher's theories, professional knowledge, principles, etc. which he possesses and uses during the execution of a task. These methods accentuate the reconstruction of one's knowledge in connection with the context and the structure of this knowledge. By some of these methods or techniques teachers are confronted with sorting and judging tasks to discover their corresponding considerations. Network representations for the analysis of verbalizations can also be considered as a promising technique.

For the research on practical teaching (phase 2a) Tillema's distinction has not been strictly followed, though methods and techniques were used which he classes in the first category. These will be theoretically as well as practically explained below, in conformity with the *process of data collection per informant*.

Preliminary conversation

At the beginning of the process of data collection it is important to create an appropriate research situation. The meaning of a - often brief - preliminary conversation should not be underestimated: "At the beginning it is important to interest the informant, to build up a shared perspective, to clarify tasks, to gain confidence and to cultivate the right climate" (van der Zee, 1983, 70). It is generally felt that such a preliminary conversation should not take a long time.

It appeared that most of the instructors involved had been well informed beforehand (see section 4.1.1). The preliminary conversation, therefore, could indeed be kept brief.

Structured open interview (I)

Interviews can be defined as verbal methods of gaining information, for example based on questions that serve a scientific objective. They can be distinguished from everyday conversations by the way they are planned. Dependent on their composition and handling, interviews can be distinguished at two dimensions: structured versus unstructured and closed versus open (cf. Hron, 1982; Emans, 1985).

I chose for structured open interviews rather than closed or standardized interviews. 'Structured' refers to the extent to which questions are fixed in the interview-scheme beforehand with regard to their formulation and their sequence (Emans, 1985, 20). Independent of the extent of structuring, open interviews are characterized by the following precepts (see also Bromme, 1981a; de Vries, 1982):

- due to no or little directive questions the responding behaviour is hardly submitted to restrictions;

- elucidating is not possible without the understanding of meanings (understanding precedes elucidating);
- different people give things different meanings.

In addition, open interviews enable an investigator to collect ecologically valid data.

With regard to aspects concerning the sequence, usage of language, etc., van der Zee (1983) as well as Emans (1985) give many instructions for the construction of (open) interviews. They also pay attention to possible problems of which an investigator needs to be aware. According to van der Zee (1983, 164), it is of a great importance that the investigator sticks to the research problem during an open interview. This particularly helps him during in-depth questioning.

The time necessary for the interview varied from 1 to 1 1/2 hour. The questions were constructed on the basis of the theory outlined in chapter 3 and the results of the preliminary investigation (Beijaard, 1985). The interview questions had a bearing upon (see appendix 1):

- characteristics of the task environment in connection with teaching, including instructors' personal features (part 1 and part 2 of the interview);
- teaching to be seen as the planning and execution of lessons and the reflection on both (part 3 of the interview);
- the informants' perception of the interview situation (part 4 of the interview).

The interview was audio-taped.

Observation

Much has already been written about observation methods. With Hermans (1984, 262), I prefer to define observation in terms of a goal-directed and systematic way of looking at behaviour. Observation methods vary from more participating (see e.g. Maso, 1987; Wester, 1987) to less participating (see e.g. van de Sande, 1984). Critical discussions about these different types of observations, for example, can be found in the work of Segers (1983), Bulmer (1984) and Swanborn (1987). Studies like these also contain relevant information about other methods and techniques.

The choice in favour of a certain observation form largely depends on the research objective. Consequently, I chose for rough observation categories, which must also be considered as units of analysis. These categories were derived from didactical theory with regard to the smallest subsystem of figure 3.4 (page 79), i.e. the inner system which represents the teaching and learning situation. The rough observation categories gave direction towards what would be observed and intended to do justice to the complexity of the everyday reality.

The observation of a practical lesson took place shortly after the interview. For pragmatic reasons, it was decided to make field-notes instead of video-taping: practical lessons particularly are often enacted at different places

in different buildings, or at fields a long way from the schools. The making of field-notes was supported by a rough observation scheme - based on theory as has been explained above - in order to do justice to teaching as a complex activity on the one hand and the process of teaching on the other (see appendix 2).

Immediately after the observation, the field-notes were worked up into questions on behalf of a retrospective interview with reference to what was observed. The preparation of this retrospective interview occurred on the basis of a framework for interpretation (see appendix 3). This framework might be seen as the result of a cohering reflection on:

- didactical components of the inner system 'teaching and learning situation' as presented by figure 3.4 (page 79);
- research results of action theoretically oriented studies and underlying starting-points (see chapter 2).

Because of pragmatic reasons, and as a result of the try-out, a 'manual' could be generated from the interpretation framework in order to facilitate the preparation of the retrospective interview (see appendix 4).

'Context-embedded' retrospective interview

Ericsson and Simon (1980 and 1984) make a distinction between verbalizing during and after the execution of a task, respectively called 'concurrent verbalization' and 'retrospective verbalization'. Talking or thinking aloud can be seen as an example of the former. Recently, this method has often been used to reconstruct teachers' planning processes (cf. e.g. Lowyck, 1979; Bromme, 1981b; Peters and Beijaard, 1983; Tillema, 1983). By talking or thinking aloud cognitive processes remain unchanged. The task determines what information will be verbalized and what information remains hidden.

In some of the studies quoted above, the execution of lessons was also reconstructed using recall techniques - such as stimulated recall, free recall or a combination of both these techniques - with reference to videotapes. These techniques or methods are examples of retrospective verbalization: verbal reports of hidden information are accessible via the informant's short-term memory. These reports represent specific cognitive processes and structures underlying observable behaviour. Ericsson and Simon (1984, 15), who locate their theory within an information processing model, see verbal reporting successively as: focusing the attention on information, encoding into language and verbalizing. It is assumed that there exists a close link between the information needed and the information stored in memory (Ericsson and Simon, 1984, 107). It should also be noticed that a subject cannot report information which is not present in the short-term memory, i.e. cues which enable a subject to recognize stimuli. The result of the remembrance process is hidden, though this can be reported, the intermediating steps within this process generally cannot. However, the inability to report remembrance cues must not be mixed up with failures inherent in reporting contents from the short-term memory (Ericsson and Simon, 1984, 167; see also Vermunt et al.,

1986, 189). These cues deal with automatic processes which quicken the processing of information. They are not available through the short-term memory and, hence, not available by way of verbal reports.

Possible problems concerning the handling of retrospective techniques can be (Ericsson and Simon, 1980; see also de Corte et al., 1986):

- the informant's reformulation does not necessarily need to represent a reflection of actual performed actions;
- the extent of detailing and explication in the reflection depends on the instruction to verbalize and on the way in which the instruction is verbalized;
- the reflection may also have a bearing upon former events or memories from the past, so that the desired information will not be obtained;
- decoding from memory and verbal reporting take time, which may imply a procedural difficulty for the investigator.

In the research on practical teaching, questions were used during the retrospective interview which contained contextual information as a result of the observation phase. Through this, the informant was supported to retrieve the desired information from his memory (Ericsson and Simon, 1980, 224). This procedure partly meets the problems enumerated above. In addition, many shortcomings in verbal reports can be attributed to memory failures or confusions, particularly when an informant is requested to give general retrospective reports, rather than reports of recent specific episodic memories. If a subject fails to retrieve information from his long-term memory, than he might argue about the situation and report the results of his inferences instead of memories (Ericsson and Simon, 1984, 168).

Despite several problems, retrospective methods or techniques can be seen as valuable and reliable sources of information. "Human subjects are not schizophrenic creatures who produce a stream of words, parallel but irrelevant to the cognitive task they are performing. On the contrary their thinking aloud protocols and retrospective reports can reveal in remarkable detail what information they are attending to while performing their tasks, and by revealing this information, can provide an orderly picture of the exact way in which the tasks are being performed: the strategies employed, the inferences drawn from information, the accessing of memory by recognition" (Ericsson and Simon, 1984, 220) (35). This conclusion is also shared by Meijer et al. (1986), who, among other things, studied the relationship between remembrance and self-judgement. In connection with the validity of retrospective data they write that retrospective data do not deserve the distrust it incurred in the past; that is to say, not a priori, because the use of retrospective data makes high demands upon the theoretical interpretation (Meijer et al., 1986, 201). In their opinion the scientific objectivity of retrospective data is under discussion in connection with their interpretation and explanation. This, however, applies to all scientific methods and, therefore, retrospection has no particular status. It is a prerequisite that an investigator interprets the informant's verbalizations carefully and that he shows understanding of

the circumstances under which these verbalizations were gained (Ericsson and Simon, 1980, 247).

In practice, the context-embedded retrospective interview took approximately one hour on average. This interview, which frequently used in-depth questioning, was also audio-taped.

Structured open interview (II)

This second interview, qua structure and procedure similar to the first interview, took approximately 15 minutes (see appendix 5). In this interview questions were posed with regard to:

- the informant's own image of the lesson taught and, eventually, the desired image, possibilities and impossibilities of realizing this image, educational in-service needs in general and with regard to teaching in particular (part 1 of the interview);
- the informant's experiences of being a participant in the investigation and experiences of having been observed during teaching (part 2 of the interview).

The first category of questions aimed at the gaining of more insights into the content and 'direction' of reflection as a part of teaching, while the second category of questions emphasized the gaining of methodological data concerning reliability and validity. This second interview was also audio-taped.

Logbook reports

Logbooks are frequently used in teacher education and considered as learning aids which stimulate the learning of reflective abilities by prospective teachers. It is supposed that writing and reflection help students to make sense of their own experiences and, through that, to become researchers of their personal and professional life (Clark, 1983, 56). Stages in writing can be identified as well as different types of writing representing different kinds of thinking (cf. Holly and McLoughlin, 1989).

In practice, logbooks are used in different ways, namely as (cf. Figuee, 1984):

- documents to remember things because of the retrospective nature of their texts;
- documents to order experiences and to relate these experiences to the broad context of (parts of) one's own profession;
- documents to develop in terms of a 'growing process' on the basis of learning from one's own experiences;
- documents to evaluate one's own actions or to be used by other persons.

Only a little is known, however, about the use of a logbook as research method, though, as in teacher education, investigators are increasingly interested in handling logbook reports for research objectives (cf. Vonk, 1982; Tistaert and Broeckmans, 1983; Vedder, 1984; Broeckmans, 1987). These research objectives particularly refer to situations in teacher education.

For the investigator it is often difficult to determine the logbook's extent of prestructuring. The extent to which the style and function of writing is fixed, similarly reasons for writing, does not correspond with the original nature of diary keeping. In educational situations teacher educators often prefer the use of logbooks which are hardly prestructured in order to stimulate prospective teachers' processes of self-structuring.

In the research on practical teaching preference has been given to a certain degree of prestructuring, because this stimulates reflection on teaching aspects the investigator is interested in. According to Broeckmans (1987, 181) a prestructured logbook is more complete from the investigator's perspective and contributes to the validity of the reports (36).

With regard to the study of practical teaching, logbooks were considered as sources of information, which had to lead to complementary data on the one hand and to make it possible to cover a longer period of time on the other. As such, it was assumed that logbook reports would also benefit the making of an inventory of teaching features of a more stable nature.

At the end of each process of data collection the informants were requested to write in the logbook for a period of five days with reference to all the practical lessons taught during these days (see appendix 6). The logbook was prestructured according to:

- three categories which appeal to the informant's ability to remember, namely: the group or class which has been taught, the theme and subject-matter of teaching, the teaching and learning activities;
- three categories which particularly appeal to the informant's reflective ability, namely: things which were going well and why, things which were not going well and why, optimal changes and the possibility or impossibility of realizing these changes.

The former three categories were designed to understand the context of the latter three categories. Moreover, it was assumed that they could also contribute to the gaining of more insight into the content and 'direction' of reflection as a part of teaching.

Logbook reporting usually takes much (spare) time, mostly at the end of a teaching day or during leisure hours. Partly because of this reason the informants were requested to answer five questions with regard to the keeping of the logbook at the end of the five days. These questions were formulated at the end of the logbook.

The process of data collection illuminated above, including the methods and techniques used, was definitively shaped on the basis of a *try-out* with two instructors. As a result of this *try-out* corrections and validity improvements were introduced. Both concepts cohere, but there is also talk of differences. 'Validation' questions whether the research methods yield the information wanted by the investigator, while, among other things, 'correction' has a bearing on the process of data collection, the reformulation of interview questions, etc. Furthermore, a *try-out* also implies an important learning effect for the investigator (cf. also Emans, 1985). To summarize, the results

of the try-out have led to important changes with regard to: the formulation, internal consistency and relevance of interview questions; the addition of the category 'rest/particularities' to the observation scheme; the construction of a manual on behalf of the retrospective interview; the instruction with regard to logbook keeping, its layout and the addition of two fictitious examples of instructor reflections (see for detailed information Beijaard, 1986, 87 ss.). Finally, scheme 4.1 demonstrates the relationship between the research questions and the methods and techniques used.

research questions	methods and techniques used			
	inter-view I	observation/retro-spective interview	inter-view II	logbook
1. features of the task environment	x	(x)		(x)
2. characteristics of teaching: - planning - execution - reflection	x x x	x		x
3. intentions, cognitions, subjective theories	x	x	x	x
4. overall pictures	x	x	x	x

x = direct derivation from the source of information
(x) = indirect derivation from the source of information

Scheme 4.1 Relationship between research questions and methods and techniques used (Beijaard, 1986, 89).

4.1.3 The processing of data: the reduction of raw data through segmentation, systematization and interpretation

According to Smaling (1987, 306) the processing of data consists of the following aspects or phases: storing, analysing, reporting and, eventually, implementing. Under the heading of 'analysis', however, Miles and Huberman (1984) conceive the whole research strategy as the processing of data. From their point of view the analysis of data consists of an interacting and cyclic process, characterized by three mutually relieving activities (37). Their vision on the reduction of data and the process character of this activity has been of particular inspiration (Beijaard, 1986, 63 ss.). These aspects will therefore be highlighted in this section.

Reduction of complexity refers to the reduction of reality to relevant aspects necessary to answer the research questions or to contribute to the solution of the research problem (cf. Wester, 1987, 119). Through interpretation this reduction process also implies 'thick description' (cf. Soudijn, 1985), that

is to say describing data at a higher level of abstraction and relating these to theoretical insights. Through 'thick description' theoretical and ecological validity come together (see also Peters, Postma et al., 1983; Peters and Postma, 1985). Within this perspective Maso's (1987) conception of the so-called 'pre-analytical phase' also fits, with which he refers to relevant theoretical and practical information gained in advance. The relevance of this information has a bearing upon the collection and processing of data, through which an adequate synthesis can also occur (Maso, 1987; Wester, 1987).

In the research on practical teaching this information gained beforehand has been extensively described in the preceding chapters. Special attention was paid to interpretation theories and 'the contribution from practice' (chapter 3). This information can be seen as a conceptual framework from which research questions have been deduced. The collection of data has also gained direction, i.e. the construction of research methods and techniques in advance. However, the quality of the descriptions based on an interpretative procedure always remains dependent on the investigator himself. In fact, he is also an 'instrument' for the collection and analysis of data. Apart from that, in principle this role of the investigator does not differ from the one in research of an empiric-analytical nature, in the course of which the investigator tries to objectify himself, for example through methods and statistical analyses (Janssens, 1985, 151). Partly because of this it is important that the investigator makes his procedure explicit. Below this will be done for the way in which the processed data were collected. Attention is successively paid to the writing of protocols, the systematization of data, their interpretation and description. In fact, these aspects represent an increasing reduction process inspired by Miles and Huberman (1984), who speak about a reduction process of a cyclic - or recurrent (cf. Broeckmans, 1987, 217) - nature. The reduction process presented here can be characterized as a linear process through which there is talk of an increasing understanding of the research object.

1) The writing of protocols

Both interviews (I and II) and the retrospective interview were recorded on tape. Then protocols were written for each informant: scheme 4.2 illustrates the way in which this was done for the interviews, scheme 4.3 illustrates the same for the retrospective interview.

When writing the protocols two aspects were important (see also Breuker et al., 1986). Firstly, the protocols were cleaned from 'disturbances' like mistakes made in speaking, breaks and hesitations, in order to increase their readability. Secondly, the informants' answers were segmented into summaries and complete answers. The answers which have been written down completely referred to:

Part	Question	Tape and side	Tape-counter indication	Summary answer	Complete answer
II C	31 31a	1A	428 430	Regularly. Often holds the view that certain coursemembers (e.g.: workers in the field of extension) make high demands, but in reality this is usually disappointing.	"Among them are people who know nothing. On the other hand some pretend that they know everything, but when I enter into the merits of the case then I notice that something is wrong."
	31b		457	With one-week course-members this is less of a problem: the lessons are of a more general, superficial nature. Adapting the lesson: giving more or less detailed information about a certain subject.	

Scheme 4.2 Illustration from a protocol of interview I (see appendix 1).

Tape and side	Tape-counter indication	Code/ question	Question	Summary answer	Complete answer
IIA	230	2.4.7:1	(with reference to 2.4.6:1: the lesson phases). Can you explain why you have chosen these lesson phases?	Yes	"Because they help me to prevent certain subjects from taking too much time. It is a tested sequence, suitable for my situations. Furthermore, with these phases I also avoid omitting things."
	240		So, you are used to handling these lesson phases?	Yes	

Scheme 4.3 Illustration from a protocol with reference to the retrospective interview (see appendix 4).

- reasons or motives with reference to 'why-questions' and spontaneously given reasons or motives;
- explanations of answers or conceptions unique to a certain informant, whether or not in relationship with his task environment.

By the writing of protocols data reduction took place on the one hand, but, as yet, the protocols were still closely related to the raw data on the other (cf. de Corte et al., 1986, 511). The advantage of this step in the process of reduction can be formulated as follows: the protocols yield rich and direct data without any distortion, unless there is talk of memory mistakes, rationalizations, etc. (see also Breuker et al., 1986).

2) Systematization of data

Next after the writing of protocols the data were re-ordered per research instrument in a surveyable and manageable way. This was done per research instrument, because every method for the collection of data resulted in its own data file (cf. Wester, 1987). The scheduling of data can be seen as a next step in the process of data reduction. Scheme 4.4 illustrates this for data gained on the planning and execution of practical lessons with reference to the first interview and the retrospective interview. The same was done with the data obtained through the second interview and the logbook.

The re-ordering and scheduling of data took place by means of the 'categories': facts, reasons or motives, aspects of the task environment and remarks. In this process the individual informant remained identifiable; moreover, there could also be talk of 'frequencies'.

3) Interpretation and description

The amount of available data from different sources seems apparently to be problematic. In connection with this, for example, de Corte et al. (1986) argue for bringing the data up to the same level of abstraction or re-arranging them chronologically. An example of the latter possibility is given by Broeckmans (1987) with regard to the division of the same sorts of data into so-called time units. A procedure like this obviates the different moments which the informants reported.

However, I preferred to apply the former possibility, i.e. striving for the same level of abstraction which can be summarized as follows: reconstruction through interpretation guided by theory. With that I subscribe to Smaling's (1987, 251) description of interpretation, namely: the answering of questions casting about for reasons, and given reasons, motives and intentions which explain behaviour. This description is based on the rationale that human acting is meaningful behaviour, or more precisely: goal-oriented, value-related and rule-guided behaviour (Smaling, 1987, 251). This description reverts to

Source	Facts	Number	Teacher no.	Motives/reasons	Number	Teacher no.	Task environmental aspects	Number	Teacher no.	Remarks
I1:45 45a	1) yes: - difficult facts	111	8,15,23	- cannot be reminded	1	8				
	- points to treat	11	15,23							
	45b	- holding to the main line - having in reverse to be able to answer questions	11 1	15,23 8	- gives security	1				
45c	2) no: - masters everything	1	25				the making of no notes is due to giving the same lessons repeatedly to groups with similar backgrounds	1	25	- teacher no. 23 has already worked for more than 20 years at the school, teacher no. 25 more than 10 years - quote the remark of teacher no. 25 about 'routines'

I1:49 49a	yes: - sort of lesson	1111 11	8,15,23,25 8,25	- sometimes a lesson does not consist of phases	1	25	many students who visit the school go short of previous knowledge, which forces one to spend too long on theory. The reverse also occurs (see question 27 up to 37)	1	15	- among other things the lengthening of phases means wandering from the point or paying more attention to a subject - quote the remark of teacher no. 23 about 'the weather'
	- previous knowledge of students	11	15,23							
	- problems which occur during the lesson	1	25							
	- weather circumstances	11	23,25	- staying inside in bad weather and lengthening certain phases	1	23				

RI:2.2.1	1) linking-up with students' initial situation: - reverting to the subject of the preceding lesson	11	23,25	- refreshing students' memory - gaining insight into where to continue - preventing the necessity for an explanation	1	25				- not explicitly linking-up with students' initial situation (weak course-members) might point to a routine coherence between this situation and educational programmes/ subject-matter - quote the remark of teacher no. 8 about the 'regular schools'					
		11	23,25												
		11	8,15												
	2) not linking-up with students' initial situation: - having taught more groups from the same school	11	8,15	- knowing what they can	1	15									
		1	15	- it is a matter of a standard lesson	1	8									
		11	8,15		1	15									

Scheme 4.4 Illustration of the way data were systematized with reference to interview I (appendix 1) and the retrospective interview (appendix 4).

the scientific tradition I have chosen, including a vision on man based on anthropological notions and, derived from that, on the objective of science. In turn the knowledge ideal has been formulated in terms of understanding (38). This knowledge ideal has led to the formulation of a certain research objective and research questions and, finally, has had methodical as well as technical consequences at the level of concrete empirical research.

As such, understanding through interpretation can be legitimated in terms of striving to do justice to complexity, contextual aspects and uniqueness by:

- focusing on relevant situational features;
- taking account of the actor's point of view with regard to cognitive processes underlying external observable behaviour.

In addition, doing justice to complexity, contextual aspects and uniqueness is of immediate importance for innovation, i.e. the development of an in-service programme. The connection of this programme with these characteristics in principle guarantees successful implementation.

Finally, it should be noticed that the investigator - like the informants involved in the research project - also undergoes a cognitive process during the processing of data, including the interpretation and description of the results (cf. also Wester, 1987). For the investigator the description of research results may be a final check on his analysis. Consequently, Miles and Huberman (1984, 213) state: "Writing is itself a form of analysis."

The descriptions of 'complete pictures' - by means of a vertical interpretation (of each individual) as well as a horizontal interpretation (across individuals) of the analysis schemes - can be seen as a reconstructive activity. These descriptions are the results of the integration of data gained by different methods and techniques. In the next section I confine myself to a summary of the major research findings. A further interpretation of teacher reflections takes place in chapter 5.

4.1.4 Major research findings: environmental influences, the process and structure of practical teaching

In the original publication (Beijaard, 1986), research results are described in conformity with the models presented in the preceding chapter (figure 3.4 and 3.5). In this section this is also done for relevant task environmental influences on practical teaching. The presentation of the processual and the structural side of practical teaching, however, takes place on the basis of an integrative interpretation, because - as became evident - process and structure strongly interfere. Consequently, structural aspects are integrated in the description of the process of teaching. Remaining aspects will be described under the heading of 'issues regarding practical teaching'. This section ends with some concluding remarks.

1) Task environmental influences

Main backgrounds of the informants

For the greater part the educational personnel consists of instructors and head-instructors. This distinction is primarily based on differences in experience and age. Relatively a large number of instructors did follow higher (agricultural) education; some of them also received any form of initial or in-service teacher education (see e.g. Kristensen and Peters, 1985). In addition, most instructors started their careers in trade and industry. These and other backgrounds do suppose that the sample taken at random (n = 29) represented the total population of instructional personnel, taking into account that principals and educational coordinators were excluded from participation in the research (see for a more complete description of the total population: Beijaard, 1985, 28 ss.).

The informants strongly differed in their motives for having become an instructor. These motives can be ordered as follows:

- educational motives: the way of working, the alternation of theory and practice, education close to practice;
- motives regarding subject-matter: being at work in the branch of industry, the combination of work and hobby or interest;
- social motives: dealing with people;
- motives of a more personal nature: improving a position, having no other job, unease about an earlier position, an intermediate stage to gain experience.

The instructors frequently mentioned more than one motive.

Along with teaching, instructors are in charge of several other tasks such as developing and updating subject-matter, maintaining of or providing with new learning aids (machines, implements, tools, models; modernizing rooms, arranging information centres, etc.), being involved in planning and management, making and maintaining contacts with trade and industry, orientating on new developments and reading literature to remain well-informed. Head-instructors are usually the heads of subject-groups or sections and, through that, they have their own responsibilities along with several external functions, for example as a member of external committees which are occupied with the development of new learning materials.

Most of the instructors appeared to be satisfied with their function. Due to internal as well as external school policy, however, some of them experienced the poor possibilities to improve their position in the school as a disadvantage. Almost all the informants criticized the integration of the practical training centres into the total agricultural education system. Along with problems regarding their legal status, it is often necessary that the instructors have to teach theory as a result of bad preparation of the students by regular schools. Consequently, it often occurs that too little attention can be paid to the practical component.

Curricula: equipment, teaching and learning materials

The learning of practical agricultural skills primarily depends on available equipment. In small groups, usually varying from six to eight, students practice skills with regard to the repairs and maintenance of implements, the use of these implements (in the field), cattle and plant breeding, crop protection, forestry, land development, horse riding, pig and poultry husbandry, and milling business. Related to these agricultural disciplines students learn manual, planning, coordinating and entrepreneurial skills.

Based on the available equipment three kinds of practical education can be distinguished:

- education by simulation and reduction of the (complex) reality (for example with the help of models and parts of machinery);
- education in the reality itself (for example using machines and implements in the centres' own farms and in the fields);
- education in situations which approach reality as closely as possible (for example tractor driving and ploughing in huge sheds or working halls, especially in bad weather).

In support of these kinds of education, instructors often use many different written materials and audio-visual learning aids.

The instructor's choice of learning aids, including implements and animals, depends on their actuality and the degree in which they are used in the agricultural branch of industry, the objective and content of the lesson and students' backgrounds such as previous knowledge and experience. Moreover, the available learning aids strongly determine whether students practice individually, in pairs or in small groups. In general it is hoped that they would practice actively and intensively. In addition, many instructors experience that student cooperation has satisfying results.

Instructors use many different kinds of written materials, which function as references, guarantee uniformity in knowledge transmission and enable students to prepare themselves prior to their visit to a practical training centre. Mostly, however, instructional leaflets are used which partly replace the instructor. These leaflets encourage students to practice independently, though supervised by the instructor (see also chapter 3, section 3.3.3).

Many instructors act according to so-called instructor-instructions as was written before (chapter 3, section 3.3.3). Some instructors experience these as an obstruction to their teaching satisfaction, while, on the other hand, others appreciate instructor-instructions as important teaching guides.

Instructors most frequently deviate from the (prescribed) subject-matter as a result of student questions or reactions, which they generally experience as a pleasant variation. This also applies to instructor questions in order to determine students' interest. Discussions particularly occur with students from trade and industry. Other 'deviations' from subject-matter are often caused by weather circumstances, actualities in the teaching environment, the student level (too difficult, easy or irrelevant for students), material trouble and instructors' personal contributions based on experiences. As a

consequence, some instructors perceive a too clearly defined curriculum or educational programme as limiting or obstructing.

Along with positive influences it has been pointed out that written materials may negatively influence the working attitude of students: too much information on paper beforehand demotivates, reduces their own thinking or facilitates the work which has to be done (particularly with highly prestructured instructional leaflets). These written materials are regularly adapted to new developments in agriculture in close cooperation with one another, by individual instructors themselves or by heads of subject-groups or sections.

Students

The authorities prescribe that the practical training centres have to give priority to students from regular (secondary) agricultural schools. Still there are many other target-groups to teach (see chapter 3, section 3.3.1). Instructors experience strong differences between attitudes of students to practical education. Students from higher agricultural education, for example, want to engage in discussions with them and need to be encouraged to practice, while students from secondary agricultural schools can hardly wait to practice. Other students, for example those from trade and industry, are only interested in practical education when they perceive this as important for their personal affairs, etc. Moreover, they differ in their previous education, agricultural backgrounds and experiences, which thwart the formation of coherent learning groups.

At the beginning of their lessons instructors often recognize discrepancies between their own curricula and those of regular agricultural schools. Along with differences between and within target-groups this demands they possess flexible and improvising teaching qualities.

Instructors' wishes regarding changes related to the students they teach, have a bearing upon:

- the students' starting points in general: too often instructors experience heterogeneous groups as obstructive for the progress of the teaching and learning process;
- the preparation of students on their visit to a practical training centre: regular schools should give better theoretical preparation to their students on the educational programmes of the practical training centres;
- the students' attitude during the lessons: instructors often perceive this attitude as 'passive', 'consuming' and 'uncritical'; moreover, many instructors want students to enter their school with a better motivation and more self-discipline which is, among other things, an important prerequisite for handling machines or implements and working with animals;
- the size of learning groups: sometimes groups are too large in connection with safety aspects and available equipment to practice;
- the length of courses and lessons: courses or lessons of a longer duration are needed as a result of increasingly specialized activities; on the other

hand, however, this can be disadvantageous for the motivation of certain types of students;

- the personal preference of instructors: many instructors prefer to teach 'students from practice' and regret that these course-members are subordinated to students from regular agricultural schools as a result of governmental policy.

Along with these wishes some instructors pointed out that they rarely receive feedback about the application of the knowledge gained and skills learned when students are back home again, or about the way in which these are integrated afterwards into the curricula of the regular schools.

School organization

New instructors - ideally - learn to teach by the following stages:

- 1) observing lessons of colleagues and orientating themselves on the subject-matter;
- 2) gradually starting to teach under supervision of an experienced colleague;
- 3) teaching independently, rather simple lessons at first and more complicated lessons afterwards.

In fact this process of learning to teach can be seen as a form of internal schooling, usually supported by a manual consisting of didactic 'rules of thumb'. Nowadays there is increasingly talk of becoming acquainted with practical teaching in an integrated way, that is to say being a business employee and a teacher at the same time.

In support of their teaching tasks, instructors cooperate in subject-groups, sections, committees or working-groups. Instructors perceive these kinds of cooperation as an immediate help for their personal teaching practice, including the exchange of information about students, new developments, procedures, etc. Moreover, cooperation stimulates collegiality and togetherness, though it cannot be avoided that it is sometimes time-consuming.

The organizational aims of instructors in schools have a bearing upon:

- the improvement of planning aspects: theory and practice can often be better attuned to one another proportionally and in time (sometimes, for example, theory is given at a time when it is impossible to arrange practical lessons); furthermore, many instructors would prefer better long-term planning of educational programmes in advance and less occasional lessons or courses on an ad hoc basis, which would enable them to plan their own in-service activities better;
- the internal organization and consultation structure: sometimes instructors experience these as too formal and committed to tight rules; several practical training centres are rather hierarchically organized and, according to some instructors, the school management hardly knows what really occurs during the lessons; in addition, instructors have emphasized the importance of a good personnel policy from a social point of view and pointed to the 'power of the elder instructors' as a result of which the ideas of new instructors sometimes go unacknowledged;

- personal and material matters: in general there are few internal possibilities for promotion; some instructors - particularly those who already have a long record of service - experience this as obstructive to their work satisfaction and argue for another appointment and promotion policy; furthermore, relatively many instructors have highlighted their lack of time for in-service activities, which are important because of the practical training centres' innovation function.

The 'complaints' enumerated above are school-bound. From an organizational perspective, therefore, the practical training centres can learn from one another.

2) The process of practical teaching

Lesson planning

Instructors differ from one another in their individual needs for lesson planning. Based on experience, they tend to reduce their lesson planning to organizational matters when they regularly teach the same lessons to the same types of students, when they master the subject of the lesson and when the lesson has a fixed structure or is a part of a standardized programme. Experience seems to be a prerequisite for reducing the complexity of the everyday teaching situation and, similarly, the pressure of preparing lessons. However, it should not be concluded that many lessons remain the same for a long time. On the contrary, agricultural developments regularly lead to lesson changes.

According to instructors, the following points of attention are - generally and in order of frequency - important for lesson planning:

- checking the equipment and learning aids on their functioning and availability;
- determining the lesson content;
- orientation on the previous education and backgrounds of students;
- formulating lesson goals whether or not in terms of what students have to know or should be able to do.

Instructors who plan their lessons extensively, seldom draw from formulated lesson goals or the previous education and backgrounds of students. This corresponds with findings of research on teacher planning (see e.g. Peters and Beijaard, 1982a; Peters and Beijaard, 1983). They may handle aspects of these planning components routinely, though they are continually confronted with changing target-groups whose previous education and backgrounds often differ strongly. This indicates that the planning aspects in question become important during the lesson itself, making lesson planning a somewhat ad hoc activity and demanding that instructors are flexible and able to improvise.

Figure 4.1 shows the planning processes of instructors who explicitly handle more than one didactical component during lesson planning. The relationship between subject-matter and learning aids, including organizational aspects, seems to be an essential one. The methodical component, i.e. teacher and

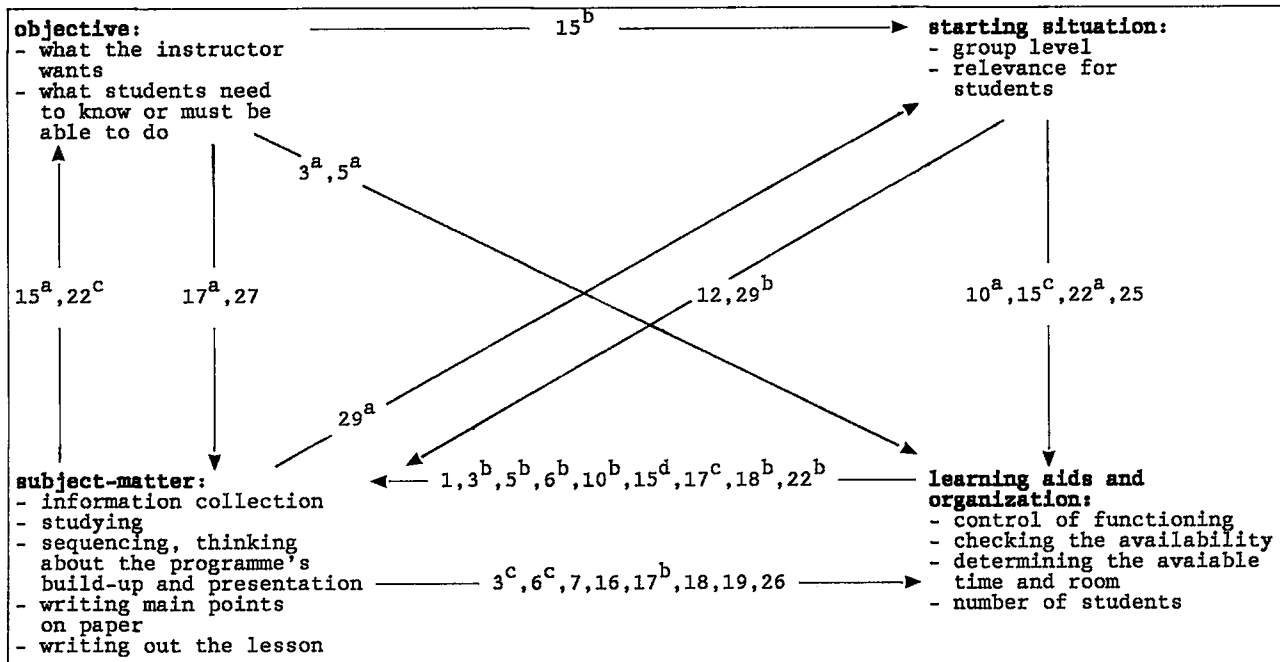


Figure 4.1 Overview of planning processes of 16 instructors. The numbers correspond with the instructors involved, the letters with the order of the planning process (Beijaard, 1986, 145).

student activities, is handled routinely or remains implicit. To some extent this corresponds with the findings of Ax (1985), who states that there probably exists a routinized relationship between this component and subject-matter. With only one instructor (no. 15) has the planning got a cyclic nature. Most planning processes are linear, characterized by a step by step approach.

Instructors who often tend to plan their lessons extensively, do this out of consideration for students: "They have the right to receive well-considered education that is adequately attuned to them." Other instructors, however, are more teacher-centred: they prefer to 'always do the same' and rationalize their reduced lesson planning with external reasons.

Many instructors who do plan their lessons, prepare notes. For the greater part, these notes consist of the main points of subject-matter and function as an aid to memory. This is in order to make sure the prescribed subject-matter is treated (often in connection with a test at the end of a course), the right sequence is followed, the uniformity in lesson contents is guaranteed, etc. The use of notes in practice corresponds with Meyer's (1980) notion of 'crib didactics' ('Spickzettel Didaktik').

Teaching in general and lesson planning in particular is influenced by the practical training centres' position within the total structure of the agricultural education system (see also section 3.3). In many cases this position stimulates the development of standardized programmes and may lead to 'preserving jar' education (Tybout, 1986, 2122-6) and an uncritical upbuilding or handling of teaching routines. Those instructors who are aware of this position often feel themselves powerless and, subsequently, dissatisfied with their teaching task.

The execution of lessons

During the research, practical lessons were observed for the duration of 50, 100 and 200 minutes, but lessons of one whole day are also usual. A school's choice for lessons of a longer duration, mostly in lesson blocks of 100 and 200 minutes, is usually based on the following considerations (Beijaard, 1986, 176):

- the real working situation is approached as closely as possible;
- students from trade and industry are used to working with such a time-schedule;
- educational planning at school organizational level is made easier;
- lesson planning is, in principle, more challenging (instructor motivation);
- concentration on tasks is enhanced;
- guidance and observation of students is made more intensive;
- contacts with students are improved.

An important prerequisite is that lesson contents and tasks are connected with students' interests, abilities, previous knowledge or experiences. This demand, however, cannot always be adequately met.

Figure 4.2 illustrates the phases of most of the observed lessons. These lesson phases are incorporated in a teaching model, which, in its most comprehensive form, has been encountered. The arrows show how individual instructors handle this model in practice.

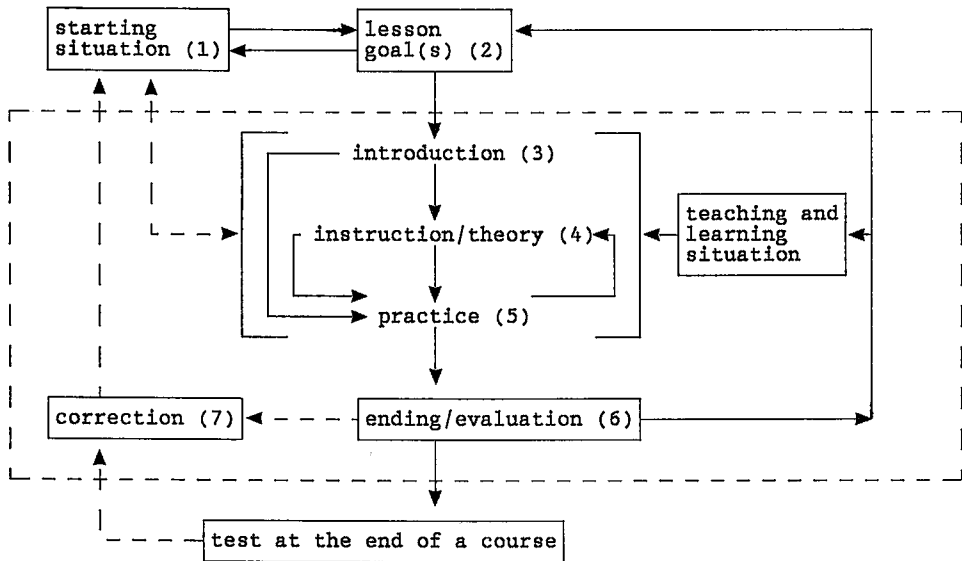


Figure 4.2 Reconstruction of the practical teaching model and how it is handled by instructors.

Most instructors start their lessons by getting to know their students if they have to teach a new group. According to many of them this determines the atmosphere of the whole lesson. Moreover, during the introduction instructors:

- estimate students' previous knowledge, experience and interest by questioning, which determines the choice and usage of instructional techniques for the rest of the lesson (ad hoc planning);
- tell something about the lesson goal(s), what can be expected and the available time; instructors suppose that clarity encourages students' motivation and involvement.

In general the introduction is relatively short.

After the introduction some instructors immediately start with the practical lesson phase (see figure 4.2), but usually this phase is preceded by a theoretical part consisting of information or knowledge transmission. However, many instructors prefer to speak of 'instruction' in this phase. According to them this concept better covers the skills to be taught in terms of 'what' and 'how' and refers to information present in a specific task situation. Generally, instruction is characterized by (cf. also van der Sanden, 1986, 39):

- information about the purpose of the task, or the demands which have to be met;
- information about the actions which have to be executed;
- information about the order of these actions.

'Instruction' is closely related to a demonstration of one or more actions by the instructor, while information or knowledge transmission entails 'speaking about', possibly supported by audio-visual learning aids, parts of machinery or materials.

During practical lessons, instruction and information or knowledge transmission are often integrated and take place successively. Instructors devote much of the available lesson time to telling as is shown by table 4.1. Possibly this is due to a routinized teaching pattern known as 'the more a teacher knows the more he wants to tell'.

lesson phases				number of lessons in which theory and practice alternate
introduction	theory/instruction	practice	ending/evaluation	
6%	37%	55%	7%	9

Table 4.1 Average of teaching time (n=29 lessons) subdivided into lesson phases (see for detailed information: Beijard, 1986, 174 ss.) (39).

Safety aspects, the working order and error-tolerance determine whether or not students practice independently. Practising independently, as instructors say, increases the involvement, encourages thinking and corresponds with reality. The reasons mentioned above also determine whether instructors guide the practising of students in a directive or non-directive way and whether or not they stimulate them to look for their own solutions. This interpretation is somewhat in contrast with findings of Schouten (1987, 109), who states that teachers are predominantly directive during student practicals. In this context it must be noticed that time pressure often appears as a negative factor.

Generally a short review or evaluation takes place at the end of a lesson. In this lesson phase instructors check learning results, repeat or summarize the most important lesson features, correct mistakes made, etc. Moreover, students often get the opportunity to judge their personal and each other's work. Many of the instructor activities at the end of a lesson, however, also take place when students are practising.

Reflection as a phase of teaching

Among other things, verbal as well as non-verbal student reactions, test results (at the end of a course) and exercises made, may all be reasons for

instructors to reflect on their lessons. Because of a lack of time, incapability, etc. these reflections rarely lead to lesson changes. If changes are necessary, these generally take place during the lesson itself. During the analysis of the logbook notes as a part of the research (see appendix 6), it was noticeable how many instructors reflected positively on attitudes and personality aspects of students connected with learning processes and learning results (see table 4.2). This is somewhat contrary to complaints about students' motivation and previous education. The logbook notes made clear that it is unfair to attribute these complaints to students, but that they are due to external circumstances (for example not being prepared on a visit to a practical training centre, doing practicals which are barely connected with their field of study, etc.). Both these and other external circumstances appear to be the source of instructors' negative reflections. In addition, it seems that they generally tend to reflect on external circumstances rather than on their personal functioning as is shown by table 4.2. On the basis of observations and research on student perceptions (Kingma, 1986; 1988) it can also be concluded that students like practicals. The combination of practice and the availability of sophisticated equipment creates an atmosphere where motivated learning is both possible and likely.

3) Issues regarding practical teaching

Practical lessons and learning areas

In view of (implicit) lesson goals and the tight connection between teaching and learning, it is possible to say something about the skills taught by instructors. The concept of skill has a bearing upon a learned power of doing something competently and presupposes systematic education (and training). A more refined definition is given by Rotenstreich (1985) who speaks of the power of faculty of engendering things or of ways of handling them. The handling of things is particularly emphasized in the practical training centres, for example learning to drive a tractor, adjusting a plough, using a computer, etc.

The agricultural skills to learn vary from relatively simple actions (manual skills) to actions of a more complex nature (so-called entrepreneurial skills entailing organizing, judging and planning). Generally, a certain knowledge and insight into techniques, materials, parts, tools, machines, implements, animals and plants are prerequisites for skill learning. The application of knowledge and insights is emphasized to some extent. Both determine the quality of an action, which corresponds to Williams' (1985) definition of skill learning. In his opinion, skills refer to making and doing. They can only be required if there is also an understanding and familiarity with the materials used and the end denotes mastery over them (William, 1985, 6). More explicitly, de Klerk (1984) and van der Sanden (1986) state that practical skills imply a combination of thinking and doing. According to them a practical task or problem cannot be executed or solved on the basis of a series of

Reflections with regard to:	category 4: what went well (n = 375 = 96%)	category 5: what did not go well (n = 223 = 98%)	category 6: desirable changes (n = 170 = 94%)
- students' attitude towards working and learning (being enthusiastic, motivated, attentive, active, properly, self-active, etc.)	1 (31%)	4 (12%)	-
- learning process and learning result (working-method, execution of tasks, application of knowledge into practice, insight, understanding, etc.)	2 (19%)	6 (8%)	-
- personal qualities of students or groups (practical attitude, being eager to learn, cooperative, quiet, positive, etc.)	3 (15%)	5 (10%)	-
- teaching (stimulating, guiding, adapting to the students' starting points, own professional knowledge, lesson phases, explaining, etc.)	4 (7%)	7 (7%)	3 (14%)
- external circumstances (state of the weather, students' previous education, preparation by regular schools, etc.)	5 (7%)	2 (19%)	4 (13%)
- nature of the lesson (theoretical, practical, alternation of theory and practice, lesson progress, degree of difficulty, etc.)	6 (5%)	8 (3%)	5 (6%)
- planning and organization (group size, duration of the lesson, available room, learning aids or equipment, transport, admission of students, etc.)	7 (4%)	1 (24%)	2 (29%)
- learning or working climate (contacts with students, atmosphere, student interaction, etc.)	8 (4%)	-	-
- lesson content (subject, connection with students' starting points, realization, nearness to practice, etc.)	9 (3%)	9 (1%)	6 (2%)
- learning aids and equipment (availability, planning, suitability for use, actuality, etc.)	10 (1%)	3 (14%)	1 (30%)

Table 4.2 Ranking of reflections by content and frequency (in percentages) on the basis of instructors' logbook notes (Beijaard, 1986, 156).

automatic actions. Knowledge and insights are not only prerequisites, they also result from skill learning or, by way of that, gain more sense for students. Consequently, theory and practice always bear to one another. Its a spiral: theory clarifies practice and practice is always theory-loaded; the practical experience enriches theory and, consequently, the learning of skills leads to a surplus value (cf. also Dochy and Luyk, 1987, 4).

To summarize, practical lessons in general and the learning of skills in particular activate several learning areas, i.e. the psychomotor, cognitive and affective area which are interrelated and overlap (see figure 4.3). The cognitive area refers to knowledge and insights concerning the how, what and why of an action, the psychomotor area to the execution of an action in the correct order, and the affective area to daring and self-confidence needed to execute an action (see also Dochy, 1987, 50). The cutting of hoofs, for example, may be seen as an action which integrates all these three areas. Nijhof and Mulder (1986, 31) interpret these areas as being at least present in basic skills. As to the (implicit) goals of practical lessons, it is possible to make a distinction within the psychomotor area between ability (being able to do what is necessary for a certain activity), proficiency (being able to do something after having practised intensively) and mastery (as a higher degree of being able to do something). Which of these three is emphasized largely depends on a student's previous education and experience, lesson goals and contents.

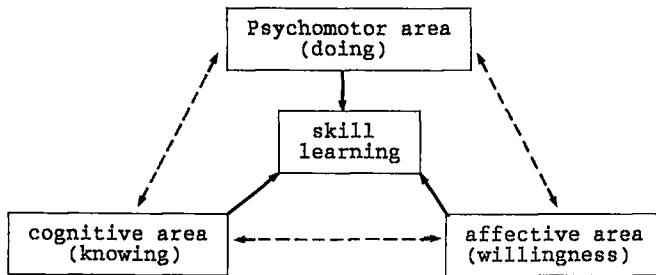


Figure 4.3 Areas of skill learning.

It should be noticed that skill learning also includes social qualities (e.g. cooperation, patience, tolerance) and - as was stated before - intellectual qualities regarding organizing, judging and planning. More specific intellectual qualities (e.g. anticipation, discrimination, evaluation) particularly take place during practical lessons which encourage students to learn by discovery or problem solving. These types of learning appeal to the cognitive component present in skills and connected with the complexity of a task. With simple, closed tasks the cognitive component is, according to Schouten (1987, 14), only activated strongly during the learning phase. Usually these tasks have predictable outcomes and do not consist of a series of integrated

actions. In practical training centres these tasks are often encountered in standardized programmes and executed by students of a lower level. Sometimes tasks of this nature are necessary for safety reasons and the careful handling of animals, machines and implements.

Lesson contents or subjects

Most of the instructors deliberately adopt a sequence in the theoretical or instructional and the practical phases of their lessons. There is often great consistency between both phases. The sequences depend on:

- the nature of the actions, or the working order which is more or less fixed;
- the reality in which the same sequence is employed (for example with ploughing);
- the machinery used (for example when treating a milk pipe).

Other considerations for bringing sequences into lesson contents or subjects concern the safety of man and animal.

Many instructors pay considerable attention to the theoretical or instructional phase of their lessons. However, it is often difficult to link the transmitted knowledge with the practice particularly with students who have had little or no experience. Consequently, a well-considered dosage of subject-matter, i.e. thinking moments, and a better integration of theory and practice should be important points for consideration (see also van der Pasch, 1989). Figure 4.4 illustrates what is meant by this. Ideally, the illustration takes full account of the motivation, concentration, interest and previous education of students.

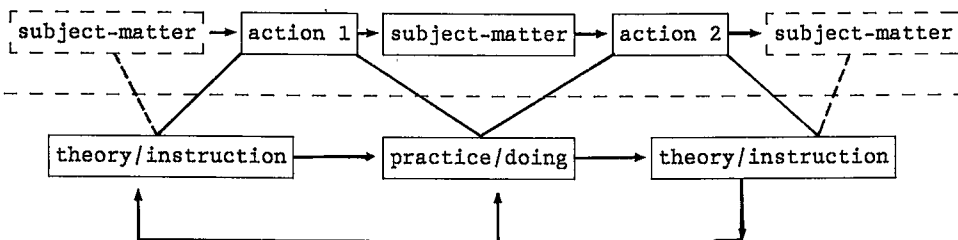


Figure 4.4 Example for the dosage and alternation of theory and practice.

Within one lesson an upbuilding as illustrated by figure 4.4 better meets quality demands in connection with continuity, i.e. quantity demands. In the teaching practice that was studied, this calls for a successive restructuring of many tasks in partial actions and thinking moments. This seems to be much easier for closed tasks than for open tasks which are usually complex and subject to unpredictable environmental influences (see also van der Sanden, 1986).

Structure and organization of practical lessons

Highly structured as well as unstructured lessons were observed. Lessons of the first nature are characterized by the planning of all actions to be executed and the predictability of the environment. During highly structured lessons instructional leaflets are often used (see section 3.3). These lessons are relatively simple to organize: the organization can be planned unequivocally, without anticipating any possible disturbance from environmental influences, including students, during the execution of lessons. This is an advantage, though highly structured lessons also have disadvantages: the possibility exists that students do not experience the benefits of practising and that their need to learn a certain skill will not be met. Schouten (1987, 95 ss.) connects highly prestructured lessons and highly prestructured learning with an algorithmic way of learning. This can, though need not interfere with strategies preferred by students, making it a disadvantage when students are directed by a certain procedure. However, it has been found that students of a lower educational level prefer detailed indications.

The aspects mentioned above are also emphasized in relatively unstructured lessons though from an opposite perspective, for example by discovery learning and challenging students to solve practical problems. To a large extent such tasks are of a heuristic nature. Moreover, these tasks presuppose lessons which cannot be planned completely. It is neither possible nor desirable to predict all environmental influences.

The instructor's teaching style is linked to the extent of lesson structuring. Highly structured lessons lead to a directive style with the emphasis on subject-matter, while with unstructured lessons the teaching style is of an interacting nature and the emphasis is on students' contributions. Student activities exceed the application of methods and techniques (prescribed by the instructor or present in the tasks to be executed). They are encouraged to think about them and to handle them with a heuristic use of knowledge.

Some didactical principles of frequent occurrence

A teacher's professionalism largely depends on the use of didactical principles. In a way these constitute the depth of one's action structure and, in general, they can be compared with didactical considerations of a rather stable nature. Some of these considerations or principles used by instructors are summarized below.

- 1) Giving examples, tips or hints taken from real practice. Among other things, this principle clarifies abstractions and increases students' motivation or imaginative faculties. Moreover, this principle is of a special importance to instructors whose lessons include safety aspects and the care of animals.
- 2) Asking students to do what has been shown or demonstrated. Trying to match demonstrated skills is, as instructors say, a challenge to students and often brings quick and satisfying results. However, this principle can also be interpreted negatively: education based on imitation results in the

modelling of students. Many students will tend to carry out the process without any real understanding and with little personal involvement or contribution (cf. also Williams, 1986). Instructors should be fully aware of this danger.

- 3) Assisting only when students do not succeed and allowing them to learn from their own mistakes. Generally, instructors who handle this principle do not want to give students the idea that they are incapable or need immediate assistance.
- 4) Demonstrating or showing frequently made mistakes beforehand. According to many instructors this is a time-saving principle. A disadvantage is - again - that little room is left for students to experiment and, through that, for their own creativity.
- 5) Repeating the same practice many times. This principle enables students to do something well: through repeating students achieve mastery over an action. During the repetition the cognitive component present in an action increasingly disappears.
- 6) Organizing student learning from concrete to abstract (or in reverse) as well as from the whole to parts. These principles are usually connected with considerations about student learning at school level (see also section 3.3).

Most of the didactical principles mentioned above are linked with personal instruction or teaching qualities. They also depend on the objective and subject of a lesson as well as students' previous education, backgrounds and experiences.

4.1.5 Some concluding remarks

The research design resulted in broad understanding of task environmental aspects, features of practical teaching as well as their interaction. It appeared to be possible to achieve complete answers to the first two research questions formulated and explained in section 4.1.1.

There are many findings available on teachers' everyday teaching, but they are usually isolated from the context (cf. Ax, 1986, 321). However, the context seems very relevant. Task environmental features vary per school but to a large extent influence instructors' practical teaching. In general, this threatens their autonomy and creativity of which some of them are fully aware. Sometimes this leads to a decreasing work satisfaction. In many cases the instructor's degrees of freedom seem to be more context-bound than person-bound.

The orientating, executing and controlling functions of an action can hardly be recognized, because - for the greater part - the planning and execution of lessons as well as the reflection on both these lesson phases often coincide. With experienced teachers they are particularly encountered during the execution of lessons. In action theoretical terms this can be interpreted as

an 'abridged action structure' referring to automatic processes accompanied by little or no cognitive exertion.

The versatility and specific implicit as well as explicit aspects of practical teaching could be made visible through research. It can be concluded that many instructors possess adequate subjective or practical theories which could be transmitted to colleagues. On the other hand, however, several of these (personal) theories need to be reconsidered again, for example by means of in-service education, in order to improve the teaching of the instructors involved. Attention also needs to be paid to a (renewed) awareness of the relationship between task environmental aspects and practical teaching in the micro-situation. More about this conclusion is written in chapter 5 after a detailed analysis of instructor reflections. In that chapter the research questions 3 and 4 are answered (see section 4.1.1). These two questions concern the instructors' reflections and the in-service programme.

4.2 Phase 2b: research on student perceptions

Project phase 2b must be considered as complementary to phase 2a. Phase 2b was designed and executed in order to complete information gained and, eventually, to correct interpretations made by the investigator as a result of project phase 2a, i.e. the study of practical teaching from the instructor's point of view. Completing this study with student perceptions is of particular importance to gain insight into the real effects of practical teaching by instructors. Moreover, in chapter 2 it was argued that, from an action theoretical perspective, the 'voices of students' should be part of the research project. They should not, in a material sense, be reduced to aspects of the task environment.

In the project phase 2b two main target-groups of the practical training centres were involved, namely students from regular senior secondary agricultural schools and students from higher agricultural schools. Supplementary to their regular, more theoretical education these students are obliged to follow several courses at one or more practical training centres, which usually last one week each (see Beijgaard, 1985). During these courses students learn skills useful for their future profession and for working in the field of agriculture.

This section consists of the same subdivision as the preceding one. Apart from that it starts with a brief overview of the theory involved and the presentation of a model developed in preparation of the design and execution of the investigation. For detailed information I refer to the work of Kingma (1986; 1988).

4.2.1 Theory involved and a model for research

By nature practical agricultural tasks may vary in their degree of complexity and the extent to which they are prestructured. These characteristics also strongly determine the nature and quality of a student's learning process. Van der Sanden (1986) describes this learning process from three perspectives.

- 1) An information processing approach focusing on cognitive processes and structures underlying the execution of learning tasks. From a meta-cognitivistic point of view it is known that students differ from one another in the extent of their awareness of these processes and structures.
- 2) An action theoretical approach according to which learning leads to new action structures. Action structure as a concept refers to a whole of observable behaviour, underlying psychological processes as well as personal and situational aspects. An action (including an automatic action) can be analysed into orientating, executing and controlling aspects. As a result of learning the need for cognitive exertion decreases. Through learning there is increasingly talk of 'manoeuvrability' and 'abridgement'. An action is manoeuvrable when it can be applied in different situations. An action is abridged when in its structure it develops into a less articulated action; this results in so-called automatic actions due to the combination of orientation, execution and control. Such a development cannot be expected with problem solving tasks which are usually of a complex nature.
- 3) A problem solving approach in which the concept of 'problem space' plays an important part. This concept refers to the problem solver's own internal representation of several components of the problem such as the starting and finishing points, the operations to be applied, rules and transformations. It denotes a mental representation of information present in the task environment combined with information available in the problem solver's memory. The way a problem is structured, therefore, is of a great importance. A student must be able to solve a problem by relating what is given to what is sought.

All these approaches emphasize the student's orientation beforehand (compare for example the selection of goals to be achieved, the making of plans of actions, etc.) (40).

In conformity with project phase 2a an action theoretical approach to student perceptions was chosen. This is an integrative approach encompassing internal and external activities, personal and situational aspects (Leont'ev, 1980; van Parreren, 1979 and 1983; Pijning, 1986) (see for detailed information chapter 2, section 2.2.2, and chapter 3, section 3.1.2). This approach can be presented by a model (see scheme 4.5). From the students' perspectives this scheme may be perceived as a heuristic model for research. The model has been constructed for two reasons. Firstly, it corresponds - partly in reaction to straight-line process-product studies - with the need to emphasize the complexity of the educational practice in research on teaching (see chapter 2 and section 3.1.1). Secondly, the selected elements as well as the cyclic

nature of the model correspond to aspects inherent in the components of an action and an action theoretical view on learning (see section 3.1.2; van Oers, 1987).

Kingma (1988) distinguishes between conditions, processes and results and the way these are related. The conditions in the scheme refer to students' orientating actions at the regular agricultural schools, situational circumstances and personal aspects. In a certain way these conditions influence the instructors' practical teaching and students' learning presented by the middle of the scheme. The last category, effects of practical lessons, refers to evaluating and controlling actions by the regular school as well as the practical training centre. Evaluation may have a bearing upon contents, experience and judgement of what has been learned; at the *regular school* these actions may lead to a continuation of what students learned at the practical training centre. Evaluation by the regular school may also lead to a change or improvement in the preparation of students on future courses at a practical training centre ('orientation basis'). At the *practical training centre*, for example, evaluation may lead to a correction of the programme, the teaching style and demands made upon students concerning the usual course of events (for example with regard to rules of conduct in the boardinghouse).

In addition, the evaluation of learning effects and experiences may, among other things, cause changes in students' expectations with respect to further practical courses. It has already been noticed that acting is situation-bound as well as person-bound. The latter refers to students' characteristics like (Kingma, 1986, 14 ss.):

- emotional, motivational, cognitive and physical factors, which should be taken into account when arranging a teaching and learning situation (41);
- the attitude, approach and learning style of students which differ from each other and, therefore, influence the teaching and learning process (Pijning, 1983);
- learning types: in the same group students usually differ from one another in the way they learn the best, for example by hearing, seeing, touching or communicating (Vester, 1976; Pijning, 1985); these and other differences demand a didactics in the course of which explaining, telling, demonstrating and giving exercises vary;
- students' different starting points; it is important to confront students with challenging and, at the same time, attainable subject-matter or tasks; this demands that instructors differentiate in order to avoid orientation for one student seeming like a repetition for another and, as such, influencing the latter student's motivation negatively.

To summarize, teaching in practical training centres is influenced by conditions and evaluated effects (see scheme 4.5). The quality of teaching is assumed to be more effective when the components in scheme 4.5 are taken into account.

4.2.2 Design: research questions and the way they were made concrete

Complementary to the research on practical teaching two questions for research on student perceptions were formulated. Both questions are stated and explained below.

- 1) How do students from the senior secondary and the higher agricultural schools perceive the teaching and learning situation at the practical training centres?**

In answering this question scheme 4.5 was used heuristically: student perceptions of practical teaching also imply perceptions concerning conditions and effects of practical lessons. The following aspects were considered to be important (see scheme 4.5):

- at the left side of the model: orientating actions (preparation by regular schools on a practice-week), fixed situation (like the organization of a practice-week and the students' stay in the boardinghouse) and student characteristics;
- in the middle of the model: executing actions of students and instructors during practical lessons;
- at the right side of the model: learning effects of a practical course, evaluating moments at the practical training centre and at the students' own (regular) school.

- 2) What is the connection between conditions, the teaching and learning situation and its effects as perceived by students from the senior secondary and the higher agricultural schools?**

This question emphasizes how all the aspects of scheme 4.5 are connected with each other. It is essential to indicate (functional) connections between different aspects, not (causal) relations.

The research on student perceptions was preceded by a *preliminary investigation*: data were collected in a qualitative way by using a focused interview, an open questionnaire and a learner-report (see Kingma, 1986). These data functioned as a basis for the construction of a definite questionnaire and, afterwards, as an aid when interpreting research findings which were processed quantitatively.

4.2.3 Data collection: the use of a prestructured, closed questionnaire

This section gives an account of the way the research instrument was developed in order to achieve reliable and valid results.

1) Selected aspects of a practice-week: theoretical variables (and dimensions) involved

The selection of important aspects may also be called an indicating process: theoretical variables are selected which represent (empirical) phenomena of the research object. Indicators are used to represent a theoretical variable and can be transformed into concrete questions, i.e. statements. An indicator of a practical lesson, for example, is 'being involved in a task'. This indicator was transformed into several statements, including 'we have continually been working at tasks'.

A theoretical variable (in this research: aspect of a practice-week) can encompass more dimensions (theoretical concepts). It is - on behalf of the validity of the research - important that the indicating process involves all relevant dimensions and, consequently, excludes irrelevant ones (cf. Janssens, 1983). The selected dimensions of the theoretical variables are presented by scheme 4.5. Their selection occurred on the basis of:

- the study of general educational literature (de Corte et al., 1981; Vonk, 1982; Kuhlemeier, 1983; Créton and Wubbels, 1984; Dekker et al., 1985) and educational literature in the field of agriculture (as to practical education in the training centres: Schuur, 1978; Beijgaard, 1985 and 1986);
- the results of the preliminary investigation (Kingma, 1986).

Inspired by Behets (1985) it was considered important to connect effective dimensions of the teaching and learning process with relevant aspects (dimensions) of practical agricultural education in the training centres. As such, these aspects can be investigated on their effectiveness as well as their mutual connection.

2) Construction of the questionnaire

The theoretical variables (dimensions) were transformed into statements submitted to students. The construction of a reliable and valid questionnaire took place according to the following procedure. Firstly, experts in the field of practical agricultural education and research were requested to comment upon the formulated statements. Secondly, it was tried out to determine whether the students correctly interpreted the questionnaire and to ensure it did not make too high demands upon them, etc. The try-out took place with a group of prospective teachers and students from a senior secondary agricultural school who were, at that moment, course-members of one of the practical training centres. Both consulting experts and trying it out led to necessary corrections.

In structure the definite questionnaire (see appendix 7) consists of five parts. The first part contains 15 questions concerning students' personal aspects. The other four parts contain 74 statements, subdivided according to theoretical variables (dimensions). In its nature the questionnaire has been prestructured and closed: students were requested to judge the statements on a

five-point-scale, varying from 'entire disagreement' (score = 1) to 'entire agreement' (score = 5). For more information about the structure and nature of the questionnaire I refer to Kingma (1988, 33 ss.). This also applies to underlying criteria concerning the formulation of the statements, categories for answering, number of statements, instructions for answering, sequence of statements as well as parts of the questionnaire, layout, anticipation of encoding and statistical data processing, and reasons why certain statements were not incorporated into the questionnaire.

3) Completion of the questionnaire

The questionnaire was completed at the end of a practice-week and, in many cases, replaced the usual verbal or written evaluation. The filling in of the questionnaire took 15 to 40 minutes and took place with the cooperation of the educational coordinators of the practical training centres. It appeared that all the students (n = 381) were able to fill in the questionnaire quietly and seriously.

The completion of the questionnaire occurred on the basis of a selective sample according to several criteria. The sample had to represent:

- the right proportions of students from regular senior secondary and higher agricultural schools who visit the practical training centres; these proportions are respectively 36% and 9% of the practical training centres' total number of course-member weeks (see Beijaard, 1985);
- the different classes (first, second, third and fourth classes);
- the national spread of regular agricultural schools;
- the variety of the practical training centres' educational programmes consisting, for example, of orientating, standardized and differentiated courses (42).

The research results are - in principle - valid for the research groups. Due to the enumerated criteria, the results can also be generalized to the total population of students from senior secondary and higher agricultural schools. However, it is necessary to proceed with care when conclusions are drawn regarding individual practical training centres, because per centre the criteria mentioned above could not be met.

At least two classes from each centre involved participated in the research. Two of the eleven practical training centres were not involved in the research because of insufficient numbers of course-members from regular agricultural schools. Finally, 19 classes at 9 practical training centres participated in the research: 14 classes from senior secondary and 5 from higher agricultural schools.

4.2.4 The processing of data: statistical analysis per statement and clusters of statements

Data were processed per statement - belonging to theoretical variables (dimensions) - and per cluster of statements. Average scores and percentages per statement were calculated to determine students' perceptions of practical agricultural education upon which they agree and differ. For a better understanding of these perceptions it was necessary to cluster statements of the questionnaire (see appendix 8). These clusters harmonize with the theoretical variables (dimensions) which were, among other things, expressed in the research questions (section 4.2.2). In total eight clusters could be formulated, namely (43):

- motivation and involvement in tasks;
- instruction and guidance;
- climate and atmosphere during the lessons;
- learning effects;
- organization of a practice-week;
- boardinghouse;
- actual connection between the regular agricultural school and the practical training centre;
- desired connection between the regular agricultural school and the practical training centre.

The first three clusters regard the theoretical variable 'teaching and learning situation', the fourth regards the 'learning effects' of the theoretical variable 'effects of the teaching and learning situation', and the latter four aspects regard the theoretical variable 'conditions of the teaching and learning situation'. The junction of data implies a loss in nuance, but benefits clarity, the interpretation of data, the answering of the research questions and the tracing of trends.

4.2.5 Major research findings: student characteristics, perceptions and connections

This section looks at important student characteristics and how students perceive different aspects of a practice-week. These perceptions are presented per cluster of statements. In addition, special attention is given to the connection between the learning effect and aspects of the practice-week on the one hand and to the influence of student characteristics and situational aspects on the learning effect on the other.

1) Student characteristics

In total 381 students participated in the investigation, 282 from the senior secondary and 99 from the higher agricultural schools. These students repre-

sented 16 schools, spread all over the country, and 19 classes: 4 first, 9 second, 5 third classes and 1 fourth class. Almost 80% of the students had visited a practical training centre before, varying from 2 to 5 times; for nearly 20% it was the first time. It appeared that only 15% of the students visited the same practical training centre more than once. As to the 'best' practical training centre 55% of the students made a difference between the centres. About 80% of all the students made use of the boardinghouse; particularly older students decreasingly tend to stay in a boardinghouse.

The students' average age was 19.3. The number of female and male students amounted to respectively 44 (11.5%) and 337 (88.5%), which does not correspond with the percentages of the total population of students in agricultural education (respectively 20% and 80%; Ministerie van Landbouw en Visserij, 1986). Only a third of all the students had followed any previous type of education in the field of agriculture. This number of course decreases among the higher levels.

Almost all the students seemed to be positively motivated by their current agricultural school: for 17% it appeared to be a pleasant form of education, while 72% indicated to be truly interested in the agricultural sector. Based on these findings, however, it cannot be concluded that - as sometimes is suggested - a lack of motivation for a practice-week is derived from a lack of motivation for following a senior secondary or higher agricultural school. About 40% of the students aimed at special employment in the field of agriculture after the completion of their current school: 32% in the primary or producing sector, mainly as entrepreneur (taking over of the parental industry), and 8% in the secondary or manufacturing sector.

Considering the profession of their parents, 56.4% of the students did have agricultural backgrounds. Significantly more parents of students from the senior secondary than those of students from the higher agricultural schools appeared to have an agricultural profession. The latter students more frequently seem to be come from 'higher' social classes.

2) Student perceptions of a practice-week

Students from the senior secondary and the higher agricultural schools possess the same opinion about a relatively small number of statements (44), i.e.:

- as to practical lessons students agree that instructors explain well and give sufficient opportunities for questions and discussions; moreover, instructors are friendly and create a pleasant atmosphere during the lessons; however, they do not always notice whether students understand things;
- as to the learning effects students enjoy small groups and, with regard to practice, they learn more at a practical training centre than at their own (regular) agricultural school;
- as to the practice-week it appears that most of the students enjoy this week and are satisfied with its organization; students prefer to be asked

for their opinion about the progress of a practice-week; they do not appreciate any guidance of teachers from their own (regular) school during their stay at a practical training centre;

- as to the relationship between their own (regular) school and the practical training centre students judge practice-weeks as important for their education; in their opinion it is relevant that the lessons of both types of schools are connected with one another; to only a small extent students have, if possible, a say in the choice of a practical training centre and the selection of subjects to be treated.

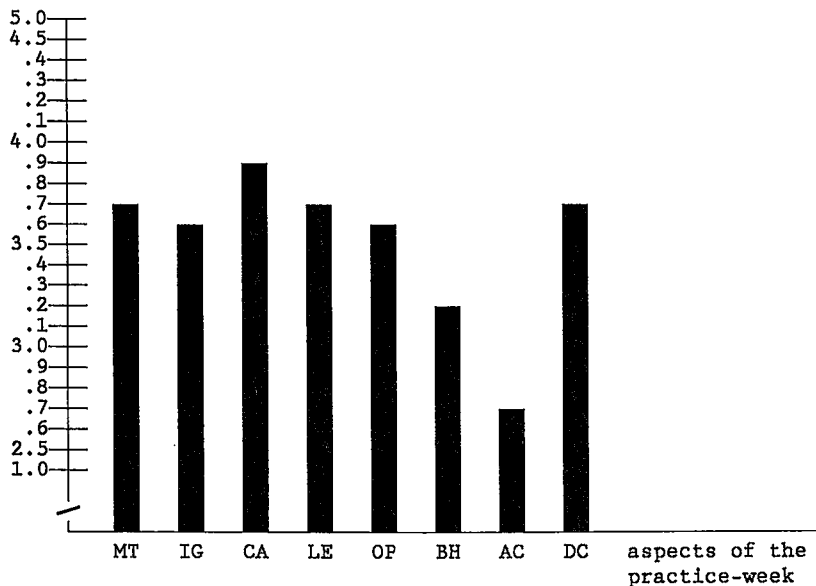
However, about most of the characteristics of practical agricultural education students differ from one another in their opinions. Results are presented below per cluster of statements of the questionnaire.

Figure 4.5 shows average scores of students' perceptions of aspects of practical agricultural education over all the practical training centres involved.,

- 1) The students generally experience practical lessons as positive, namely:
 - the average score on motivation and involvement in tasks is good, but differs per practical training centre; at some centres, for example, students said they had been at work on tasks continually, while at other centres this occurred for only half of the time;
 - the average score on climate and atmosphere forms the high point; this is, among other things, particularly influenced by possibilities for being occupied practically;
 - the average score on instruction and guidance is also relatively high; students particularly experience instruction as excellent, while, at some practical training centres, the guidance of students could be improved.
- 2) The effectiveness of practical agricultural education also scores up to the mark. As to this aspect the practical training centres differ: particularly at the centres which represent the agricultural disciplines pig and poultry husbandry the learning effects are less. This is undoubtedly due to the orientating nature of the courses within these disciplines, which must be distinguished from preparatory courses on students' future occupations:
 - without further preface, for example, the organization of a practice-week has been found to be in order;
 - the stay in the boardinghouse scores relatively low; only with regard to two practical training centres students judge the boardinghouse positively;
 - the actual connection between the regular agricultural schools and the practical training centres forms the lowest point; it must be noticed that the average score of the actual connection differs per practical training centre;
 - the desired connection between the regular agricultural schools and the practical training centres is at a satisfactory level and in contrast with the actual connection; the average score reflects the students'

desire for improved connections between programmes of their own (regular) schools and those of the practical training centres. The results presented above are based on average scores of nine practical training centres. These centres should not be treated alike. The conclusion can be drawn that students experience two aspects as good at all the practical training centres, namely the instruction during practical lessons and the organization of a practice-week. As to the other aspects the centres differ from one another (see Kingma, 1988).

score



Explanation of abbreviations:

MT = motivation and involvement in tasks

IG = instruction and guidance

CA = climate and atmosphere

LE = learning effects

OP = organization of the practice-week

BH = boardinghouse

AC = actual connection between the regular agricultural school and the practical training centre

DC = desired connection between the regular agricultural school and the practical training centre

Figure 4.5 Students' average scores on aspects of practical agricultural education (Kingma, 1988, 68).

The practical training centres are autonomous in the way they provide for instruction and organize a practice-week. Both aspects are positively perceived by students. As to the other aspects they usually depend on the attunement on or connection with the regular agricultural schools. This connection is often problematic and corresponds with the generally acknowledged problematic relationship between theory and practice in vocational education (cf. Schellekens, 1980). However, this does not imply that the situation in the field of agricultural education should remain the same. Attempted improvements need - as was written before - to emphasize a better attunement of educational programmes and, through that, better preparation of students' visits to training centres. In addition, these centres themselves can improve the quality of their education by paying more attention to the guiding of students during practical lessons as well as their stay in the boardinghouses.

3) Learning effect connected with aspects of the practice-week

According to 70% of the students one learns much during a practice-week. The same percentage also experienced this week as pleasant. Hence, it may be supposed that a connection exists between learning and atmosphere. It is interesting to determine if this really is the case and what other factors influence learning during a practice-week. Connections found and described below particularly point out to certain tendencies, though these are not strongly marked.

Table 4.3, which is based on Pearson's formula for calculating correlations, shows that the learning effect is primarily connected with students' motivation and their involvement in tasks during practical lessons. The climate and atmosphere during these lessons as well as the organization of a practice-week also appear to be connected with the learning effect. This connection is only a little less for the instruction and guidance. Comparable connections were found as a result of correlations between statements (see Kingma, 1988, 73 ss.). The importance of 'motivation and involvement in tasks' for the learning effect, for example, appears from the connection between the statement 'I learned much during the practice-week' and the following items: attractive subjects, nice tasks, being practically occupied a lot, varying lessons, enthusiastic and motivating instructors.

The statistical significance of the different aspects of the practice-week was examined by a regression analysis. It appeared that 39.8% of the learning effect is determined by the course of events during the practical lessons. This percentage corresponds with findings of other investigators (Dekker et al., 1986). By examining the influence of the separate aspects of practical lessons the following appeared to be the case. The students' motivation and their involvement in tasks contribute 35% to the learning effect, the climate and atmosphere in the class 26%, and the instruction and guidance 17%. Hence, for the greater part, the learning effect is determined by students' motiva-

tion for being at work on tasks. As such, a conclusion of the preliminary investigation could be affirmed: at a practical training centre a student learns as much as he himself wants (Kingma, 1986).

	MT	IG	CA	LE	OP	BH	AC	DC
- motivation and involvement in tasks								
- instruction and guidance	.52							
- climate and atmosphere	.58	.61						
- learning effect	.59	.41	.51					
- organization of the practice-week	.53	.36	.44	.47				
- boardinghouse	.19	.11	.18	.12	.41			
- actual connection	.21	.11	.11	.10	.21	.14		
- desired connection	.14	.13	.23	.20	.18	.13	-.11	

Table 4.3 Connections between aspects of the practice-week (Kingma, 1988, 72).

The climate and atmosphere also contribute significantly to the learning effect. Hence, the supposition described earlier about the relationship between learning and atmosphere seems to be a correct one (cf. also Créton and Wubbels, 1984).

The contribution of instruction and guidance to the learning effect has been relatively small. This seems to be in contrast with literature about the influence of 'direct instruction' as an important variable (cf. Behets, 1985). Apparently, this contrast is due to the fact that this investigation concerns vocational education, in which motivation in general and directedness towards a profession in particular play a more important part than in general education.

4) Influence of student characteristics and situational conditions on effective learning

Several student characteristics were investigated as to their influence on students' motivation for being seriously at work during the practice-week. Setting a test at the end of this week, for example, particularly influences the learning effect with younger students. On the other hand, their stay in the boardinghouse exerts a negative influence. Students who know what they are pursuing through education experience a greater learning effect than those who are uncertain about their future plans. Moreover, students with agricultural backgrounds seem - possibly contrary to all expectation - to learn significantly less than students with no agricultural backgrounds. Actually, this calls for differentiated programmes for these two types of students.

Situational conditions contribute differently to the learning effect. Students experience the organization of a practice-week as important to the learning effect. Fortunately, students are generally satisfied with this. According to

the students (and statistically significant) the attunement between practical training centres and their own (regular) schools should be improved in order to maximize learning on practical courses. Students express a need for more coherent 'line' in their curricula which encompass the educational programmes of both types of education. This would contribute to the learning effect as is affirmed by students who followed differentiated programmes. These students experienced a considerable greater learning effect than students who did not follow such a programme. A differentiated programme demands that both types of education are well informed about the two programmes and the needs of the students. Particularly older students indicated that it is important to have a say in the selection of subjects and, eventually, the choice of a practical training centre to link up with their needs and previous knowledge.

4.2.6 Some concluding remarks

Through the eyes of students it can be concluded that the practical training centres meet their needs with respect to regular agricultural education. However, the learning effect could be increased by improving the linking-up of educational programmes with student characteristics. This is only possible when practical training centres and regular agricultural schools closely cooperate.

From an action theoretical perspective practical agricultural education is really effective, when theory and practice are integrated in teaching and learning processes and when there is talk of shared responsibility of both types of education stimulated by governmental policy. An integration of theory and practice, for example, can be stimulated by guiding through questioning: at adequate moments the instructor asks for the what, how and why of an action. In general, questioning encourages students' thinking, they learn from their own mistakes and will therefore gain a better imaginative faculty of a problem or task (cf. also Beijard and Ettema, 1985). It is also relevant that:

- students co-determine the educational programme of the practical training centre and that they have the opportunity to orientate themselves on this programme;
- students co-determine what should be done to solve a problem or task and how this should be done; as such, they themselves encounter actions instead of prescribed actions (perhaps they might ask for prescriptions, but then as a result of their own thinking);
- reflective moments are built in in practical lessons, that is to say beforehand, during and afterwards.

Suggestions like these may lead to (independent) thinking by students. In turn this will benefit the quality of a skill learned, because students learn in conformity with a certain method or approach that consists of an interplay between thinking and doing.

Finally, the research results show that the problem of the total project, i.e. the concern about the instructors' teaching qualities (see chapter 1), should be handled with care. Many students are quite satisfied with the way instructors instruct during practical lessons. However, this finding might be influenced by students' (intrinsic) motivation for practical work and the usually impressive learning environment consisting of machines, implements, animals, etc.

4.3 Appraisal

Tentatively and on the basis of research results it can be concluded that the first two research questions of project phase 2a could be answered. Justice has been done to the instructors' intentionality - in terms of reasons and motives on the one hand and facts on the other - and to complexity as well as to their interaction, uniqueness and contextual features. Based on research results it has been possible to make the versatility and specific implicit as well as explicit aspects of practical teaching visible. This occurred on the basis of the actor's point of view regulated by the knowledge ideal, i.e. understanding the complexity of teaching, and interpretation theories derived from didactical theory, results of research on teaching (and acting), results of a preliminary investigation of the research object and system theory in order to meet the criterion of holism.

The connection of action theoretical starting-points with practice-oriented research seems to be a fruitful one in meeting the knowledge ideal mentioned above: a broad and integrative understanding of practical teaching could be realized through description, interpretation and reflection in conformity with rules inherent in the hermeneutic or interpretative scientific tradition. It is, however, questionable whether a complete picture of practical teaching could be achieved. It is also important to determine the practical and theoretical relevance of the investigation. Both these aspects will be considered below.

Research has attempted to achieve a complete picture. Apart from the observation of one lesson and one-off interviews per instructor, logbooks were used to gain insights over a longer period of time. A combined set of methods and techniques was used to make a multitude of aspects explicit and to relate these to each other. The following remarks can be made in connection with the collection of data.

- 1) The investigation primarily aimed at information in the breadth. An instructor was not followed for a longer period of time. An advantage of this is that more instructors could participate in the research. Inherent in that, however, might be the possible loss in nuances and details (cf. also Peters and Postma, 1985).
- 2) The investigation was strongly influenced by the investigator's perspective. The instructors' interpretations were prestructured by a theoretical framework. This facilitates the collection, analysis and synthesis of data,

but may also imply a danger (see Wester, 1987): the investigator's perspective influences and could possibly replace the informants' systems of meaning during his reconstructive or interpretative activities. I became aware of this problem during the collection of data: many instructors, for example, were not used to handling didactical categories or components explicitly. In practice all these components are present, but instructors could not verbalize or interpret them as such.

There was talk of a double reduction of complexity, namely reduction of the individual instructor's complexity and reduction from theory based on choices of the investigator. Though this is inherent in practice-oriented research as was described in chapter 2, one can wonder if these reducing activities could be realized by an individual investigator in a justifiable way. In connection with the demand of a complex research design this also applies to the preparation of the investigation.

To avoid the research project becoming too teacher-centred perceptions of students were also investigated. Due to results of this study the problem of the total project (see chapter 1) took on another, less absolute face. Additionally, student perceptions particularly affirmed the influence of external, situational circumstances and conditions on practical teaching and learning. As such, the picture of practical teaching could be completed and underpinned in conformity with the action theoretical starting-points described in chapter 2. Metaphorically speaking, in view of validity the followed procedure can be seen as a form of research 'triangulation' (Smaling, 1987, 310) along with triangulation within one investigation.

It appeared that instructors possess many subjective theories which are of some value to their colleagues. The explicitation of these theories seemed to be practically relevant, as many of them could be directly included in the didactical in-service programme (see chapter 5). Moreover, these subjective theories formed:

- a basis for legitimating the selection of starting-points, subjects, tasks and points of discussion of the in-service programme;
- a basis for discussions, particularly about task environmental influences on practical teaching, by the principals of the practical training centres (45).

In chapter 5 more attention is paid to the quality and nature of the instructors' subjective theories as a result of interpretations of reflections.

The theoretical relevance of the research results primarily regard the research object: knowledge of and insights into practical teaching could be gained and described in terms of object theory. Hence, along with the criterion of practical relevance the criterion concerning the development of theory could also be met. This theory can be considered as a specification of the domain theory, i.e. theory about teaching in general, corresponding with action theoretical starting-points and key-concepts. The relationship between both the levels of theory is mediated by the concept of knowledge ideal, used interpretation theories and methodological as well as methodical aspects. It is, at this moment, a little premature to ascertain to what extent research

findings yield feedback to the theoretical orientation at paradigmatic level.
This is postponed to the end of chapter 5 and emphasized in chapter 7.

5 TEACHER REFLECTIONS

In chapter 2 reflection was described as a phase or part of teaching and as a source of information (for the investigator). Generally, reflective teachers are expected to function in a 'better' way than non-reflective teachers. They are supposed to function more independently, consciously and systematically, and are more open to educational innovations (cf. Korthagen, 1987). Notions about reflective teaching can be found in publications dealing with the teacher as researcher (see e.g. Hopkins, 1985; Klem et al., 1988), inquiry-oriented teacher education (see chapter 3, section 3.1.4) and school-based learning to teach (see e.g. Furlong et al., 1988).

To summarize, in chapter 2 reflections were considered as being present in actions. More precisely, reflection was defined as:

- a function of intentionality: intentions, cognitions or subjective theories as well as conative aspects are mediated and represented by reflections;
- a human quality or attitude expressed by the ability to concentrate on something;
- an 'instrument' with a retrospective and prospective function.

These different descriptions of reflection all mean virtually the same.

This chapter links up with the preceding one, in which the first two questions of the research on practical teaching (see section 4.1.1) were answered. The latter two research questions - concerning the nature of reflections and the development of a didactical in-service programme - are answered in this chapter. Section 5.1 pays attention to reflection as a phase or part of teaching. Section 5.2 deals with reflection as a source of information. Section 5.3 gives an account of the in-service programme developed. All of these three sections are derived from the original project report (Beijaard, 1986) and the handbook (Beijaard, 1987a) that was developed in connection with the in-service programme. Problems and perspectives regarding the analysis and interpretation of teacher reflections are discussed in section 5.4. This chapter ends with an appraisal in section 5.5.

5.1 Reflection as a phase of teaching

Reflection can be seen as the human ability to plan, adjust or change one's own actions. In a certain way this ability presupposes the availability of concepts and procedures characteristic of a certain profession.

This section interprets reflections derived from the logbooks kept by the instructors. These reflections were already ordered according to frequency and

content in chapter 4 (see table 4.2, page 111). In the original project report (Beijaard, 1986) they were distinguished as *empiric-theoretical* reflections, i.e. reflections concerning 'what went well' and 'what did not go well', and *normative-theoretical* reflections, i.e. reflections concerning 'desirable changes' (see also Peters, Postma et al., 1983). By this distinction - on the basis of which the logbook was constructed as a research instrument - justice is done to the retrospective and prospective function of reflection.

It was found that empiric-theoretical reflections particularly refer to *causes* of why something did or did not go well. For the greater part, reflections concerning 'what went well' are of a concrete nature and directly bear upon given lessons. In their formulation, however, they vary from general to specific as is illustrated below.

- Examples of concrete reflections formulated in more specific terms:

"Many questions were posed about advantages and disadvantages."

"Students cooperated well during the positioning of machinery."

"There were sufficient parcels available."

"The students' previous knowledge was sufficient."

- Examples of concrete reflections formulated in more general terms:

"The students had a great mind."

"The students' experiences appeared to exceed expectations, so that it was possible to let them proceed independently."

"The students had already been confronted with theory for 25 hours and could engage in practical experience and discussion, through which the lesson went very well."

The reflections illustrated are examples of concrete reflections, close to acting. As a result of remembrance they are, as it were, 'lifted out' above the teaching and learning situation. These reflections may be interpreted as *spontaneous, non-lasting* reflections because they are predominantly restricted to experiences of concrete moments and because remembrance and experience are directly related.

For the greater part, the foregoing also applies to empiric-theoretical reflections concerning 'what did not go well'. Below some examples are given of these reflections.

"The ending should have been faster, because the students needed more time."

"Some students could not bring themselves to be at work without supervision."

"There was too little room to drive, because the lesson had to be given inside due to bad weather circumstances."

"As a result of insufficient recognition the students completed parts of the instructional leaflet too superficially."

Along with these concrete, short-term reflections, reflections have also been encountered concerning 'what did not go well', which are of a more abstract nature, i.e. reflections that are not directly connected with experiences of concrete moments. These reflections might be interpreted as *experiences present in memory which exceed the concrete lesson situation*. Their reproduction, however, is stimulated by experiences of concrete moments, but they may go back far into the past. Particularly reflections of this nature affirm the presupposition that they can contribute to a description of more stable features of teaching. Below some examples of these reflections are given.

"... Worse is, that they do not accept our way of milking, because they prefer the procedure followed by their father (...). It seems to be a fact that farmers' sons do not want to change their taught milking skills or to adapt these to our methods."

"Students from Belgium are used to a more authoritarian school system, so that it takes longer to loosen them up."

Normative-theoretical reflections, i.e. reflections concerning 'desirable changes', particularly refer to *aims* or *future images*. These are twofold, namely:

- aims with reference to concrete experiences concerning 'what did not go well';
- aims of a more general nature which exceed the lesson situation, i.e. reflections stimulated by concrete experiences concerning 'what did not go well', or long-term reflections based on experiences present in memory.

Normative-theoretical reflections can correct teaching as was shown by the logbooks: concrete future images were regularly realized when instructors had to teach the same lessons again. However, general future images were not realized in these lessons. These images are mentally present, but not directly 'translated' into actual or concrete teaching or into actions closely related to teaching. Usually they remain notions, their realization is above all obstructed by aspects of the task environment or the conditional structure of teaching. Below some examples of these reflections are given.

"The course should be made more practice-oriented."

"Reduction of the group size by extending the educational personnel or taking this into account with the application of students."

"The regular school should better inform itself about the lessons of the practical training centre. Without more ado a lesson programme is filled in now."

The task environment, therefore, strongly interferes in possibilities or impossibilities, in favour of or against teaching itself (see also section 4.2). In principle, however, the teacher always seems to possess information as a result of reflection which more or less encourages certain actions. In view of acting this information is generated by different kinds of reflections as is summarized by figure 5.1. This figure is elaborated on by Broeckmans and Tistaert (1988) in order to use it as an analytical framework for reviewing their own studies of (prospective) teacher reflections as well as those of others. General trends in the results of their review are the following:

- the most reported 'object' of teacher reflections has a bearing upon class performance in a particular lesson;
- most explanations teachers give are causal attributions; rational analyses of what happened are less frequent;
- reflections do not always contain a prospect; evaluations of poor class performances, however, usually lead to (intended) adjustments of teaching; these adjustments are very diverse and identified in different ways.

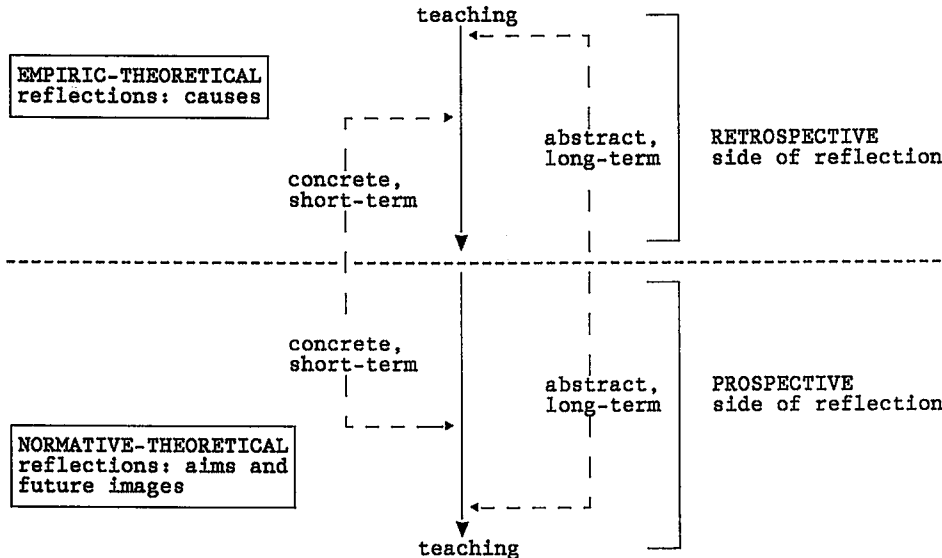


Figure 5.1 Summary of reflection as a phase of teaching (46).

The authors themselves conclude that large parts of their analytical framework are not covered by the reviewed studies. Most problematic seems to be that their results give the impression that these, for the greater part, are based on reflections of prospective teachers who are engaged in a learning process. It sounds plausible that experienced teachers are less likely to adjust their teaching. Apparently they often mention poor class performance pro form's sake, or are unable to change due to external circumstances or environmental constraints (see also Beijaard, 1988).

5.2 Reflection as a source of information

The information given by instructors was dealt with in chapter 4. In this section more attention will be paid to the nature of this information, i.e. instructor reflections, with the emphasis on reasons or motives underlying practical teaching.

In chapter 4 (scheme 4.4, page 99) was demonstrated that reflections with regard to the same 'why-questions' mostly vary per instructor. Along with this interpersonal variation intrapersonal variations were also encountered: with reference to one 'why-question', for example, an instructor frequently gave more than one concrete or abstract as well as specific or general reason or motive. This can be illustrated by part of an interview protocol:

Investigator: Why do you think it is necessary to prepare your lessons?

Informant : To avoid getting into a rut and only teaching routine lessons, and to be sure that the machinery works.

As a result of the variety of instructor reflections it was only possible to interpret their nature and function in general terms. This was done in the light of the theory outlined in chapter 2 (see also Peters, Postma et al., 1983; Peters, 1984a and 1984b).

As to their nature or kind a distinction can be made between:

- general reflections that represent teachers' subjective theories regarding teaching and learning (for example discovery learning, solving problems independently, etc.);
- model-like reflections or teachers' subjective theories that represent blueprints for teaching (for example the order of lesson phases, the sequence of subject-matter, teaching and learning activities, etc.);
- specific reflections that represent teachers' subjective theories regarding actual teaching; these reflections are of a concrete and specific nature and have a direct bearing upon the given (or planned) lesson.

With respect to this ordering or structure of instructor reflections, it can, though cautiously, be concluded that *only a few instructors* meet all the demands Peters (1984a) - ideally - makes upon the cognitive side of a teacher's intentionality (see also chapter 2, section 2.2.1). On the basis of figure 5.2 this conclusion will be explained. This figure demonstrates that

teachers' subjective theories are ordered sequentially and hierarchically. At the top of the figure are general or abstract subjective theories; at the bottom these theories are concrete and specific. It is assumed that the coherence between the different levels is a regulative ('top down') as well as a constitutive ('bottom up') one. Below the emphasis is placed on the former. Between the subjective theories at different levels there exists ideally a deductive coherence.

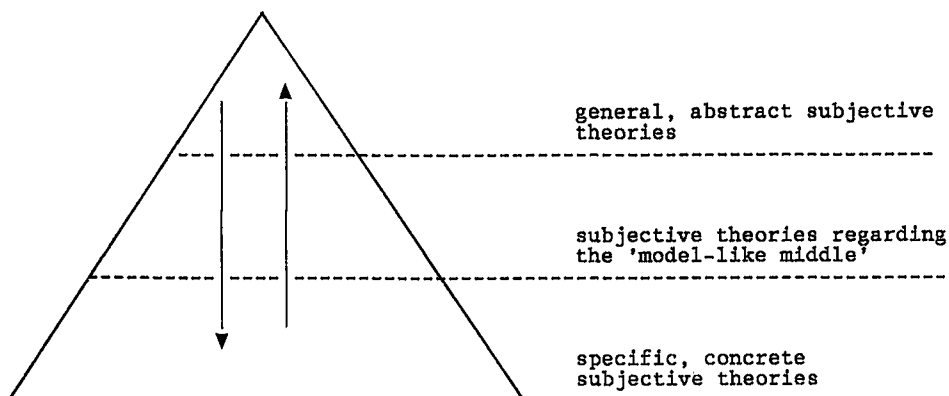


Figure 5.2 Representation of coherence in the cognitive structure (Beijaard, 1986, 205) (47).

In the original project report the following inferences were drawn on the basis of reflection as a source of information (Beijaard, 1986, 205 ss.).

- 1) Only a few instructors possess general, abstract theories about teaching and learning. All instructors possess at least subjective theories concerning the 'model-like middle' and many concrete, specific subjective theories.
- 2) In the form of reflections the three kinds of subjective theories are encountered in a deductive coherence with only a few instructors. With the exception of one instructor there is also talk of *consistency* in this deductive structure.
- 3) Inconsistencies between subjective theories can, among other things, be explained by a lack of educational experience, insufficient (didactical) knowledge or because of having had only poor opportunities to experiment. These inconsistencies were expressed with reference to the retrospection on external observable teaching behaviour. In arising cases, therefore, there seems to be talk of an *insufficient empirical basis* for subjective theories, or of teaching which is *insufficiently thought out from theoretical perspectives*.
- 4) Cognitive representations of aspects of the 'model-like middle' make clear that these prescriptively function for acting. With the exception of instructors who followed any teacher education, many instructors do not explicitly think in terms of didactical categories. 'Model-like' thinking

appears to be of an *intuitive* nature, which affirms the conclusion that many instructors act according to didactical principles, rules of thumb or recipes *gained by tradition or non-autonomously*.

- 5) It is *not* necessary to have followed any teacher education to possess general subjective theories about teaching and learning. However, it appeared that this has relevance for imparting coherence in one's cognitive structure and, therefore, in teaching. It was found that this coherence and consistency are particularly present with instructors who had followed teacher education.
- 6) Coherence and consistency do *not* necessarily lead to good teaching. Other configurations or qualities also seem to play a part, such as emotional and moral aspects, one's appearance, being enthusiastic and showing involvement. Discrepancies between the 'levels' of subjective theories, however, lead more quickly to *inadequate* teaching or to teaching with *unintended effects*.
- 7) Concrete subjective theories are - as was written in section 5.1 - of a spontaneous nature and directly connected with experiences of moments from given lessons. The cognitive representation of these theories occurs by way of one's short-term memory. Relatively few instructors (adequately) reflect on these concrete theories from a general didactical and model-like body of knowledge. This statement may point out that instructors are not used to placing concrete experiences into a broader or theoretical perspective, or that instructors are unable to do so due to a shortage of (didactical) knowledge or insufficient time or room.

The inferences drawn above imply several suggestions for the development of a didactical in-service programme. More attention to these suggestions and this programme will be paid in the next section. After that some additional problems are discussed with regard to the analysis and interpretation of teacher reflections.

5.3 Development of the in-service programme

In this section attention is paid to general conclusions based on findings described in chapter 4 and the preceding sections, to choices underlying the arrangement of the in-service programme and to additional criteria specific for in-service education of teachers. A brief overview of the programme's content is also presented.

5.3.1 Some general conclusions

In chapter 2 teaching was defined as at least a semi-profession. To a certain extent it can be assumed that each professional activity has a rationality of its own expressed by one's performance. It appears that rationality and

intentionality sometimes are not always compatible. Among other things, this discrepancy is caused by:

- inconsistencies within intentionality itself (lack of a sufficient deductively articulated cognitive structure);
- inconsistencies between what one thinks and what one does (insufficient empirical basis);
- task environmental influences on the execution of education, which make aspects of teaching somewhat unpredictable;
- acting according to theoretically ill considered, non-autonomously gained recipes, principles or rules of thumb (lack of acting alternatives due to a shortage of knowledge and limited opportunity to experiment).

With the exception of task environmental features this conclusion to a lesser extent applies to a number of experienced instructors who possess a consistent, deductively articulated cognitive structure.

Intentionality and context interplay. In principle, neither dominates. This interaction makes clear that teaching occurs under *limiting conditions*. A teacher's intentionality is directly connected with degrees of freedom to act, task environmental demands and - in the case of the practical training centres - demands of regular agricultural schools. Instructors are particularly confronted with uncertainties about students' starting points, who, in addition, are often taught only briefly. These uncertainties probably explain why many instructors act on the basis of standard programmes as a result of knowledge based on experience.

Actions and action structures that are peculiar to practical agricultural education were made explicit and described. It appeared that teachers' action competency is above all expressed during the execution of education. Other aspects play a part in this, unlike lesson planning which takes place implicitly, routinely, abridged or only partly explicit. Action competency only becomes complete by reflection on the planning and execution of lessons. Because of diverse reasons, however, this reflection seldom occurs systematically. Despite of this conclusion the logbooks kept by the instructors show that reflection in a certain way can enable one to explain his actions functionally. Through that, in principle, one also makes sense of his actions.

It is not suggested that instructors are unable to make sense of their actions. With many instructors, however, this process of sense making is of an intuitive nature and strongly connected with the individual, experience-based knowledge they possess. Many instructors lack a more objective, theoretical frame of reference which could enable them to increase their opportunities under given task environmental circumstances. Teaching not based on any theory increases the chance of a failing rationality. This might be problematic for the upbuilding of routines. Non-thought out routines, or routines that are not based on any theory, may lead to inadequate teaching. In other words, a theoretical knowledge basis is necessary to answer teaching actions to oneself as well as to others (students, colleagues, etc.).

Reflections on routines represent concrete or specific and abstract or general knowledge. Acting routinely occurs on the basis of tacit knowledge upon which

reflection is possible and, through that, routines can be adjusted. Examples of reflections on and adjustments of routines were encountered in the logbooks kept by instructors and can also be given as a result of the instructors' participation in the research project. Instructors were requested to reflect in a systematic way and reflections were evoked by the investigator. Some instructors experienced this as an immediate help for improving their teaching practice.

In general it can be assumed that routines give teachers a sense of security. In connection with this Giddens (1984, 60), for example, holds the view that a sequence of (schooling) activities should provide for sufficient time and room for improvisation and interchange. Both these demands increase one's *teaching flexibility* and, through that, the *manoeuvrability of routines* (cf. also Peters, 1985).

Finally, the chance of inadequate teaching increases when one does not know the action conditions. It was already pointed out that this may lead to unintended effects and, in connection with this, that knowledge of students' starting points is of special relevance. For practical reasons, therefore, instructors often stick to standard programmes, or make adjustments as a result of reflection *during* the execution of lessons. This indicates that reflection is present in teaching, whether or not it is raised to the level of consciousness. However, it also appeared that some instructors were not able to adjust, so that their acting can be typified as less adequate.

5.3.2 The in-service programme: choices involved

The patterns outlined so far as well as the descriptive analyses of chapter 4 contain several suggestions for the development of an in-service programme. This section deals with choices underlying the framework for this programme.

Based on research results I chose for *augmenting the instructors action competency* and, as far as applicable, for *supporting them to break through their action routines* as starting-points. The emphasis had to be placed on the augmentation of instructors' didactical professionalism by reconsidering and extending their existing action repertoire. This choice was prompted by notions about teaching competency and the improvement of teaching in chapter 2, section 2.2.3, concerning the exchange between objective and subjective theory.

It was decided that the following aspects in the in-service programme needed consideration:

- instructors' task environment and action conditions;
- general theories about teaching and learning;
- theoretical background information regarding didactical models as aids for the arrangement of teaching and learning processes;
- partial actions of a specific and concrete nature belonging to didactical categories;
- reflective skills regarding the planning and execution of practical lessons.

To some extent this enumeration represents the three levels of one's cognitive structure (see figure 5.2) related to contextual features on the one hand and to reflection on the other. This calls for an *action structure* of instructors as is represented by figure 5.3. This figure also represents the structure of the handbook written for the in-service programme (Beijaard, 1987a). In general the concept of action structure refers to a whole of partial actions, the way these are build up and related to one another, integrated with situational and personal aspects (cf. van Parreren, 1979 and 1981). A subject, of course, is presupposed. An action structure results from learning processes. Novice teachers, for example, differ from experienced teachers in the extent of lesson planning. Their action structures differ because of different stages in learning processes. In an experienced teacher's action structure many more 'practical theories' are integrated; this also enables this teacher to act on the basis of an abridged action structure. With both teachers, however, their performance or competency results from their action structure.

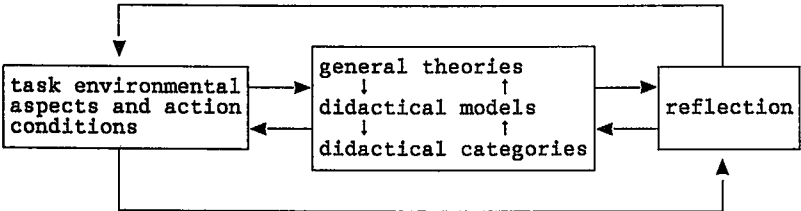


Figure 5.3 Desired action structure and structure of the in-service programme's handbook.

As regards the content of the in-service programme it was important to link up with the descriptions in chapter 4 in order to legitimate choices made. Moreover, many of these descriptions could be brought into the programme; particularly those derived from instructors whose action structures were characterized by consistency, deductive coherence and, proportionally, many general subjective theories which possess important learning moments for other instructors.

It is not the purpose of this section to discuss the developed in-service programme in detail. An overview will be given in the next section. Figure 5.4 demonstrates the underlying vision of this programme on classroom teaching as a process, i.e. the teaching of practical lessons in agriculture. In this context the figure emphasizes ingredients of the desired action repertoire and action competency (cf. van Parreren, 1979 and 1981; see also van Parreren, 1988a and 1988b).

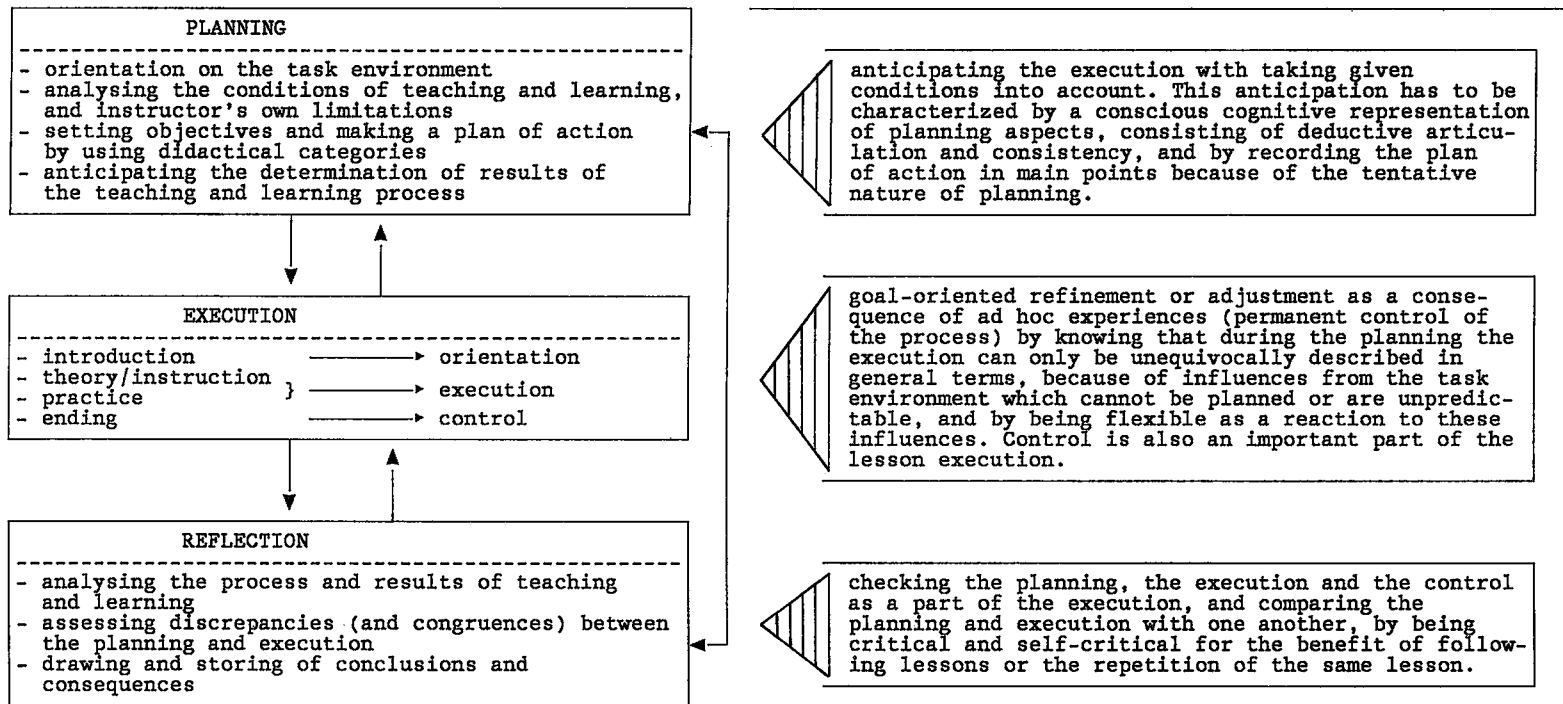


Figure 5.4 Desired action repertoire and action competency with regard to the teaching of practical lessons.

According to van Parreren the concept of *action repertoire* refers to possibilities to act which are stored in memory and which lie ready to be used. It can be seen as an ordered capacity to act in certain situations. An adequate action repertoire forms a good 'orientation basis' for acting and is directed towards questions like: What do I have to do? What must I do? How must I do it? Why must I do it like this? (van Parreren, 1988a, 60). In figure 5.4 action repertoire has a bearing upon all the three phases of teaching, i.e. planning, execution and reflection. As such the concept coincides with but also exceeds the orientating function of planning, its realization and the controlling function of reflection which, at the same time, is of an orientating nature. This view is inherent in the conception of teaching as an action unit, subdivided into three partial actions corresponding with the functions of an action (see chapter 2, section 2.2.2). It should be noticed that the elements of an action repertoire are manifold and may vary from the technique of motorial activities like walking or cycling to established customs of speaking or well-exercised forms of reasoning (van Parreren, 1988b).

The concept of action structure has a bearing upon the total activity of the acting individual, not only upon immediate observable parts of behaviour by an outsider. It is more like a theoretical construction, a supposition about what underlies a certain action (van Parreren, 1981, 157). A person enriches his action repertoire through qualitative changes in the action structure as a result of learning and, through that, his *action competency* increases. Both the desired action repertoire and action competency are expressed by figure 5.4 in view of the in-service programme. It is assumed that teaching is a goal-directed action just like the partial actions planning, execution and reflection. To each partial action, therefore, belongs a structure, repertoire and competence in strict relationship to each other.

To complete the in-service programme it is important to distinguish between experienced and prospective teachers, to integrate theoretical and practical schooling and to take into account that teaching is, to some extent, a unique or situation-specific and normative or person-bound activity (cf. also Peters, 1985). These characteristics of teaching do not facilitate schooling activities that focus on the integration of objective theory into teachers' subjective theories as a form of innovation (see also chapter 2, section 2.2.3 and 2.2.4).

5.3.3 Overview of the in-service programme

1) Some prior conditions and objective of the course

Legally, 13 days are available for the course. In a period of about half a year the course consists of six blocks of two days each and one day for evaluation, reflection on effects and the delivery of certificates. In addition, each instructor is visited once at his own practical training centre

during the period he participates in the course. Each block is in principle offered at different practical training centres in The Netherlands. The reason for this is twofold: travelling is equally spread over the course-members and the opportunity created to get to know one another's schools.

Because of its intensive nature the course is executed by two teacher educators. The number of participants in the course may vary from 16 to 20. In principle the course is only accessible to instructors of the eleven practical training centres and obligatory for those instructors who are appointed after the first of January 1986. In conformity with legal regulations these instructors can only be appointed permanently when they have followed the course.

In support of the course a research-based handbook (Beijaard, 1987a) was developed which, in general, may also function as a reference book for all instructors. The handbook tries to contribute to *augmenting the expertise of the instructor as teacher*. It consists of five parts which are summarized below.

2) About the handbook

Part 1: introduction and account

This part explains how the handbook came about, which objectives it serves, its format and its starting-points. It is essential that the handbook links up with *the course-members personal knowledge and experiences*. As such the handbook pretends to refer closely to practice. However, the handbook also provides for new information. Therefore, an arrangement was chosen which would enable course-members to exchange new information with existing knowledge and with knowledge based on experience. An arrangement like this seems to be essential for in-service education: usually the course-members already possess much educational experience (see also Peters, 1985; Coonen, 1987b). Additionally, they are adults. In general, adult education aims at the improvement of independent action in everyday situations (cf. Stroomberg et al., 1983). Much importance is attached to giving responsibility to the course-members. They are asked to formulate own learning goals by means of a *learning contract*. It is possible to adjust this learning contract several times during the course (see figure 5.5). This generally fulfils the needs of the course-members, who usually know very well what they want to learn and, from that, derive their motivation for following any education.

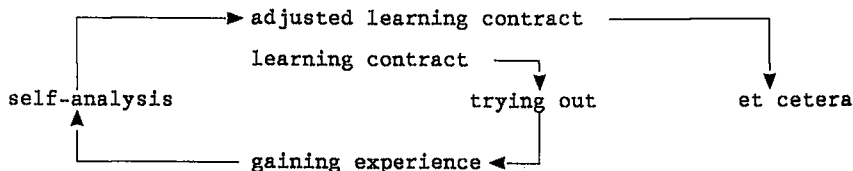


Figure 5.5 Function of a learning contract.

All the subjects the handbook deals with are ascribed to the function of an instructor at a practical agricultural training centre. The real relationship with educational practice, however, becomes apparent through exercises and discussion.

Part 2: the teaching of microlessons

This part of the handbook emphasizes what microlessons are, why these play an important part during the course, which teaching skills are practised, how a microlesson can be prepared and procedures and rules for giving feedback.

A lot has already been written about the objective and function of microlessons in the educational literature. Teaching microlessons can be described as an educational method to learn or practice specific skills in a systematic way. In imitation of Leeuwis (1986) the handbook demonstrates this method by comparing the learning of basic skills with learning to play a musical instrument. This learning process is characterized by features which apply to the learning of every skill.

The way in which microlessons are organized has important advantages: a reduced number of students are taught, the lessons are of a short duration, the learning content is restricted and a specific number of teaching skills are practised. Microlessons increase the opportunity to practice and reduce the everyday teaching complexity which is, among other things, characterized by numerous teaching skills at the same time or by teaching skills which rapidly succeed each other (cf. also Lowyck, 1985). Teaching occurs in simulated educational situations; course-members themselves act as students. The lessons are video-taped and placed at the course-members' disposal, for example in order to detect aspects which remained underexposed or undiscussed. It is assumed that course-members who already have some teaching experience can learn a lot through microlessons: the feedback of others may lead to reflection on teaching routines and to suggestions for improving their teaching practice. The microlessons are organized as:

- 1) *presenting* activities like explaining, demonstrating, giving instruction and providing students with exercises; among other things, it is important that a teacher is able to transmit his intentions in a clear, well-ordered and effective way;
- 2) *interacting* activities to lead or guide educational situations which demand that course-members contribute to their own learning process by asking and answering questions, responding to opinions, points of view, etc; activities like these demand that the instructor is flexible: at one time he has to take initiative (e.g. by summarizing between times), at another time he has to show reserve (e.g. by listening);
- 3) *delegating* activities directed towards students' group or individual learning activities; in these cases the teacher's task focuses on the preparation and organization of the lesson, the provision with learning materials, the guidance of students' self-activities and the evaluation of results.

By microlessons each group of activities is practiced separately in two simultaneous groups.

Course-members are requested to prepare a microlesson by using a lesson plan which, at least, covers the subject, lesson goal(s) (intended learning results), learning aids, teaching and learning activities and personal learning goals. For the formulating of these personal goals instructors are recommended to consult their learning contract.

Each microlesson is followed by feedback: first the teacher of the microlesson is given the opportunity to comment on his own performance, then the other course-members give their observations and, finally, the course leader summarizes what has been said and may add things. The given feedback is characterized by objectivity, restriction to main points, reference to clearly recognizable lesson moments (especially when aspects of one's personality are involved) and - if possible - by giving alternatives (see also Leeuwis, 1986). It is assumed that these characteristics stimulate a safe and open learning environment.

Part 3: the agricultural education system

Agricultural education forms a part of the total Dutch vocational education. The handbook briefly describes each type of agricultural education as well as changes and innovations within agricultural education (see also Segeren, 1984; Kingma, 1986) (48).

Special attention is paid to the place of the practical training centres within the whole agricultural education system and to their:

- historical backgrounds and developments in later years;
- objectives, tasks and target-groups;
- nature or philosophy of education, i.e. 'learning by doing'.

Descriptions of these aspects are derived from the first project report (Beijaard, 1985; see also section 3.3 of this study). It is assumed that instructors have to be well-informed about their own general context as well as more specific features of this context from a historical and societal perspective. The more specific context of practical teaching by instructors is emphasized in the next part of the handbook.

Part 4: conditions for practical teaching and learning

In the first chapter of this part attention is paid to factors that influence teaching, i.e. personal factors, student and task environmental characteristics (see figure 5.6). It should be clear that teaching depends on, but also influences personal and situational factors.

Special emphasis is placed on the instructor's immediate task environment, i.e. equipment and learning aids, subject-matter and school organizational aspects (Beijaard, 1986; see also section 4.1.4 of this study). By the handbook students are treated as a special category. Information about students deals with differences between and within target-groups (Beijaard,

1986; see also section 4.1.4 of this study) and student perceptions of practical teaching by instructors (Kingma, 1986 and 1988; see also section 4.2 of this study). The first chapter of part 4 ends with some inferences for practical teaching: instructors should be flexible, possess improvising qualities and have a broad knowledge basis as regards content and didactical background knowledge.

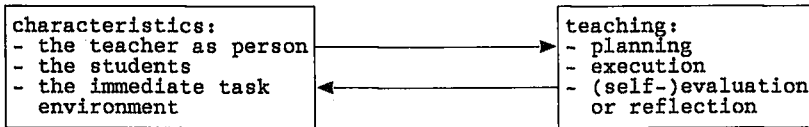


Figure 5.6 Relationship between personal and situational characteristics and teaching.

The second chapter of part 4 confronts the course-members with an overview of developmental stages (see also Buijs and Rijkers, 1985), because they teach students from different ages. Attention is also paid to some general mental disorders which may influence a student's learning capabilities and of which an instructor needs to be aware. Finally, some aspects are described with regard to (developmental) stages a teacher himself passes through (cf. Prick, 1983; Vedder, 1984).

The third and final chapter of part 4 deals with some theory about learning and types of learning processes. These processes come about in teaching and learning situations which vary from closed to open, respectively from pre-structured to unstructured (see also Oudkerk Pool, 1984). It is necessary to pay attention to this variety of teaching and learning situations, because in reality instructors themselves also - though often implicitly - differ in the ways they organize their lessons (Beijaard, 1985 and 1986; see also section 3.3 of this study).

Part 5: teaching and action competency

In conformity with the functions of an action, teaching is considered as an action unit consisting of planning, execution and (self-)evaluation. Ideally, a conceptualization of professional classroom teaching needs to emphasize these phases under given personal and situational circumstances. It is shown that in reality many instructors tend to reduce their lesson planning to organizational matters on the basis of routines or an 'abridged action structure', that the execution of a lesson cannot be planned unequivocally because of unforeseen events and aspects which cannot be predicted, and that instructors barely reflect on given lessons afterwards ('self-evaluation') (Beijaard, 1986; see also section 4.1.4 of this study). Though the teaching reality differs from what is prescribed by theory, it is argued that teachers need to have learned to plan their lessons in a comprehensive way in order to

build up adequate and manoeuvrable teaching routines. Handling routines by themselves is seen as positive; providing that they are developed in a well-considered way, for example as a result of reflection on individual teaching 'experiments'.

The second chapter of part 5 emphasizes the making of a *plan of action* by confronting course members with important didactical key questions (cf. van Gelder et al., 1979; de Corte et al., 1981; Oudkerk Pool, 1984 and 1987). These questions are considered as a framework to enable an instructor to theorize about classroom teaching from different perspectives (cf. Joyce and Weil, 1980; 1984). As such intuitiveness is, as it were, exchanged for a more systematic way of working connected with the what, the how and the why of teaching. Examples are derived from the second project report (Beijaard, 1986; in section 4.1.4 a more integral description is given of didactical categories which are represented by the didactical key questions).

The third chapter of part 5 deals with the *execution* of practical lessons. The following aspects are emphasized:

- the uniqueness of teaching because of personal and situational influences (see also Becker, 1984a and 1984b);
- didactical principles which, more or less, form one's 'depth structure' of teaching (Peters and Beijaard, 1983); these principles are usually part of one's action repertoire on which a teacher does not reflect (consciously) (cf. Beijaard, 1986; see also section 4.1.4 of this study);
- motivation techniques which, like principles, usually stay implicit during lesson planning, but which are important during the execution of a lesson (see also Deula-Leitung, 1986); motivation techniques not necessarily need to coincide with didactical principles, but they often are - like these principles - routinely handled by a teacher;
- the interaction or the way instructors deal with students; usually a teacher initiates the interaction, which may be legitimated on several grounds (cf. Alblas et al., 1986); a distinction is made between student-centred and teacher-centred activities (see also Beijaard, 1986);
- teaching and leadership styles in connection with functional behaviour (cf. Créton and Wubbels, 1984); it is emphasized that no uniform teaching style exists: one's character, vision and conceptions as well as personal and situational aspects are involved; to some extent one has to develop his own teaching style (see figure 5.7), and self-analysis is seen as an important method during this learning process;
- learning types, that is to say that students learn on the basis of different (combinations of) learning styles (cf. e.g. Vester, 1976); a teacher has to take these differences between students into account by means of varying teaching and learning activities and learning aids (see also Lowyck and Tillema, 1984); being aware of different learning styles is especially important for instructors of practical training centres, because they teach students whose learning abilities often differ strongly.

The enumerated subjects are illustrated in the handbook by many examples from the instructors' everyday teaching practice.

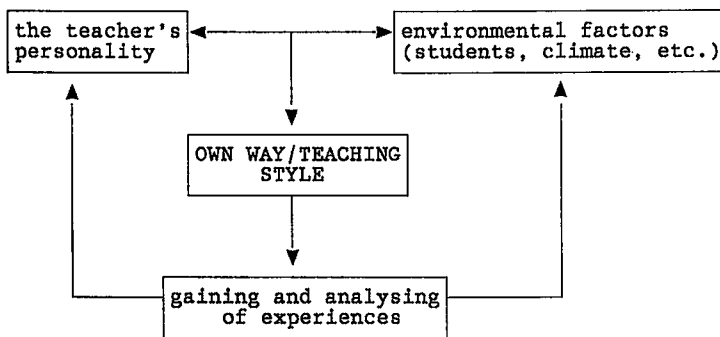


Figure 5.7 Development of an own teaching style under given personal and environmental circumstances.

Finally, chapter 4 of part 5 deals with *self-evaluation* as a teaching phase. By the handbook self-evaluation is described as a form of reflection upon the planning and execution of a lesson in terms of "it went well or it did not go well because of these or those reasons" (pg. LOBO, 1982). It is a prerequisite for self-evaluation that one is aware of the how and the why of the things he does, respectively of underlying reasons or motives. Self-evaluation as a part of professionalism helps one to make his teaching routines visible and, eventually, to adjust these. It is emphasized that self-evaluation needs to be a professional's custom. The handbook offers several methods for systematic self-evaluation, namely:

- self-evaluation with the help of a prestructured checklist;
- self-evaluation on the basis of personal learning objectives;
- self-evaluation by observation and discussion about what has been observed;
- self-evaluation by keeping a category-based logbook.

It is argued that self-evaluation makes a teacher's profession more dynamic.

5.3.4 Additional theoretical considerations

Until recently little attention has been paid in The Netherlands to learning processes during the in-service education of teachers. In contrast with preservice courses, an in-service course leader meets teachers with a great variety of cognitive and professional development. By definition these groups are heterogenous (Vonk, 1986, 50). In addition, much is still unknown about adult learning processes.

In-service teacher education can serve several objectives (cf. Tillema and Verloop, 1985) and encompass different levels, i.e. the micro, meso or macro level (Knoers, 1985). However, at present no crystallized didactics of in-service education exists, though impulses to such a didactics are already given (see e.g. Peters, 1986; Coonen, 1987b).

The in-service programme under discussion, therefore, is primarily directed towards the professional abilities of the individual instructor. It has been developed in conformity with starting-points described in chapter 2. In line with these starting-points some additional theoretical attention is paid to the structure of the programme and the learning process involved.

1) About the structure of the programme

The course primarily tries to realize an exchange between objective and subjective theory. Actually, this implies an integration of theory and practice. For this purpose a handbook has been developed which meets two quality demands (cf. also de Jong, 1988).

- 1) *Theoretical reference*, i.e. a systematic body of knowledge with regard to:
 - procedures and means for the realization of educational objectives, that is to say aspects which play a part during the planning, execution and reflection;
 - general conceptions and ideas about teaching and learning as well as their coherence in order to legitimate chosen procedures and means and to set norms for one's own choices.
- 2) *Ecological relevance*, i.e. closely tied-in to the everyday teaching situation which is usually of a complex nature, so that a teacher is made aware of personal and situational limits.

Both quality demands correspond with the 'balance hypothesis' described by Peters and Postma (1987). In research on teaching this hypothesis refers to the cognitive and ecological paradigm (cf. Shulman, 1986; see also chapter 3, section 3.1.1, of this study). In terms of approaches these concepts can also be applied in preservice and in-service teacher education. The focus of attention needs to be a balance between intentionality and complexity (see chapter 2). In connection with this Peters and Postma (1987, 115) state that prospective teachers could develop balanced, flexible and cognition oriented routines. In-service education should continue this process and stimulate teachers to concentrate on and to clarify their teaching behaviour in the light of given circumstances.

2) About the learning process

Augmenting one's professionalism implies a qualitative change of the action structure which underlies action competency. Competent teaching demands of teachers - in the context of adult education (cf. Vonk, 1986) - that they articulate their own practical or subjective theories against the background of demands put upon their intentionality in terms of a deductive coherence of the cognitive structure and internal consistency between intentionality and complexity. Both are prerequisites for adequate reflection (49). The course tries to realize this by:

- emphasizing the *function* of reflection with regard to the teaching phases planning, execution and reflection by means of microlessons and systematic feedback;
- stimulating reflection as an *attitude* concerning their task environment, the broader (historical and societal) context, conditions for teaching and learning, and individual potential through exercises, discussions and 'research' activities in their teaching reality.

It is assumed that both reflection in its function and as an attitude stimulate course-members to connect objective and subjective theories. Cognitive representation is, at least for the person involved, a prerequisite for further development of what one does and for the assimilation of new teaching behaviour. Due to the uniqueness and complexity of each teaching situation it is also assumed that, to some extent, the exchange between objective and subjective theories should be seen as a person-bound learning process; the cues for this process usually arise from the context, including experiences and knowledge of other course-members.

Generally, reflection is a function of intentionality. As such intentionality needs to be represented by reflection, implying consciousness of one's own actions and that self-knowledge is an essential characteristic of professionalism. Both consciousness and self-knowledge better enable a teacher to steer, legitimate, control and interpret his actions (Peters, 1984a and 1984b; see also note 12).

To summarize, by the course in general and the handbook in particular the following aspects are supposed to be realized in order to restructure or to extend the course-members' action repertoire:

- a systematic body of knowledge through an exchange between objective and subjective theory;
- a deductive cognitive structure, internal consistency between intentionality and complexity, consciousness of one's intentionality and self-knowledge;
- reflective abilities regarding the function of reflection and reflection as an attitude.

De Jong (1988), for example, argues that aspects like these should be quality demands to be put upon preservice as well as in-service curricula. By these demands one's whole action structure is at issue, so that - in principle - an adequate action repertoire can be built up.

5.4 Some problems and perspectives concerning research on teacher reflections

During the processing of data several problems were encountered with regard to the analysis and interpretation of reflections. This section reflects on some of these problems from a theoretical perspective. Successively attention is

paid to the diagnosing of teacher reflections, the relationship between motives and reflection, differences between people to stand back and objectively look upon their everyday reality, and teachers' use of metaphors.

5.4.1 Diagnosing teacher reflections and 'good teaching'

Instructor reflections were interpreted in this study by connecting them with quality demands upon intentionality from a theoretical perspective. Below it will be explained that the diagnosis of these reflections necessarily had to be of a general nature.

- 1) It appeared that 'good teaching' may also occur without adequate reflection and the possession of a systematic, deductively articulated knowledge basis. I would like to call such teaching intuitive teaching, usually guided by specific and concrete knowledge and routinized teaching rules. Both mental antecedents involved in actions and reflection can be highlighted in initial and in-service teacher education, and as such they have an important orientating function, but they do not necessarily lead to good teaching. It should be acknowledged that, to some extent, one must also be a suitable person to teach. This quality cannot really be represented cognitively and refers to categories such as emotional and moral ones (cf. Clandinin, 1986) as well as one's appearance.
- 2) 'Good teaching' calls for norms connected with the inter-human context (Beijaard, 1988). However, these norms are just available in theory. De Jong (1988), for example, connects teaching competency with the ability to legitimate actions pedagogically and didactically, the use of adequate means and procedures to achieve goals, the possession of an internally consistent and systematic knowledge basis, ecological relevance, consciousness and self-knowledge. Quality demands like these are mostly considered too teacher-centred with the emphasis on knowledge and skills a teacher needs to possess.
- 3) It is known that the more a teacher evaluates the more he knows, and the more he knows the more he evaluates (see also Rotenstreich, 1985). This may imply a trap-fall for the investigator when he compares this teacher with teachers who know less or who are less articulate and who, despite these 'shortcomings', seem to be 'good' or even 'better teachers'.
- 4) The theoretical construction of a hierarchy of mind (regulative or constructive; see also note 47) is only one way of managing complexity. The tendency exists to emphasize a top down hierarchy and to undervalue a bottom up hierarchy. This study shows that intentionality can also be built up by contextual experiences: many instructors who did not follow any teacher education possess relevant subjective theories predominantly gained by experience. It appeared that these instructors often used other theoretical concepts than the investigator did. This may lead to invalid interpretations of reflections of which the investigator should be aware when drawing inferences about one's teaching qualities.

5) The interpretation of teacher reflections against the background of different levels of cognitive functioning is primarily the investigator's interpretation. In talking of cognitive levels it is very easy to assert that one level of control is above another. But how does one know when one process is operating at a higher level than another? It seems impossible to answer this question adequately by putting a too one-sided emphasis on intentionality. Harré et al. (1985) write that the explanatory domain is personal as well as social: what anybody does on a particular occasion can only be fully explained by reference to both domains. They call this the 'dual control of action' (Harré et al., 1985, 21). Inherent in the definition of an action (see chapter 2) it has been assumed in this study that both domains are mediated by reflections, though the primate has been ascribed to reflection as a function of intentionality.

Apparently, much more research needs to be done on the nature of teacher reflections, how they can be diagnosed in relationship with 'good teaching' and what 'good teaching' actually means. In addition, insight into one's intentionality, in itself, does not necessarily need to have a particular meaning. Real understanding is only possible within its context. Intentionality and, through that, reflections should - more than was done in this study - be tested on their practicability in the actual teaching reality.

5.4.2 Motives and reflection

In this study motives are considered as an important empirical reference for the reconstruction of the meaning of an action in a context. Inherent in the definition of an action (see chapter 2) motives are mediated by reflections, spontaneously given or evoked by the investigator by so-called 'why-questions'.

At first sight motives give the impression that teaching is a unique, person-bound matter. At a higher level of analysis, however, motives are often expressions of or refer to rules that represent an above-ordered level of processes and structures. Whether implicitly or explicitly it became clear that all the instructors involved in the research project referred to such common rules. Examples of these rules are: 'teaching serves a purpose', 'relationships between students and teacher are asymmetrical', 'one has to listen when another speaks to him', 'you should be friendly', 'you cannot punish adult students', etc. Rules like these refer to categories, including moral ones, that are ordered above the individual. They are expressions of the social domain. In their function they regulate actions, in their scope they are spatiotemporal. A person integrates them into his actions, which is expressed at cognitive or conscious level. To some extent a person possesses degrees of freedom to handle them to his own mind.

Both the social and the personal domain are found in one's motives; both provide the frame within which actions occur. Through reflection insight can be gained into both domains. Strictly speaking, motives function above the

cognitive or conscious level, because they refer to rules which guide or underlie life patterns. A person who does not act in conformity with these rules can (and should) be sanctioned. In essence, therefore, there is a priority of social matters over the purely individual. It is only by the integration in a spatiotemporal, social context that the relevance of an action can be examined (see also section 5.4.1).

The rule metaphor (Harré et al., 1985) seems to be acceptable, because in their verbal accounts people often refer to rules as justifications of what they are doing. However, it is realistic to assume that one cannot always know what the large-scale patterns are that his actions are part of. Many determinants, perhaps, cannot be ascertained because they are not located within or exceed the individual (see also Harré et al., 1985, 30). For this reason, for example, it can be explained that instructors involved in the research project sometimes answered 'why-questions' in terms of: "it seems logic to me that I am doing it like this", or "we all do it in this way".

In addition to comments made on hierarchies in section 5.4.1, it might perhaps be a challenge for research to place motives at the top of the hierarchy and to perceive them as the highest level of control. It might be a challenge to do this more explicitly than has been done in this study, in which motives were considered as parts of one's intentionality. In fact this is right, but the surplus value of the 'new' perspective exceeds cognitive psychology and better meets the starting-points of action psychology. It is suggested that motives represent a level that exceeds the level of cognitive awareness of the individual which, in turn, controls the levels of actual (teaching) behaviour. Within this perspective the idea keeps going that information may flow from higher-order controllers to lower-order controllers as well as in reverse. Possibly, this 'new' perspective might also provide for an alternative to what Brand (1984) calls out-of-date motivational theories in order to meet conative aspects involved in actions.

5.4.3 Reflection and the dilemma of taking distance

Reflection always implies a certain distance in terms of 'thinking about' (Beijaard and Goffree, 1986). Under given research circumstances, or due to these circumstances, all the instructors involved demonstrated that they were able to reflect. Connected with the knowledge one possesses, including knowledge of one's action alternatives, the quality of this activity and meta-activity varies per instructor. In the everyday teaching reality, however, it appeared that experienced instructors do not tend to take distance of this reality in an explicit way. This corresponds with the findings of Clandinin (1986), who discovered that reflection seems to be more of an ongoing part of practice which can be made clear by observations of the execution of lessons. As a result of situational stimuli reflections often underlie ad hoc planning activities during the execution of a lesson. Due to abridged action structures, experienced instructors neither (or hardly) reflect during lesson

planning nor on the planning and execution of lessons afterwards or on reflection as a part of teaching (in terms of a meta-cognitive activity).

Taking distance afterwards has most frequently been encountered with instructors who were engaged in the planning and organization of new courses and had a high degree of personal responsibility for these courses. Regularly these instructors indicated that this is particularly the case during experimental stages and, afterwards, when they try to process student reactions and their own impressions. Usually, an instructor who develops courses (on his own), and who is entrusted with a great deal of responsibility, possesses a higher degree of autonomy within the school organization than instructors who are predominantly in charge of teaching 'standardized courses' often prescribed by others. Consequently, these instructors are not challenged into taking distance from their everyday teaching reality.

For taking a more active role in their personal professional accountability and, through that, for making sense of their profession, it is assumed that it is important that every teacher stands back from his teaching and looks upon his actions objectively. Even if a teacher is willing to and aware of this necessity, how can he meet this professional demand? Beijaard and Goffree (1986) show that even for student teachers during problem solving activities this often seems to be difficult. Generally speaking, they mention this the 'dilemma of distance' (Beijaard and Goffree, 1986, 14). Given the versatility of teaching, what needs to be the object of reflection? Does distance taken too early block the rest of the teaching and learning process? How real is the missing of an important learning effect when distance has been taken too late? In other words, seeing through the own teaching practice and the identification of important moments are often less simple than is perhaps assumed. This conclusion, for example, is showed by Calderhead (1988, 10) who states that the ability to look at one's behaviour 'in the third person', separating oneself and one's own emotional commitments from practice, is often itself a difficulty for both student and experienced teachers. In his opinion more research is needed to enquire into what exactly the processes of reflection involve and how they might be developed (see also Calderhead, 1989).

Encouraged by this study it seems to be of a great importance that teachers keep on viewing their profession as open to improvement or change. Ideally, this demands a certain degree of responsibility and autonomy in an innovative context or, at least, a context which may not be experienced as constraining or too rigid. It is assumed that teachers' evolving identities as professionals and their striving for adequate ways of teaching are influenced heavily by their opportunities for professional renewal and by the climate and conditions within which they work (cf. Holly, 1989, 199). In other words there should be room for creativity opposite to external demands and circumstances. According to Woods (1988) the following criteria underlie creativity:

- there must be something new (innovation);
- it has to be something of the teacher himself (ownership);
- there must be control over the carrying out of the idea;
- it should meet the criterion of relevance.

These criteria that underlie creativity in teaching undoubtedly will stimulate reflection. How systematic reflection of experienced teachers ought to be, through what it is characterized, when it is necessary, which benefits it exactly serves and how it can be best encouraged still seem to be unanswered questions.

5.4.4 Teachers' use of metaphors

Teacher thinking studies predominantly attempt to present teachers' knowledge in its own terms. In extreme cases this may lead to pure copies of reality. In chapter 2 it was argued that neither theory nor practice is served by these copies (cf. also Creemers and Hoeben, 1984). Actually, these studies remain nothing but fiction unless they are followed by any interpretation in view of testing or development of theory.

Elbaz (1988) writes about the importance of the teacher's 'voice', i.e. the investigator's willingness to hear the teacher's version. The studies she quotes inspired me to re-examine the protocols (see chapter 4) on the presence of metaphors used by instructors when they answered the so-called 'why-questions'. As far as is known, a similar attempt was undertaken by Munby (1986) in order to study teacher's professional knowledge. Munby writes about the analysis of teachers' metaphors as an attractive heuristic; in his opinion voice is given to tacit knowledge by the metaphorical language a teacher employs. This conclusion is supported by Clandinin (1986) who found that teachers often verbalize their images in the form of metaphors.

In general a metaphor has a meaning; literally it is often nonsense. In their function metaphors reduce undue information and unite this to recognizable images (Idenburg, 1988). Metaphors are a way of perceiving reality and are of a more holistic nature than literal terms or concepts involved in language. However, the question arises what exactly is a metaphor and what not? Terms or concepts like 'lesson', 'student', 'homework' and 'teaching' might seem to be literal. But other terms like 'discipline' and 'inhibit' are less clear-cut. In addition, speaking about parts of a teacher's language in terms of metaphors largely depends on the context that language refers to or is used in. Hence, it has been decided in this study that primarily the context determines whether a teacher's terms should be literally or metaphorically taken.

When re-examining the protocols, I discovered that many instructors used metaphors in order to accentuate and, at the same time, to obscure relevant information. Below some examples are given of 'metaphors' to illustrate this conclusion (50).

- (with reference to teaching course-members from trade and industry) "I especially try to draw people from trade and industry" (in Dutch: 'uit de tent lokken');

- (with reference to the formation of learning groups) "Usually the less able students immediately show up for what they are" (in Dutch: 'door de mand vallen');
- (with reference to the planning of subject-matter) "You should not be a market-vendor, it has to be a game between students and teacher";
- (with reference to beginning to teach) "You are just thrown to the lions" (in Dutch: 'voor de leeuwen gooien');
- (with reference to making acquaintance with students) "I think that, by doing this, the threshold is lowered" (in Dutch: 'de drempel verlagen');
- (with reference to conceptions about practical teaching) "... so many men, so many minds" (in Dutch: 'zoveel hoofden zoveel zinnen');
- (with reference to the transmission of theory during the introduction of the lesson) "By this I lift a corner of the veil" (in Dutch: 'een tipje van de sluier oplichten');
- (with reference to the way certain students react upon each other) "When a student gives a wrong answer the whole pack jumps at his throat";
- (with reference to lesson planning) "Tight planning is not possible when you do not know whom you are dealing with" (in Dutch: 'weten welk vlees ik in de kuip heb');
- (with reference to the instructor's own knowledge basis) "You have to cover a broad area" (in Dutch: 'op een breed vlak staan');
- (with reference to the transmission of theory) "They cannot jump straight in at the deep end" (in Dutch: 'in het diepe springen');
- (with reference to the introduction of exercises) "You can throw them into the water, but they must also be able to swim."

These and many other examples show that most metaphors are rather vague. For the greater part, however, they were not examined on their explanation. This implies a kind of agreement about their meaning, which indicates that metaphors are of a person-exceeding nature. To a certain extent metaphors are objective, cultural givens. Used in a certain context they do not describe but refer. They cannot be conceived as distortions of meanings; in their own way they also disclose reality. However, they exceed literal categories and in their function they may limit a subject's rationality. For this reason it seems to be important to pay more attention to teachers' use of metaphors. They should at least not simply be taken for granted in research on teacher verbalizations.

5.5 Appraisal

In theory the concept of reflection is easily described. It can also be operationalized in a research design. However, the interpretation of reflections gained by research is problematic, because:

- their meaning is strongly person-bound connected with unique situations; the interplay between person and situation is of a complex nature and

difficult to describe unequivocally; it questions what is individual and what is collective;

- people differ in their ability to reflect, and reflection and 'good teaching' do not necessarily need to cohere.

For these reasons research on teacher reflections is by definition limited.

As an alternative to traditional, behaviouristic oriented forms of teacher education, reflection represents an educational ideal supported by specific methods (cf. e.g. Peters, 1985; Zeichner, 1987). From this perspective preservice education differs from in-service education. In the former reflection serves more a growing process, while in in-service education reflection is predominantly directed towards changing, improving or extending the existing action repertoire. In this sense reflection can also represent a deficiency conception of education (see Tillema and Verloop, 1985). Against this background it has been argued that the developed in-service programme, i.e. the handbook (Beijaard, 1987a), could not only be based on the criterion of ecological relevance, but also on the criterion of theoretical relevance. It is not known how the programme actually stimulates reflection (and learning to reflect). This calls for a research project based on a more experimental design. However, for such a project no facilities are available. I have to confine myself, therefore, with general impressions based on course-member evaluations and comments of the course leaders. To summarize, both course-members and course leaders have expressed their contentment. The handbook has been reprinted unaltered. The course leaders recently supplied the programme with some new subjects, and left out others.

It is also not known if and how reflection by course-members is hindered by their obliged participation in the course, or their primary interest in the certification process above the professional learning process. Along with environmental constraints, reflection may also be hindered by the course-members' dominating ideas about schooling. These ideas, especially those of instructors who did not follow any teacher education, are influenced by their experiences as a student and generally include the more traditional visions underlying teaching.

Context-bound and particularly moral motives that exceed the individual, have been ordered above cognitive awareness in the preceding section. It was argued that they are predominantly socially determined. The way they are integrated into the personal domain might perhaps be a challenge for research. It should be noticed that this integration process probably demands long-term participative observations, biographies, etc. By research methods like these conative elements involved in actions can perhaps be better disclosed.

How rational is intentionality knowing that intentionality is context-bound? Rationality refers to one's ability to steer, legitimate, control and interpret one's actions (see Peters, 1984a and 1984b) on the basis of a relationship between means and ends. However, this means-ends scheme ignores the relational connection of intentionality with the context. This connection is

given and characterized by a diversity of norms and values. The means-ends scheme takes the line that intentionality is an independent entity that represents the known object, but leaves apart the object itself.

True, intentionality implies a connection between means and ends and, through that, rationality, but in its relationship with the context intentionality is also more than that (Kee, 1987). That which escapes from rationality need not be arbitrary or normless. On the contrary, it belongs to the inter-human context regulated by norms and values.

The augmentation of one's rationality might be a goal to strive for; it is a kind of empowerment in that it improves one's ability to reason. But reasoning is relative: it may fail or be wrong in the particular context. The concept may often be used too extravagantly in connection with the knowledge one possesses and the ability to reflect. The concept of rationality should always be tested for its practicability (cf. Rotenstreich, 1985) and, hence, be the object of reflection in view of the social life of the individual and that of others. Rationality in teaching is no exception to this rule.

6 METHODS AND METHODOLOGY INVOLVED

Aspects of this chapter dealing with the collection and the processing of data have been referred to in chapter 4. Practical teaching has been studied from a multimethodical perspective in order to obtain complete 'pictures' and reliable results (triangulation). A specific position was taken with regard to validity. Scientific criteria like these are the foci of attention in this chapter.

In section 6.1 attention is paid to how the informants experienced their participation in the research. Their perceptions of the research methods and techniques used are of particular importance in view of the quality of the research findings.

Section 6.2 places the emphasis on methodological criteria like objectivity, reliability and validity. Aspects that are connected with these criteria are - from an action theoretical perspective - treated in section 6.3 as issues of special interest. Attention will be paid to the status of the actor's point of view, the asking of so-called 'why-questions' and the role of the investigator.

6.1 The informants' perceptions of the research situation

In view of reliability and validity of research results, it is important to know how the informants experienced their participation in the research project. This section is restricted to their perceptions of the research situation in general and the research methods and techniques in particular.

6.1.1 The investigation in general

All the instructors experienced their participation in the research project as positive, useful or pleasant. Many of them connected this impression with learning experiences: questions were asked about aspects of their everyday activities, which usually remain unconscious or elapse automatically. In addition, several instructors positively conceived the systematic way of questioning as a form of self-critique.

Along with this positive side effect some instructors also added several remarks about the design and purpose of the investigation. Among other things, they wondered why they were not observed for a longer period, if only a few selected instructors could be representative for the whole school and if a

guarantee could be given to avoid any misuse of the research results. Questions like these forced the investigator to explain things (again). Finally, two instructors emphasized that they had to answer many questions in a relatively short time. Retrospectively they expressed the feeling that, due to the number of questions, they had not always given the right answers. Below more attention is given to this retrospective notion and to many other perceptions of the instructors involved with regard to the methods and techniques used.

6.1.2 About the methods and techniques used

1) Structured open interview (51)

All the informants found the interview similar to the research situation in general, in that it was positive, pleasant or enjoyable. Their underlying reasons, however, differed from one another and referred to the experience of the 'conversation', the degree of difficulty of the questions, the result of the interview connected with the goal of the total project and its learning effect (see for detailed information: Beijaard, 1986, 101).

With reference to the interview instructors became more aware of aspects concerning concrete events during practical teaching, teaching in general and students' starting points as a continually recurrent problem. This learning effect or process of developing awareness was especially apparent with instructors who did not follow any teacher education.

Twelve instructors inferred that they had given information on things which they preferred not to speak about, namely colleagues, the school organization and its internal policy. Aspects like these are expressed in the school's atmosphere, mutual social contacts and career potential. They are particularly found in larger schools which possess rather complex organization structures. Five instructors pointed out that they, in general, find it difficult or unpleasant when they have to talk about themselves. As people they find it hard to praise or criticize themselves.

Clear suggestions for improving the interview(s) were not given by the participants. Some of them referred to problems inherent in an interview: too little time to think, having to react too rapidly, etc. In order to be well prepared and to be able to give well-thought out answers, these instructors would have preferred to have the interview questions beforehand instead the list of points which had been sent to them.

All the instructors made positive comments about the investigator as interlocutor. These related to the conduct of the conversation, the investigator's attitude and his interview technique. Partly because the investigation was directed towards 'general' teaching aspects and not towards subject-matter in particular, the instructors also perceived the investigator as an acceptable interlocutor.

The structured open interview at the beginning of the data collection yielded much information about characteristics of the instructors' task environment and their practical teaching. Both 'good' and relatively complete pictures could be gained. This was affirmed by the informants and could be derived from the interview results themselves: only a small number of instructors complied with the request to give additional comments at the end of each group of interview questions (see appendix 1, the questions 19, 26, 33, 39, 46, 54 and 59). In these cases, however, informants tended to emphasize or repeat information already given. Generally, there is impression that no information was held back consciously; this conclusion is supported by the instructors' expressing of dissatisfaction with aspects of the organization and internal policy of their schools. This may partly be due to the privacy guaranteed by the investigator. On the other hand, many instructors insisted themselves on expressing their feelings as responsible participants in the investigation.

2) Lesson observation and retrospective interview

Six instructors were explicitly aware of being observed during the lesson. Four of them indicated that this led to a more non-personal and self-conscious way of teaching, to a more careful choice of words and to speaking less frankly. The other two instructors intimated that they only had the feeling of being observed at the beginning of the lesson. Most instructors, however, did not have the feeling of being observed. In the practical training centres particularly the instructors often see and hear one another when they teach: lessons are frequently taught in the same room, instructors regularly observe each other's lessons and visitors are often led about through the school to watch instructors and students at work.

According to most instructors (n=25) the investigator's presence during the lesson did not influence the students. The other four instructors affirmed that the students were more quiet than usual or that they, particularly at the beginning of the lesson, adopted an attitude of waiting.

No instructor essentially taught differently from usual. Five instructors pointed out that they felt themselves a little inhibited in their interaction with students, that they did things more consciously than they were used to or that they wanted to do things well. Instructors, for example, who wanted to do things well prepared their lessons better in order to make a favourable impression upon the investigator, or tried, despite a lack of time, to complete the lesson in order to demonstrate a lesson as a whole.

The observed lessons varied from 50 to 200 minutes. Mostly complete lesson units were observed, but also lessons which form part of longer lasting units, i.e. courses. The duration of lessons and the courses that are offered are strongly school-bound and differ per practical training centre (see also Beijaard, 1984b and 1985).

For the observation of lessons it was decided not to manipulate the differences mentioned above. The lesson subjects were also left free: preference

was given to the observation of lessons in conformity with the regular timetable. These choices attempted as far as possible to leave the normal situation intact. The only restriction was, as stated above, that the observation had to be of practical lessons.

The observed lessons were directed towards learning in real situations, for example in the schools' own farms or in the fields, and in situations that approach reality as closely as possible, for example using models or parts of implements, etc. Learning in the latter situation is often necessary to reduce the everyday complexity or to make visible what cannot be seen in reality.

Shortly after the lesson observation each instructor participated in a context-embedded retrospective interview. Most instructors seemed as happy with this 'conversation' as with the structured open interview. Some of them were astonished at the quantity of didactical aspects the investigator had observed. They found it difficult to imagine that so much knowledge was involved in their teaching. Through in-depth questioning using so-called 'why-questions' they indicated that much had been turned over. Most instructors found it a positive experience to be confronted with their own teaching. Several instructors, however, pointed out that some questions were not easy to answer, that - in their opinion - the investigator sometimes asked for the sake of asking or that they had the feeling of repeating themselves.

3) Logbook keeping

Many instructors felt both positively and negatively about keeping a logbook. The positive experiences have a bearing upon:

- 1) the logbook as a *source of developing awareness*, because it forces one to put experiences into words; usually one does not do this, or to a much lesser extent; in this sense, as was also indicated by instructors, the logbook can be seen as a relevant addition to teaching routines;
- 2) the logbook as a *source of change* when interpretations are connected with the analysis of one's lessons; interpretations afterwards have led to the setting of priorities for changes or adjustments, or to what had to be maintained and what could be improved.

These experiences of logbook keeping correspond with the findings of Burgess (1988) who writes positively about the possibility of reflection by teachers on their own practice with the use of diaries. To summarize, it is a useful aid to critically reflect upon one's practice. This conclusion is supported by the instructors involved in the research project. However, it remains uncertain whether these reflections are indeed put into actions (Beijaard, 1986, 106).

Almost half of the informants felt negatively about the time that was needed for logbook keeping. Partly through this instructors differed from one another in how seriously they completed this task. In addition, the logbook had often to be written at the end of a long and full day of teaching. In connection

with this five instructors pointed out the following problems which are primarily of a methodological nature:

- the tendency existed to repeat themselves, especially when the same lessons had to be taught in succession to the same 'types' of students;
- the difficulty of writing experiences down briefly;
- the occurrence of interferences; memories of latter lessons influenced those of prior lessons.

Problems of this nature may lead to forgetting or distorting certain information. To some extent an obstruction of the faculty to remember is involved (see also Lowyck and Broeckmans, 1985; Broeckmans, 1987).

According to the instructors the logbook schemes gave sufficient opportunity to write down personal experiences. In their opinion the schemes were logically constructed and showed an open way of questioning which enabled instructors to write down everything they wanted. The logbook categories were predominantly perceived as a guide or aid for analysing one's lessons. This perception corresponds with the preference that is generally given to the prestructuring of logbooks or diaries (see also Burgess, 1988). Nevertheless, several instructors suggested the following improvements:

- there should be enough room to make notes, though many instructors appreciated the need to be brief, as it encourages them to focus;
- there should also be categories regarding activities that exceed the concrete teaching situation, i.e. side activities, because of their influence on teaching.

However, it is significant that no one was negative about the prestructuring of the logbook for the sake of keeping it. In not a single case was this seen as an obstruction. An additional advantage of prestructured logbooks is that they are easier to compare.

6.2 Methodological criteria

The research strategy that has been followed implies methodological considerations which deviate from those belonging to the empiric-analytical research tradition (see chapter 4, section 4.1). These considerations concern objectivity, reliability and validity. This section explains how these criteria were met. They are also critically examined on the way they were applied in order to study the complexity of teaching in practical training centres for agricultural education.

6.2.1 Objectivity

Objectivity or intersubjectivity refers to the choices made by the investigator to obtain research results and to these research results themselves (cf. Swanborn, 1987). Objectivity demands that the investigator makes explicit the choices that underlie the research process. As such it is often stated in

literature that, in principle (Hoeben, 1981), an investigation has to meet the demand of replication.

In view of the research project that was executed, I prefer to speak about objectivity in terms of disciplined or explicated subjectivity (see also Clark, 1986, 13; Smaling, 1987, 317). This choice is based on the investigator's object involvement, i.e. the importance he attaches to the informant's intentionality - and through that also to his own intentionality - and the striving for completeness. In no way does this position imply arbitrariness. Disciplined subjectivity really does appeal to the use of scientifically accepted methods and techniques as well as methodological rules and procedures. With that objectivity can primarily be characterized as the investigator's scientific honesty (cf. Lakatos, 1970).

This scientific honesty has partly been met in chapter 4, section 4.1, with regard to research on practical teaching. Figure 6.1 summarizes what was under discussion in that chapter. Aspects of this figure will be reflected on in the remaining part of this section with the emphasis on the reliability and validity of research results. A reflection on these scientific criteria particularly refers to the research strategy that was followed.

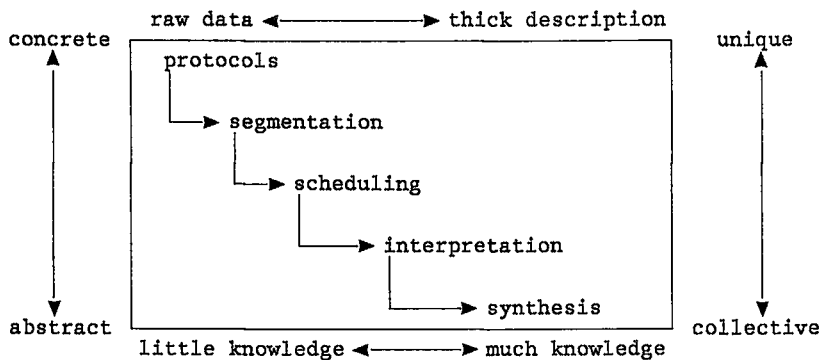


Figure 6.1 Summary of methodological rules and procedures followed in chapter 4, section 4.1.

In connection with 'objectivity' of the research process, some remarks are necessary about the objectivity of the research findings themselves, i.e. the interpretations of actions made by the investigator. Generally, the research results were generated within the hermeneutic or interpretative scientific tradition. It was stated before that an empiric-analytical approach based on a causal-nomological model is unsuitable for the explanation of actions, because this model is in contrast with the postulate of freedom (see chapter 2 for details). For the objectivity of a rational reconstruction of actions it is - from a hermeneutic or interpretative perspective - important to acknowledge the following features (see also Schuyt, 1986; Charlton, 1987):

- actions are understandable when they are rationally reconstructed from the acting person's perspective of the situation; for a real understanding of the meaning of an action one cannot deny its context;
- adequate or accurate reconstructions of meanings are connected with systems of meaning and structures which intuitively or consciously are present in and represented by one's actions;
- the postulate of human freedom does not imply that generalizability is impossible; rules and structures exist that exceed the individual and, through that, action patterns can be reconstructed;
- there is no causal relationship between a general or collective action structure on the one hand and an individual one on the other; yet a relationship exists between the logic of a situation and a concrete action.

Through these features action interpretations may claim to be objective. From an interpretative perspective the objectivity of research results depends on the extent to which the investigator identifies himself with the research object and perceives reality with the eyes of those he is studying (Wester, 1987, 14). This does not imply that research results are similar to the self-interpretations of informants. From an observer perspective actions can be described differently than from an actor perspective and, therefore, go beyond the self-interpretations of informants. In this sense theory plays an important part, because theory itself has an objective status.

6.2.2 Reliability of research results

Reliability refers to the extent to which consistency in empirical findings can be achieved. Within the empiric-analytical scientific tradition, reliability is usually derived from the extent to which an investigation can be repeated. In principle an investigator who uses the same methods can obtain the same results as those of a prior study. It may be obvious that this principle can never be met: even the most exact replication of research methods fails to produce identical results (Goetz and Lecompte, 1984, 211). Generally, as practice is never static, no study can be repeated exactly, regardless of the methods and designs used.

Smaling (1987) shows that in research of a descriptive and interpretative nature reliability is handled in different ways. In view of the project under consideration, i.e. research on practical teaching, reliability has been conceived as a function of credibility. It encompasses an internal and external aspect. Both aspects are treated below. In certain respects, issues of reliability overlap issues of validity. The former issues can be seen as criteria for the latter.

Internal reliability has a bearing upon methodical and technical aspects as well as strategies that are followed (Janssens, 1985, 153). Internal reliability may, if possible, also refer to the degree in which other investigators, given a set of previously generated constructs, would match them with data in

the same way as the original investigator did (cf. Goetz and Lecompte, 1984, 210). In the research on practical teaching the internal reliability was met by:

- recording data onto tape to avoid any loss of information;
- departing from and interpreting data against the background of a theoretical framework in order to achieve consistency in empirical findings;
- illustrating the investigator's interpretations and conclusions with primary data, i.e. quotations of the actor's point of view;
- using more methods and techniques to obtain information about the same object ('triangulation').

In imitation of van der Kley (1982) the latter aspect of internal reliability played an important part. Though methodical triangulation played a central role in the research project under consideration, triangulation regarding researchers, theory and data can also be distinguished (see Maso, 1984; Teunissen, 1985). In addition, research triangulation might also be possible (cf. Smaling, 1987).

Along with methodical triangulation, data triangulation was particularly important in the research on practical teaching, that is to say that data were collected at different times and places (cf. Teunissen, 1985, 87) (52). Supplemented with methodical triangulation, whereby methods and techniques complete and partly overlap each other on essential points, data triangulation can be seen as an important aid in describing the social reality as accurately as possible. It is a disadvantage that - inherent in these forms of triangulation - the processing of data is very laborious and time taking. Generally, triangulation demands a positive motivation and cooperation of the informants involved as well as a high research tolerance (Teunissen, 1985, 96).

Based on research results the following remarks can be made with regard to the internal reliability striven for.

- 1) No instructor consciously held back any information. Each instructor answered every question in a non-threatening, confidential atmosphere.
- 2) No instructor experienced the recording of data on tape as disturbing. All the instructors showed understanding for the investigator's desire to meet the criterion of controllability and, with that, an important internal reliability demand. Audio-taping enables an investigator to store as much data as possible; it also facilitates his concentration on the conversation.
- 3) With the exception of the logbook no instrumental effects could be discovered that seriously threatened or influenced the internal reliability. Aspects concerning logbook keeping are discussed below. Sometimes it appeared to be problematic for the investigator to determine whether or not in-depth questioning was needed. In-depth questioning took place in cases of doubt. Moreover, sometimes informants had the feeling that they had to repeat prior answers. However, these informants emphatically made clear that this did not irritate them; when this occurred they were willing to answer questions (again).

- 4) In order to illustrate research findings with primary data, it sometimes appeared difficult to find suitable quotations. Regularly these illustrations were not available or unsuitable for incorporation into the text (see for examples of illustrations: Beijgaard, 1986).
- 5) Methodical triangulation yielded many data, but threatened their processing and interpretation. This procedure also turned out to be very laborious. Therefore, a well-considered planning of available time has to be a prerequisite. In addition, it appeared to be difficult to connect different data derived from different sources, though directed towards the same research object (see also chapter 5).

In section 6.1 it was written that logbook keeping was problematic for several reasons. In general it can be concluded that the thoroughness of logbook keeping decreases accordingly as notes have to be made with reference to an increasing number of lessons. Nevertheless, the logbooks yielded much information on the basis of which task environmental influences on practical teaching could particularly be affirmed. In total the 29 instructors involved in the research project made logbook notes of 241 lessons.

External reliability concerns whether or not independent investigators would discover the same phenomena or generate the same constructs in the same or similar settings (Goetz and Lecompte, 1984, 210; Janssens, 1985, 152). In the project under consideration it was attempted to meet this criterion by:

- making the investigator's theoretical insights explicit (see chapter 2 and 3);
- describing how the selection of informants, situations and conditions took place (see chapter 4);
- giving information on methodical and technical procedures concerning the collection, analysis and interpretation of data (see the chapters 4 and 5).

Through informing the reader about the enumerated aspects, external reliability can perhaps be best considered as the investigator's attempt to be conscientious and complete. This does not necessarily mean that another investigator could obtain the same results when he uses the same methods and procedures. Earlier it was written that this is impossible: not only because practice is dynamic and subject to change and, therefore, always to a certain extent unique, but investigators also differ from one another with regard to their interests, backgrounds and theoretical perspectives. Instead of a 'principled replication' preference was given to the concept of 'imitability' (see e.g. Bleeker and Mulderij, 1984): the reader of the research report must be able to 'follow' what was done and to make judgements about choices made by the investigator and his underlying arguments.

6.2.3 Validity of research results

Validity is concerned with the accuracy of scientific findings. It refers to the extent to which these findings meet the research objectives or fulfils the

investigator's intentions (cf. Smaling, 1987, 279). According to Goetz and Lecompte (1984, 210) the establishing of validity requires that one:

- determines the extent to which conclusions effectively represent empirical reality;
- assesses whether constructs devised by investigators represent or measure the categories of human experiences that occur.

To summarize, in imitation of Janssens (1985, 154) validity was conceived in the research on practical teaching as the extent to which research findings correspond with the phenomenon they are inferred from.

Like reliability, validity encompasses an internal and external aspect. *Internal validity* emphasizes the issue of whether the investigator studies what he thinks he is studying (Goetz and Lecompte, 1984, 221). The focus of attention is the extent to which the investigation justifies the research findings and conclusions drawn. Factors which influence internal validity, and which have been taken into account when studying practical teaching, relate to (see also Janssens, 1985, and chapter 4, section 4.1):

- the selection of informants and situations;
- instrumentation effects, so that, prior to the definite investigation, it was necessary to try out the research methods and techniques;
- disturbing effects due to the investigator's presence, his involvement (over-report, going native, research blindness), the reactions of informants (over-readiness to help, giving socially desirable answers, etc.) and the limitation of the investigator's capacity to acquire, store and remember information; insight into disturbing effects of this nature could partly be obtained by a try-out, which also seemed to be a useful exercise for the investigator; moreover, the informants were explicitly asked about possible disturbing influences;
- interpretations made by the investigator and possible competitive explanations; inspired by publications of Huber and Mandl (1982), Wahl (1982) and Lechler (1982) I attempted to meet this problem by means of communicative and action validation: the former refers to the extent to which the investigator and informants agree on interpretations, the latter relates to the validation of interpretations by external observable actions.

Contrary to Wahl (1982), who considers communicative and action validation as two successive steps in time, both forms of validation were used as follows. Firstly, verbalizations were validated by external observable actions, as a result of which new information could also be gained. Secondly, interpretations made between times, that is to say during the process of data collection, were validated communicatively. Both communicative and action validation were considered as a cyclic process that had necessarily to be stopped for pragmatic reasons.

Partly on the basis of described perceptions of informants concerning the research situation (see section 6.1) the following appeared to be true with regard to the internal validity.

- 1) Most instructors acted as they were used to. They consciously tried to demonstrate a real teaching and learning situation; among other things, this might be due to the correspondence conducted with them prior to the investigation and to the frequent contacts with the educational coordinators of the practical training centres. In general, these coordinators played an important part, as intermediaries between the investigator and the informants. Partly because of these coordinators all the selected informants were willing to participate in the research project.
- 2) Most instructors did not resent their participation in the research project. However, some of them expressed less pleasant feelings about the keeping of the logbook, because this task demanded time and often had to be completed after school-time.
- 3) The instructors did not experience the investigator's presence during the lessons as disturbing. According to some instructors the investigator's presence marginally influenced students, but in most lessons this influence could not be recognized. Perhaps this was due to the way the investigator was introduced by the instructors and the way students were informed about the objectives of the research project.
- 4) Most of the time communicative validation of interpretations with reference to lesson observations, including interpretations that were needed to pose so-called 'context-embedded questions', resulted in affirmations by the informants. Only a few instructors supplemented or explained these interpretations. It seldom occurred that an instructor corrected an interpretation made by the investigator. Based on the results of communicative validation it can be concluded that the investigator's interpretations were correct or that the informants were not able to react to these interpretations adequately. Indications for the latter conclusion were obtained when some instructors showed their astonishment about their own (implicit or tacit) didactical knowledge when they were confronted with the interpretations.
- 5) The validation of verbalizations by external observable actions led to insights into congruences and discrepancies in teaching (see chapter 5). Studying external observable actions also yielded supplementary information. This information seemed to be of a different nature than, for example, information gained by the logbook and the interviews (see chapter 5). These different kinds of information threatened the construction of general patterns, i.e. the connection of data from different sources, which might be seen as a disadvantage of methodical triangulation.

In addition to this enumeration it must be noticed that doubts exist about the accuracy of verbal reports. Lowyck and Broeckmans (1985), for example, examined several causes of a poor validity of such reports. Starting from the work of Ericsson and Simon (1980 and 1984) they identified causes of a poor validity which can be summarized under the following headings: inaccuracy of data, incompleteness of data and the way processes under study are influenced. Lowyck and Broeckmans (1985) also looked at methodological implications of

self-reporting techniques. Among other things, these implications concern the point in time of reporting, the object of questioning, the extent to which the questions are structured, the reporting form, supplementing sources of information that can be consulted, the way these sources are used, the reporting situation and the informant's starting point (see also Broeckmans, 1987, 173 ss.).

In order to obtain internal valid research results I attempted (see also chapter 4, section 4.1):

- to stimulate immediate remembrance by allowing only a short period of time between the observations of lessons and the retrospective interviews and by posing context-embedded questions; immediate remembrance was not always possible with logbook keeping and interferences occurred;
- to establish an equal starting point for all informants: correspondence was conducted with each of them about what could be expected and the objectives of the research project; additional explanations were given by the educational coordinators who had been well-instructed beforehand;
- to obtain comparable data by the use of structured, though open-ended research methods;
- to submit informants to equal circumstances: with the exception of logbook keeping it was possible to execute the research activities within all the informants' regular school-time.

Actually, these and other measures (see also the preceding section) taken to ensure internal validity all have advantages and disadvantages. If choices are well-considered and procedures systematically worked out, then the circle reverts to Ericsson and Simon (1980 and 1984) who are positive about self-reports, i.e. using verbal reports as data.

In general it can be concluded that there is no indication that informants consciously hold back information, verbalize representations which completely differ from what was observed or that a person does not really mean what he says (cf. Fromm, 1987). On issues like these we can only speculate. In cases of doubt one might consider action validation; carefully considered this kind of validation enables an investigator to examine how well an informant has access to his own cognitions or subjective theories. In advance, however, it is incorrect to start with a distrust towards informants as investigators still often tend to. In principle such a point of view is morally objectionable.

Based on the explanation of internal validity given above, it can be concluded that - with the exception of some marginal notes - ecological data could be obtained: in consideration of many measures necessary for the organization and execution of the investigation (cf. Peters and Postma, 1985), pictures of practical teaching could be gained that primarily represented the natural context from which they were inferred.

Although internal and external validity are interrelated issues, they are usually separated. *External validity* refers to the extent to which research results can be applied to other situations. This denotes the generalizability

of research findings and conclusions or how representative the investigated situations are of other situations. This kind of representativeness could partly be met by a broad selection of informants regarding personal characteristics, schools and courses they teach. Smaling (1987, 287) calls this way of selecting systematic representativeness, which has to be distinguished from representativeness on the basis of a sample taken at random.

Through systematic representativeness also representativeness regarding the total population, i.e. all the instructors in the eleven Dutch training centres for practical agricultural education (n = about 300 instructors; see also Beijaard, 1985), could partly be met. This demand for a certain expressiveness regarding the total population implied that concessions had to be made to in-depth studies in favour of broad studies per informant. This could give rise to a problem to be met that has been described by Peters and Postma (1987). They emphasize that the more an investigator studies in the depth, the more he ceases to notice what is general.

It appeared that 29 informants yielded much information. This number of participants turned out to be sufficient: after processing the data of several informants the law of diminishing returns already became effective, which can be taken as an indication of systematic representativeness. In addition, the distinction between large-scale and small-scale studies seems to be of a secondary importance: "There are technical differences, but the distinction has no relevant scientific-theoretical dimension" (Hofstee, 1984, 16).

Along with systematic representativeness, external validity has also been striven for by starting from and embedding research results in a theoretical framework. According to Goetz and Lecompte (1984, 235 ss.) three basic issues should be addressed in evaluating the theoretical or conceptual framework: it should not be an afterthought, it should be appropriate in scope and content to the research questions and it should be derived from empirically based statements of relationships or convertible into propositions that can be empirically investigated, rather than developed directly from normative assertions or value judgments assumed to be factual. All these criteria could be met; the theory used had an important search-light function, while depending on subjective choices of the investigator. The analysis and interpretation of data was strongly connected with this perspective (see also Wester, 1987).

The theory used was helpful in making the necessary 'scientific detour' (cf. van Strien, 1986): through theory a thick description of original data was possible and accountable. Through thick description ecological and theoretical validity have come together and, through that, research findings and conclusions possess a stronger expressiveness of a general nature.

6.3 Methodological issues of special interest

In addition to the preceding methodological aspects, there are other issues that need special attention. Attention will successively be paid to the actor's point of view, the relevance of asking so-called 'why-questions' and

the role of the investigator. These issues are discussed against the background of action theoretical basic notions.

6.3.1 Status of the actor's point of view

In the project under consideration much importance was ascribed to the opinions of informants. Smaling (1987, 290 ss.) describes six reasons why it is relevant to consider the actor's point of view, namely:

- informants have the right to receive information and to react upon this information (ethical reason);
- in exchange for participation in the research project, informants may demand to have a say (practical reason);
- the scientific aspect of the relationship between the investigator and the informants may explicitly focus on the actor's point of view (metatheoretical reason);
- having actors describe a subject or phenomenon as research objective (pragmatic reason);
- actors can be seen as the best sources of information for obtaining knowledge about a certain domain (instrumental reason);
- validating research results or conclusion by the actor's point of view (methodological reason).

In the research on practical teaching the actor's point of view was essential and based on principled choices; in terms of cognitive representations or subjective theories, these choices refer to the underlying vision of man and the goal of science (see chapter 1 and 2).

The importance of subjective theories partly emanated from the problem concerning the gap between theory and practice (see chapter 3, section 3.1.4). It was argued that an action theoretical perspective can contribute to bridging this gap by putting the emphasis on the subjective theories of experienced teachers (instructors), though interpreted with the help of (more) objective theory. A similar attempt was undertaken by Corporaal (1988). In section 3.1.4 attention was paid to the distinction she makes between subjective theory and practical theory. The first type refers to the knowledge of a layman, the second to that of a professional. This distinction might perhaps be useful for teacher education, but cannot be applied to experienced teachers. Their theories are subjective and - as a result of education - also practical. Moreover, their knowledge is always tentative, subject to change and transient instead of fixed and unchanging. A dialectical vision on the relationship between theory and practice is in fact introduced: the world of practice continually shapes the teacher's knowledge and, in reverse, the teacher himself structures the world with the help of his knowledge (see also Clandinin, 1986).

Differences exist in the way teachers verbalize their knowledge; in teacher thinking studies 'easily' verbalized knowledge, i.e. knowledge that is accessible to oneself, is often called subjective theory (cf. Mandl and Huber,

1983), while (articulated) tacit knowledge is often called practical knowledge. In this study I prefer to follow Handal and Lauvås (1987) who define the term 'practical theory' as a person's private and integrated set of elements which, theoretically speaking, can be subdivided into personal experience, transmitted knowledge and experiences, and values (ethical, political and philosophical). "In this way a practical theory may be regarded as a complex 'bundle' of all these elements. It is also worth stressing that it is indeed a practical theory, primarily functioning as a basis or background against which action must be seen, and not as a theoretical and logical 'construct' aimed at the scientific purposes of explanation, understanding or prediction" (Handal and Lauvås, 1987, 9). In addition to this, this study agrees with Corporaal that practical theories held by different teachers may have a certain degree of similarity, but they will always contain a personal or individual aspect. Whether inspired by cognitive psychology or a more ecologically oriented perspective, subjective or practical theories function as a bridge between theory and practice. Hoeben (1989), for example, contests this function by drawing attention to the contraproductive consequences of an action theoretical view on practical theories. However, with Hoeben hardly any communication is possible, because his critique is too preoccupied with his own vision on research that corresponds with the 'empirical cycle' for conducting research (cf. de Groot, 1975; see also chapter 4). This is a research strategy that consists of notions which belong to the empiric-analytical scientific tradition. On the basis of an action theoretical vision it is indefensible to neglect practical or subjective theories of (professional) practitioners. In action theoretical approaches (to teaching) the emphasis is put on the study of speech. Its analysis - for example commentary given on certain observations - has become an important part of the investigation (cf. Harré et al., 1985, 86 ss.). In accordance with practice-oriented research as described in this study (see chapter 2, section 2.2.4), such an analysis neither implies the primacy of practice nor a very one-sided emphasis on theory. Generally, the development of a theoretical framework beforehand prevents informants' subjective opinions and 'member validation' from being overweighed. An investigator, independent of his scientific backgrounds, tends to interpret practical theories as right or wrong. However, due to the openness of performance criteria concerning 'good teaching' and due to the fact that teaching is situation-bound as well as person-bound, such interpretations are impossible. The issue is not whether practical theories are right or wrong. It is essential that an investigator learns to understand these theories, to ensure consistency and to contribute to their conscious use (cf. also Handal and Lauvås, 1987, 20).

6.3.2 Asking 'why-questions'

During the processing of data a distinction was made between actual information (the 'what') and spontaneously given reasons by informants or reasons

evoked by the investigator through so-called 'why-questions' as a special form of in-depth questioning.

Why-questions imply a desire to search for underlying mechanisms that connect apparent - and at first sight - incoherent behaviour. I agree with Schuyt (1986, 109) that dropping the why-question too early is a grave mistake; by leaving this question aside, an investigator restricts himself to a superficial approach to reality. With regard to teaching, for example, we can learn more by searching for the underlying reasons why one teaches, why one chooses a particular teaching style, etc.

Generally, why-questions yield insight into one's intentionality and - in an action theoretical study - its implicative meaning, respectively intentionality connected with the context in which it is used (cf. Harré et al. 1985; Schuyt, 1986). Through this connection it is possible to explain actions 'logically'. A teacher, for example, who does not plan his lessons is not necessarily a bad teacher. His reason, namely, might be that he has already taught those lessons several times and that, at least to him, the lessons had turned out satisfactorily.

In-depth questioning in general demands intensive research. Such research, with respect to extensive research, goes much more into details of the phenomena that are investigated. Consequently, as a result of intensive research it is possible to draw more realistic conclusions. However, earlier in this study it was written that why-questions also have limits; we do not always know what we are doing as a result of the large-scale life patterns of which events are only a part, i.e. social and institutional determinants which are not located in or which exceed the individual (see chapter 5, section 5.4.2). An advantage of why-questions seems to be that - along with the cognitive side of intentionality - information can be obtained about emotional and motivational or conative aspects (see for example a teacher's underlying reasons with lesson planning when he is anticipating keeping order).

6.3.3 Role of the investigator

From an ethical perspective in-depth questioning demands a special relationship between the investigator and the informant. There is talk of a subject-subject relationship between both the investigator and the informant. It is presupposed that both are part of the same world and that both have the same aims, namely good education, but differ in the way they contribute to this objective.

Action theoretical research starts with cooperation between investigator and informant, particularly when this research is of an interpretative and descriptive nature. Cooperation, however, does not imply that an informant must be able to do the same as the investigator and in reverse.

It can be upheld that an action theoretical investigator should possess the following qualities (53):

- be skilled in using the language of the informants so that he can understand them and communicate with them;
- have a feeling for social relations to be aware of the position the informants are in, including his own position as investigator;
- feel at home or at ease in the research context, for example based on experiences as an investigator or on experiences as a teacher;
- possess historical awareness, which is relevant in connection with the informant's responsiveness and corresponds with the notion that reality is dynamic and subject to change.

Several of these quality demands are of a personal nature. In general, however, they require that an investigator carefully prepares a research project, including a preparatory study of the final research object (see for example the preliminary investigation concerning the practical training centres in agriculture: Beijgaard, 1985; see also chapter 3) and a try-out of the developed research methods.

The investigator especially bears responsibility for the transmission of research results to the informants involved as well as other interested target-groups (colleagues, principals of the schools, students, etc.) (54). In general - and independent of underlying scientific notions - this responsibility has to be incorporated in every research project. In an action theoretical research project, however, this aspect is basically inherent in the vision of man. Moreover, relationships with informants are built up; they have the right to be informed about the research results and must have the opportunity to react to these.

6.4 Appraisal

A research process can be characterized as a social situation, whereby the intentionality of both the informant and the investigator are relevant. With the help of the starting-points and key-concepts formulated in chapter 2, it has been possible to meet methodical and methodological demands in a specific way. The methods and methodology involved are not unique to action theory; they refer to rules which form part of the interpretative or hermeneutic scientific tradition and can be applied when doing research from an action theoretical perspective.

With regard to objectivity and reliability the following aspects turned out to be important: credibility, scientific honesty related to disciplined subjectivity, and imitability. In view of validity the role of theory, representativeness of research findings with respect to the natural situation, and the extent to which adequate verbalizations could be obtained played an important part.

Tentatively the following conclusions can be drawn with regard to some of the aspects mentioned above:

- the informants involved showed a great research tolerance;

- most of the informants felt some responsibility for the quality of the research, which led to a satisfying cooperation;
- some of them, however, also took advantage of the opportunity to 'complain' about internal school affairs;
- objectivity in theory might be relevant, but the nomenclature that is inherent in this theory can also be problematic from a communicative point of view;
- for several reasons the logbook is a less suitable research instrument;
- by participating in the research project, almost all the informants underwent important learning processes.

The project under consideration tried to avoid approaching reality superficially. Through in-depth questioning, involvement of the investigator, labour-intensive methods and techniques and a complex research design, I attempted to meet a knowledge ideal based on a sound scientific background. This background does not imply resistance to reduction and abstraction, which are inherent in any scientific activity. They aim more at a search for reduction and abstraction that considers what should be investigated and not the number of characteristics of the research object. When one studies something in detail, then the number of people involved in the investigation will be reduced and not the number of 'variables' (see also Schuyt, 1986, 110).

As a result quite an intensive research project was executed (project phase 2a). The main purpose of abstraction was directed towards gaining insight into action patterns, i.e. stereotyped ways of thinking, feeling, doing and willing from an awareness of their own behaviour by the informants involved in the investigation. This implies, as was written before, a certain kind of generalization as a result of abstraction. To a small extent generalization to other, non-participating 'members of the class' could also be realized by means of what was called systematic representativeness. In retrospect, the desire to meet both kinds of generalization implies some ambiguity: to go into detail on the one hand and to strive for generalization of research findings in a classical sense on the other. In the project under consideration a clearer stand could be taken in favour of the former. It is assumed that the more one goes into detail the more realistic conclusions one can draw.

PART III

INTERPRETATIVE EVALUATION

7 TOWARDS AN IMPROVED ACTION THEORETICAL PARADIGM CONCERNING RESEARCH AND DEVELOPMENT IN THE DOMAIN OF TEACHING

In chapter 1 reconstruction was described as a theoretical reflection or an interpretative evaluation in view of the further development of theory at paradigmatic level. In this study reconstruction does not imply a total revision of the starting-points and key-concepts which underlied the project under consideration. Preference is given to speak of reconstruction in terms of a correction of these. This will be done on the basis of the second part of this study (the chapters 3, 4, 5 and 6). More about the reconstructive activity itself is written in section 7.1.

Important questions for reconstruction were formulated in chapter 2, section 2.3, concerning the suitability of action theory, the relationship between research and development, and the adequacy of understanding through interpretation. These questions are answered, as far as possible, in section 7.2. For the sake of clearness it must be noticed that these questions should not be mixed up with the questions of the project under consideration; these questions were formulated in chapter 4 and answered in that chapter as well as in chapter 5.

Section 7.3 offers several perspectives for problems encountered during the reconstructive activity. These perspectives are of a theoretical and methodological nature and should be taken into account in view of a (more) consistent action theoretical approach to teaching in further research and development projects. This corresponds with what was written in chapter 1, section 1.1, about the growth of a research programme based on replication and continuity.

A final word on the subject of this study is given in section 7.4. The emphasis is placed again on the relationship between theory and practice in view of bridging the gap between both.

7.1 Correction through reconstruction

Reflection encompasses the ability to concentrate on things which went well and to learn from mistakes made. This study is based on such a perspective. Here learning implies a process of modelling characterized by an increasing extent of detailing: good things are verified and elaborated, alternative perspectives are offered for mistakes made. In addition, this learning process proceeds in a deductive and an inductive way. It is essential that such a process takes place on the basis of empirical findings, which makes of reconstruction a concrete activity. Along with normative or prescriptive choices - inherent in the concept of action and derived from a vision on man

and science - also creative and subjective elements are present in the reconstructive activity. Many descriptive arguments are used which are open for discussion and critique.

Reconstruction continually implies searching for, deepening and elaboration. Because of this many results of the reconstruction were already processed in the preceding chapters. Compared with the original basic publication (Beijaard, 1986) it was possible:

- to formulate starting-points and key-concepts more precisely and well-thought out in chapter 2;
- to make theoretical and methodological choices more explicit in the chapters 3 and 4;
- to add important considerations to theory and methodology in the chapters 5 and 6; more in general this applies to the appraisals at the end of each chapter of part 2.

The theoretical surplus value (and practical implications for doing further research) as presented in the preceding chapters, are not repeated in this chapter.

7.2 Answers to the questions for reconstruction

In chapter 2, section 2.3, three questions for reconstruction were formulated. The first question concerned the suitability of action theory for research and development in the domain of teaching. The second question emphasized the relationship between research and development in this domain and focuses on the research-based didactical in-service programme developed. The third question dealt with the adequacy of understanding the complexity of teaching through interpretation.

These three questions are not answered in the sense of right or wrong, but in an interpretative-evaluative sense; aspects are emphasized which are relevant from an action theoretical point of view. A description of perspectives in view of an improved action theoretical paradigm in the domain of teaching will be postponed to section 7.3.

The subsequent section should be read against the background of aspects which were illustrated in the second part of this study, i.e. chapters 3, 4, 5 and 6. These chapters provide the answers to the questions of this reconstruction.

7.2.1 Suitability of action theory

In the project under consideration action theory had, particularly, a *heuristic* function. This theory is placed above interpretation theories; the latter theories can be seen as less abstract, but they also possess a heuristic function. Generally speaking, action theory does not permit everything; this theory, for example, cannot be identified with pure nomothetic or idiographic science. The first type of science is in contrast with the postulate of

freedom; the latter emphasizes uniqueness. Action theory is, as it were, concerned with generalities within uniqueness.

Located within the interpretative or hermeneutic scientific tradition, I accept the action theoretical starting-points and key-concepts as formulated in chapter 2. Actually, in view of the understanding of everyday reality an action theoretical paradigm implies:

- a vision on man and science, in which man is seen as a competent and active being; science should serve the improvement of man's competency;
- a holistic and less reducing approach; methodologically this has to do with the perception of reality which cannot be defined as 'empirics' in the classical sense;
- an appreciation of uniqueness; at the same time there must be some coherence or similarity, i.e. a common basis which makes a profession recognizable and accessible to others; such a basis can be created with the help of objective or scientific theory;
- an integration in a historical and cultural context: the ecology of one's competency has an objective status, which legitimates the existence of general patterns within uniqueness.

These general characteristics of action theory are based on rich traditions which may not be easily abandoned. On the basis of behaviouristic foundations, however, this has been done for many years in research and development in the domain of teaching.

The surplus value of a heuristic use of action theory in the domain of teaching can be summarized as follows:

- teachers and those who are learning to teach are allowed to speak for themselves in contrast with an approach based on behaviouristic assumptions; by these assumptions the processes of teaching and learning to teach are seen as no more than an adaptation to expectations and directives of others, accomplished, for example, through imitation, reinforcement and trial and error;
- teaching knowledge cannot be seen as predetermined and independent of a context; in addition, room must be left for dealing with moral and emotional dilemmas which also form part of teaching; hence, a teacher is not simply a person who executes a (prescribed) task;
- it is essential that a teacher is able to (critically) theorize about the complexity of the conditions that influence his teaching, including personal factors as an aspect of this complexity;
- learning to teach should not be reduced to deriving skills and techniques from a preexisting body of knowledge; such teacher education - and in-service education - inhibits the self-directed growth of (student) teachers and, more generally, is in contrast with their professional growth;
- teaching is a much involving activity which cannot be learned in a molecular way in the sense of stringing parts or specific units together; one must learn to deal with teaching as a whole in order to deal with it at all, for parts or units of teaching interact and derive their meaning from the whole process in which they are embedded;

- reflective teaching encourages self-directed growth and the development of professionalism; this process, however, cannot be fully unique or personal, because there must exist a shared professional basis, to be provided by objective theory, which - in turn - makes reflections on teaching exchangeable and accessible to other people.

It can be concluded that characteristics like these possess impact in view of doing research and the arrangement of initial and in-service teacher education.

The application of action theory in research and development in the domain of teaching, however, did not appear to be without problems. Encountered problems regard theoretical as well as methodological aspects, namely: the relationship between the cognitive and motivational side of intentionality, the operationalization of certain action theoretical concepts connected with learning to reflect or reflection in general and aspects related to the research design. Special attention to these problems will be paid in section 7.3 in view of the further development of an action theoretical approach to research and development in the domain of teaching. This further development ideally takes place in the context of a research programme.

7.2.2 Relationship between research and development

The preceding section dealt with the impact and implications of action theory in research and development in the domain of teaching. This section emphasizes the underlying innovation theoretical perspective of this theory. This perspective refers to the central problem of this reconstructive study, i.e. the desire to bridge the gap between theory and practice (see chapter 1, section 1.1). By practitioners as well as theorists, both theory and practice are often seen in opposition to each other. From an action theoretical point of view, however, this is a false contrast, for practice contains information for the development of theory and - in turn - theory guides practice to become more professional. This is inherent in the vision on man and the goal of science on the basis of action theory; it is also inherent in the fact that - due to their joint societal basis (Wardekker, 1986) - investigators and practitioners partly aim at the same, namely improving the quality of education.

Action theory implies a perspective on science in which no place is left for an absolute primacy of theory or practice. In the project under consideration it was attempted to meet this point of view by way of practice-oriented research. It was argued that this type of research not only strives for knowledge acquisition, but also intends to contribute to the solution of practical problems. Practice-oriented research, therefore, implies an innovation-theoretical perspective which can be formulated in terms of making practice more scientific. In concrete words this perspective can be described in terms of enhancing teachers' action competency on the basis of reflection or learning to reflect. Through reflection teaching is not only a constructive

activity, which encompasses the planning and execution of lessons, but also a reconstructive activity in which the exchange between subjective and objective theory plays an important part. Generally speaking, reflection leads to action competency which is less contextually determined and more of an intentional or self-determined nature. Actually, this innovation-theoretical perspective implies emancipating elements (cf. also Postma et al., 1989).

Due to the incorporation of an innovation-theoretical perspective, research not only describes (and explains) what is - by definition science lags behind practice then - but should also be occupied with what could and ought to be. Hence, there is talk of a target-direction which can be only realized under special conditions and in a certain way to avoid that science prescribes how practice should be. In this context it is essential that the *voice of the practitioner* sounds through in the target-direction: if not, then practitioners are gagged and left behind 'speechless' (see also Terwel, 1984, 8).

In conformity with action theory it was attempted to realize a relationship between research and development on the basis of the innovation-theoretical perspective or target-direction mentioned above. By way of a complex research design, the teaching reality in question could be reconstructed and, subsequently, be confronted with itself in the form of an in-service programme. It was assumed that information about the own teaching reality, i.e. subjective or practical theories of (successful) instructors, could be useful for in-service education in order to enhance the participants' personal interpretation abilities, respectively their abilities to (critically) reflect on their personal teaching situation. In addition, with the help of objective theory it was assumed that a surplus value could be given to their subjective or practical theories in view of professional growth or change.

By combining objective and subjective theory in one curriculum, the criteria of ecological relevance and theoretical reference could be met (see chapter 5, section 5.3.4). On the basis of these criteria learning to teach, i.e. professional growth in the domain of teaching, implies an exchange between both kinds of theory, whereby - in principle and again under certain conditions - the teacher has the last word and not the educational science. With 'last word' is meant: drawing conclusions for the personal teaching practice on the basis of arguments expressed in a professional language that is shared by colleague teachers. 'Last word' in this sense means that objective theory (associated with or building on subjective theory) is incorporated in a teacher's practical theory. Under given situational and personal circumstances, a consistent use of this practical theory, which can be made visible through reflection, can be seen as an important criterion for its effectiveness. In addition, through the incorporation of objective theory in subjective theory, the latter kind of theory might be extended, adjusted or changed. Objective theory provides a teacher with a more solid basis for the legitimation of his actions (55).

7.2.3 Understanding through Interpretation

The relationship between theory and practice is a very complex one. This relationship regards not only the innovation theoretical perspective as described in the preceding section. It encompasses - from an action theoretical point of view and against the background of practice-oriented research - also methodological and methodical consequences.

Under the heading of 'understanding through interpretation' these consequences are summarized below. They concern the place of commonsense in scientific research, the necessity of a 'scientific detour' for conducting research on this commonsense and the nature of the research design.

1) Criterion of relevance as research perspective

In general, interpretative educational research emphasizes the understanding of individuals' everyday reality by describing the complex situations in which they function. This process of understanding, however, cannot suffice with a copy of common sense of the informants who are involved in the investigation. On the other hand, it is not allowed to ignore their practical or subjective theories and to see these theories as disturbing or irrational. The setting aside of these theories implies the pay of a heavy price; the cost is the *danger of irrelevance*. In addition, it is morally unacceptable to deny the validity of teachers' knowledge and to underestimate their status as an expert.

The criterion of relevance can be met in two ways. Firstly, the relevance of common sense or - more generally - actions, can be examined only by interpreting them in a context. In a certain way this implies a priority of the social over the individual and, through that, to a certain extent an objective status is given to common sense. Secondly, it is important that the process of understanding takes place in a theory-guided way in conformity with practice-oriented research as was described in chapter 2 and illustrated in chapter 3. Because of its objective status, theory can help to make (implicit) practical theories (more) explicit in an accountable way and, consequently, be a help to refine and extend these theories.

2) Necessity of a 'scientific detour'

Essential is that understanding through interpretation takes place in a disciplined way in order to meet scientific criteria. When, for example, during the understanding of actions the emphasis is placed on aspects of intentionality, authenticity or uniqueness, then that does not imply that distance is taken from general validity. Understanding from an action theoretical perspective, namely, is neither directed towards strict individual intentions nor interested in unmotivated justifications of individuals like "I

did it because I liked it" or "I did it in this way, because I am what I am". Intentions and reasons like these are no part of practices that are understandable by others (see also Widdershoven, 1987).

It must be clear that knowledge of an action cannot be a product of an elucidation in a deductive-nomological sense. It can at most be a result of an interpretation process that has been found satisfactory (cf. Nijk, in: Baart, 1986). In the project under consideration this opinion was seen as relevant. The understanding of actions in the light of motives or reasons differs from deriving occurrences from (universal) laws. Nevertheless, it is essential that in both cases an individual event will be clarified on the basis of a methodically accepted way. However, causal elucidations deal with other aspects and cannot be seen as similar to interpretations on the basis of understanding.

Interpretations are necessarily abstractions from social reality and can be seen as results of the confrontation of the investigator's perspective with the actor's perspective. The logic of interpretation itself demands that both perspectives differ from one another, but they must also possess any connection. In view of action theory, Bosman (1985) argues that this issue needs further elaboration. It is, for example, essential that the participants involved (investigator and informant) possess (a) shared conceptual scheme(s). As regards content, this might be seen as a minimal prerequisite for a succeeding understanding. In addition to this, many other conditions concerning this relationship play an important part (see what was written about validity and the role of the investigator in chapter 6).

3) Priority of intensive over extensive research

In research inspired by action theory it is, among other things, relevant that attention is paid to conscious as well as unconscious factors. The latter often remain implicit in actions and are only accessible through external observation. This view demands research of an intensive nature in contrast with so-called extensive research (cf. Schuyt, 1986). The conception of intensive research that was held in the project under consideration disagrees with the idea that intensive (interpretative) research only plays a part with the formulation of hypotheses, respectively the 'context of discovery', as the first step to be taken in extensive research. On the contrary, it is defensible that research of an extensive nature precedes (more) intensive research.

From an action theoretical perspective a conception of intensive research was held in the project under consideration, which differs from pure naturalistic inquiry. Research in this sense is rejected, because of the absence of a certain prestructuring of the investigation beforehand. By prestructuring with the help of objective theory the expressiveness of research results increases. Moreover, prestructuring provides research with a critical function; as such research can be more than a confirmation of the status quo (see for details chapter 2, section 2.2.4, in connection with practice-oriented research).

Connected with the claimed 'knowledge ideal' (i.e. understanding the complexity of teaching), it is fundamental that phenomena are investigated in their natural context, that perspectives (subjective or practical theories) of participants in this context are seen as relevant and that the research design is - despite a certain extent of prestructuring - of a complex nature to do justice to reality. In addition, the preparation and execution of a research project that emphasizes these features put high demands on the investigator. As illustrated in the second part of this study, these demands, for example, refer to the selection of adequate interpretation theories, the development of a multi-methodical approach, being a participant in the investigation, making this position explicit and wavering between objective and subjective theory. Intensive research as meant above is not characterized by methods and techniques that are specific for action theoretical research, though many methods and techniques are excluded for this kind of research. In this context it is relevant to acknowledge that practice is dynamic and subject to change, that this practice is of a complex nature and consists of people who act willingly and knowingly.

7.3 Perspectives in view of an improved paradigm

In section 7.2.1 were several problems already anticipated which needed further attention. This takes place in the subsequent section. The problems encountered will be translated into perspectives, which is in line with the increasing process of detailing of a research programme on the basis of replication and continuity. In view of further research and development projects it is essential that the outlined perspectives are integrated in this programme at paradigmatic level.

7.3.1 A dynamic relationship between the cognitive and motivational side of intentionality

In the project under consideration, action theory was expected to cover external behaviour, underlying cognitive and conative processes, and environmental influences. It was attempted to operationalize this holistic perspective by elaborating the interplay between intentionality and complexity, which is in accordance with fundamental action theoretical notions. The latter concept refers to contextual features, students and personal aspects; the former concept refers to cognitive and conative elements.

The project under consideration overemphasized the cognitive side of intentionality. In chapter 5 was concluded that this is due to a lack of adequate motivational theories that can be incorporated in the integrative theory which initially formed the basis of the project. Actually, an integrative theory is needed that connects cognitive aspects, motives and contextual data; a theory which should be called a 'theory of consciousness' in order to emphasize the

relevance of one's personal reality interpretations. It should be noticed that such a theory also applies to abridged or automatic actions, unless these actions have never reached the level of consciousness; abridged or automatic actions can be brought up to the level of consciousness by using retrospection after having observed these actions.

Koch-Priewe (1986), for example, anticipates such a 'theory of consciousness' in her study of subjective theories of four teachers. For that purpose she consulted Soviet-Russian psychological literature, in particular the work of Leont'ev (1979). Among other things, Leont'ev defines motives as the core of one's personality. A motive is implied in the object (of activity) and closely connected with cognitions and emotions. Essential is the dynamic character of Leont'ev's theory: a motive can become an intention and in reverse; an intention can be represented cognitively. This vision implies a less rigid conception of motives in comparison with what was written in chapter 5, section 5.4.2. In that section it was argued that motives are ordered above cognitions and refer to rules which guide or underlie life patterns. This view can be upheld, but needs to be seen more dynamically to avoid that too much emphasis is placed on the determination of man or the idea that man can be made (56).

7.3.2 Action theoretical concepts in view of a personal competency-based perspective

The suitability of applying action theory increases as concepts can be better demarcated or defined and operationalized in view of concrete activities. A lack of well-described concepts particularly played a part during the construction of the research-based in-service programme. Concepts like action repertoire, action structure and action competency appeared to be heuristically useful, but did not (yet) offer sufficient support for concrete development activities (57). These activities were guided by the idea of professional growth on the basis of reflection, which is so crucial within the exchange process between objective and subjective theory. Essential is that reflection as educational principle in teacher education is extended by a concrete perspective on professional growth. Through that, the previously mentioned concepts are also provided with a particular meaning.

Teaching and learning to teach may perhaps be best characterized as a process in which reflection expresses professionalism before, during and after a (series of) lesson(s), including other aspects concerning education. This statement is supported by teachers' subjective or practical theories. At different (cognitive) levels these theories are - for the greater part - results of reflection on personal teaching practices. In general it is relevant that teachers develop adequate subjective or practical theories. For this purpose (student) teachers should experience an explicit and direct relationship between theory-based concepts and the handling of classroom situations.

Below three statements are formulated and explained from a didactical and learning theoretical point of view. They roughly encompass a concrete perspective on professional development to be provided by teacher education. In further action theoretical research and development projects this perspective has to be elaborated in more details.

1) Teacher education should address (student) teachers' 'zone of proximal development'

In teacher education the exchange between objective and subjective theory and learning to teach can be combined by addressing a student teacher's 'zone of proximal development'. From this point of view a teacher educator must start from orientations that guide a teacher's actions and be aware that these orientations are the result of a teacher's experiences and reflection processes. This subjective form of processing practice can be made explicit, so that the opportunity is created to understand the orientations of teachers and to make these orientations - especially those of successful teachers - subject of teacher education. At the same time the opportunity is given to realize changes in practice as a result of a 'discourse' with objective or scientific knowledge. The moment to realize changes is where for (different) persons the zone of proximal development begins. Didactically, such a learning process can be arranged by responding to teaching problems as is explained below.

2) Learning to teach should preferably occur on the basis of 'teaching problems'

Teacher educators should help student teachers to develop adequate practical theories. From a didactical point of view this can be arranged by a problem-based perspective, so that a teacher - at long-term - is able to respond to various sets of teaching problems with (some degree of) consistency. The teacher who fails to develop a practical theory would be expected to respond erratically to individual or classes of problems.

Personal experiences make clear that 'problem-based learning to teach' is very well possible in teacher education (Beijaard and Goffree, 1986). Generally speaking, problem solving processes can best meet what Roth (1966) called the execution of 'mature' actions (see chapter 3, section 3.1.2). In addition, a problem-based learning process encourages reflection, because - due to self-steering (personal choices involved) and field-steering elements - a person is continually out of balance. The execution of an action and reflection during as well as after the whole process, helps him to find this balance again (58). By figure 7.1 this learning process is made visible. Essential is that the teacher is aware of the existence of the problem, that he recognizes it as such, that he possesses acting alternatives in view of how the situation ought to be and that he is able to apply professional knowledge (cf. Medley, 1988).

It is also essential that reflection - as is shown by figure 7.1 - is of a cyclic nature ('analysis of' and 'orientation on').

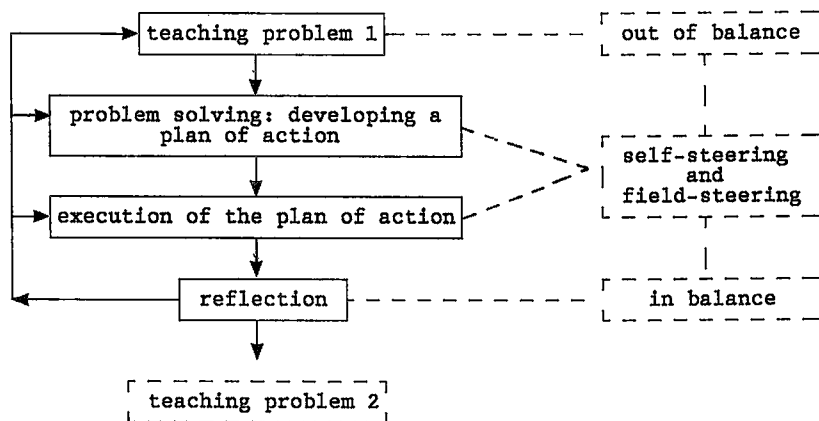


Figure 7.1 Problem-based learning to teach (see for details: Beijaard and Goffree, 1986).

3) Learning to teach should take place in view of teaching as a complex activity

Learning to teach should not be restricted to performing the same teaching behaviour as a result of reinforcement, imitation or trial and error. Relevant is that a solved problem leads to the desire to tackle another problem, or the same problem but at a higher degree of complexity. The concept of *complexity* is supposed to play an important part in learning to teach when it is acknowledged that it is an environmental as well as a personal characteristic: a problem situation is more complex when an individual needs to integrate information from different sources in order to solve or handle a problem; as a personal characteristic complexity refers to the ability to formulate further necessary 'kinds of integrations', i.e. to the possession of acting alternatives and to being conceptually flexible (cf. Mandl and Huber, 1978).

In teacher education the relationship between both personal and situational complexity is relevant when selecting or planning problems. These problems need to be connected with or build on student reflections, which is a prerequisite for doing justice to students, and to meet motivational and emotional aspects along with cognitive ones.

From a curricular point of view, then, the criterion of ecological relevance as well as the criterion of theoretical reference can be met. The first criterion emphasizes one's personal growth, the second criterion focuses on the establishment of a professional basis which one integrates in his action repertoire and which he shares with colleagues. Both criteria should be guided by the rule of quality above quantity.

The statements mentioned and explained above can be much more elaborated. They imply a perspective on the development of professionalism, which should be emphasized in further action theoretical research and development projects. The ultimate aim of teacher education should emphasize personal growth (cognitive, motivational and emotional) in view of a higher degree of complexity (development or change of practical theory, whereby practical theory possesses ecological relevance and theoretical reference). Within this aim of teacher education, reflection remains an important key-concept. Ignoring reflection leads to persons who are too much 'contextual' and too less 'experimental' or 'intentional'. In addition, it is known that a reflective educational programme is positively connected with the learning gain of students (pupils) and that - particularly long-term - such a programme positively influences a teacher's work satisfaction and leads to a more adequate self-perception of teachers (cf. Korthagen and Wubbels, 1989).

7.3.3 Innovation-theoretical perspective and the total context of the school

Due to a lack of facilities no systematic research could be done on the effectiveness of the developed in-service programme in view of the underlying innovation-theoretical perspective (see section 7.2.2). Based on conversations with those teacher educators who execute the programme, only some tentative things can be written.

In course of time the in-service programme has been offered to many instructors of the practical training centres for agricultural education. According to the teacher educators involved the impact of the programme is visible in the teaching of many individual instructors. However, the impression exists that an optimal implementation of the programme is obstructed by certain contextual conditions concerning the structure of the school organization and dominating ideas of leading persons in the schools about the function and organization of practical teaching and learning in agriculture. As concerns these persons, it appears that it is not enough to inform them about research results and the underlying rationale of the in-service programme. For an optimal integration of this programme in the real context it is insufficient that the participants to whom the programme is offered (critically) reflect on their educational context (task environment). Principals, educational coordinators and those who are exempted from following the in-service course (usually older and experienced instructors) should also participate in in-service education. Through education they need to be encouraged to create conditions to make the structure of the school organization and, through that, the leading ideas about practical teaching and learning more flexible and accessible to discussion. It is essential that principals in particular feel themselves responsible for contributing to a positive growth-oriented environment. In some respects, however, this might interfere with their responsibility for staff evaluation (59).

In further action theoretical research and development projects, therefore, it is relevant that special attention is paid to the integration of the innovation-theoretical perspective in the total context of the school and not only in the action competency of the individual instructor. It must be noticed that, dependent on the training centre one works in, instructors differ in their degrees of freedom to act. In addition, the situation about which has been written above may differ from other types of schools.

7.3.4 In-depth research and 'ecology of the classroom'

From the perspective of an integrative theory it was attempted to make informants' subjective or practical theories explicit and, through that, to uncover the coherence of sense that is present in these theories. However, with this the limits of the research design became also visible. There are forms of rationality which are not directly accessible. Moreover, in actions also wrong or irrational reasons or motives can be involved. Avoiding problems like these necessitates that more attention must be paid to the actor's context than was done, in order to test (parts of) practical theories on their practicability and to gain insight into the conditions under which these theories can be or are put into practice (see also the preceding section). For this purpose it is relevant to acknowledge that the actor's context consists of spatial and temporal aspects. His context is not only linked to the actual environment, but also to historical events; past experiences and expectations play a part in a teacher's professional actions (cf. also Kelchtermans and Vandenberghe, 1990; they developed a conceptual framework for the study of a teacher's professional life from a biographical perspective).

Compared with the project under consideration, it is worth to take long(er) term research into consideration in which priority is given to in-depth research over research in the breadth. The project under consideration attempted to meet both. Covering the problem of research ('problem' is related here to 'knowledge ideal', i.e. understanding the complexity of teaching) should be essential and not the desire to generalize as a consequence of which many informants are involved who can only be investigated 'superficially'.

The ecology of the classroom is also relevant, that is to say that the investigator must simultaneously focus on the teacher, the students and contextual features. Hence, students' actions are relevant and must be taken into account within one and the same research design, which was not done in the project under consideration. In that project two research designs were developed, though on the basis of one perspective as a result of the application of action theory (compare the starting-point in chapter 2, section 2.2.5, with the research phases of chapter 4).

7.4 A final word on the subject

In the social sciences many investigators still underestimate the relevance of the real practice for the development of theory. To avoid that theory (increasingly) estranges from this practice it is, however, a prerequisite to acknowledge the joint venture of both theory and practice.

Van den Dungen (1989), for example, explicitly demonstrates that in former days much scientific progress primarily stemmed from practical needs and not from theoretical ones. He wonders why so many social scientists carefully view their research object these days through glasses characterized by distance and frequency. In his opinion these characteristics - of usually extensive research - imply a loss of 'contextual awareness' (van den Dungen, 1989, 27). For this loss no compensation exists; the result is that much social research obtains something unreal. From this perspective practice can be studied only fragmentarily, which, remarkably, is often seen as an indication of thoroughness.

In essence a social scientist should be aware of the 'error of theory'. On the other hand, adequate research cannot be conducted without theory, because scientific theory possesses a more or less objective, i.e. intersubjective status and contributes to the fact that research results are not a mere copy of reality. However, in their operationalization the selected theories must leave room for this reality. By explicitly expressing this demand in the research design, it is acknowledged that (practice-oriented) research strives for the development of theory in interaction with practice. To me this seems essential for educational research and a prerequisite for necessary efforts to bridge the gap between educational theory and educational practice.

This study upholds the view that the application of action theory offers such a perspective. Based on this theory it is essential that justice is and must be done to both theory and practice. Consequently, the investigator cannot suffice with giving an account of his work to the 'scientific forum' alone; he should also give an account to the users of his research results. In The Netherlands this latter form of accountability is unfortunately still of no common interest. I think that I - by including an account of mistakes made - have been able to meet both criteria. Both accounts formed explicit parts of the project under consideration.

SUMMARY

The introduction of this study describes five developments regarding research and development in the domain of teaching. These developments are closely connected with the desire to bridge the gap between the theory and the practice of teaching. Successively, attention is paid to: (1) changes in research on teaching, (2) the impact of research results on the teaching practice, (3) methodological consequences for educational research in general, (4) developments in perspectives concerning teacher education and (5) developments in perspectives concerning teaching.

The general introduction anticipates an action theoretical approach to teaching, which underlied a previously executed research and development project that concerned practical teaching by instructors of the eleven Dutch centres for practical agricultural education. This project ran from August 1984 until August 1987. The research was directed towards practical teaching by instructors. A didactical in-service programme has since been developed for these instructors, based partly on the research results.

The aim of the present study is twofold: on the one hand a description is given of the project mentioned above, on the other the most important starting-points and key-concepts that underlied the project are submitted to a reconstruction. Through reconstruction it is attempted to realize a theoretical surplus value and, consequently, to contribute to the consolidation of an action theoretical paradigm regarding research and development in the domain of teaching.

Part I

The first part encompasses the theoretical and methodological framework of this study and consists of two chapters. In chapter one the aforementioned project is placed within the scope of the development of an action theoretical approach to teaching. It is argued that the development of such an approach is based on replication and continuity and takes place in the context of a research programme. The desire to bridge the gap between theory and practice is attached to this approach. In connection with this it is relevant to obtain (more) knowledge of teaching as a complex activity. It is tried to achieve this through an integrative study of (external) observable teaching, of cognitive processes underlying this teaching, including the conative elements which play a part, and of the contextual influences involved.

The aforementioned project encompassed the following phases: (1) a preparatory study of the Dutch centres for practical education in agriculture, (2)

research on practical teaching by instructors, (3) research on student perceptions of this type of education and (4) the development of an in-service programme. These phases are briefly described in chapter one. In this study the reconstruction concerns the research on practical teaching and the developed in-service programme.

In this study reconstruction is seen as a 'theoretical reflection on' or an 'interpretative evaluation of'. A distinction is made between different levels of scientific activity in order to clarify what exactly is being dealt with. The reconstructive activity takes place at paradigmatic level, that is to say the level of a research programme. At this level the relationship between theory (action theoretical assumptions, including methodological rules for the designing and the execution of empirical research) and the domain (teaching) is emphasized. This relationship forms the object of reconstruction. On the basis of the previously executed project this relationship is the object of reflection from an action theoretical point of view.

The above-mentioned relationship is emphasized in chapter 2. Prior to giving concrete form to this relationship, attention is paid to some general aspects of the concept action. Literature about this concept demonstrates that it is used plurally. Partly because of this, the following is presupposed with regard to the concept action:

- it is based on a vision of man as an ethically, as well as intellectually, competent and active being; social science ought, along with and in coherence with the acquisition of knowledge, to serve this vision;
- an action is a configuration of intentionality, reflexivity and relationship with a context, whereby a subject is presupposed.

These notions formed the basis for the further development of starting-points and key-concepts at paradigmatic level.

In chapter 2 the following five starting-points are described with regard to the domain of teaching:

- intentionality and complexity interplay; intentionality refers to a teacher's cognitive and conative directedness towards his task and task environment; complexity has a bearing on characteristics of the task environment and on a teacher's personality aspects;
- in teaching the following action phases can be distinguished: planning, execution and reflection; these three phases can be studied and analysed in conformity with the orientating, executing and controlling functions of an action;
- teaching is an activity whereby at least two people are involved, i.e. the teacher and the student; teacher actions are for an important part determined by student actions and reversed;
- learning to teach takes place on the basis of an exchange between objective and subjective theory; this point of view has the following consequences: (1) teachers should be 'educated' rather than 'trained' and (2) the transmission of knowledge and (learning) to reflect are automatically not compatible;

- by preference research on teaching is practice-oriented, that is to say theory-committed research which is practically relevant and also contributes to the development of objective theory; theory has a search-light function: it guides the collection of data and helps with their analysis and interpretation; in addition, the research design has to be in conformity with the complexity of the situation in practice (ecological validity), to be directed towards a diagnosis of this situation and to emphasize the study of cognitive representations.

The reconstruction focuses on these five starting-points and the key-concepts belonging to them. In connection with this it is attempted to answer the following three questions: To what extent may teaching be understood from an action theoretical perspective? In which way is it possible to give research-based suggestions for the augmentation of teachers' rationality or professional competency? To what extent is understanding through interpretation an adequate way to approach the complexity of teaching?

Part II

The second part of this study describes in four chapters the design and the execution of the research and development project mentioned above. Chapter 3 deals with theoretical insights (interpretation theories) which have been important for the definite design of the research on teaching by instructors in the centres for practical agricultural education. This chapter starts with an outline of the historical aspect of this part of the project.

Firstly, an overview is given of research on teaching in terms of research programmes related to scientific traditions. Much attention is paid then to recent research on teacher thinking. Arguments are given for the incorporation of this type of research in a broader, more encompassing conception. Action theoretical research is introduced as an appropriate alternative.

Secondly, the concept of action is further explored. For this a brief study has been undertaken of insights as developed by the hermeneutic ('geisteswissenschaftliche') tradition and of two anthropological views on learning, respectively the work of H. Roth and the Russian psychology of learning.

Thirdly, attention is paid to important general didactical theories and models. In connection with this German literature is referred to in particular, as the Dutch didactical theories and models show interfaces with this literature. Special attention is paid to the significance of these theories and models in relationship to educational practice.

Fourthly, the emphasis is placed on the (continuing) discrepancy between the theory and the practice of teaching. Several causes for this discrepancy are described and perspectives are offered for the solution of this problem, including teaching based on 'recipes' and 'everyday didactics'. Both perspectives are discussed and provided with comments. Teaching as a special form of acting is seen as an appropriate alternative. Reflection as an educational

principle and the didactical arrangement of this principle form an important part of the interpretation of teaching as a form of acting.

After this historical section a further explanation is given of the way the action theoretical principle of holism has been shaped. For this system theoretical insights have been tentatively used, which enable one to reduce the complex reality to a surveyable structure. Combined with results of the preliminary investigation these insights have led to a heuristic model for research on teaching by instructors. As regards content, this model has been constructed by making use of the didactical theory of Heimann and Schulz, supplemented with insights from the so-called 'critical didactics'. To this model, which is primarily a structure model, a process model has been added which separates teaching into planning, execution and reflection phases. This process model consists of points of attention for research mainly derived from recent research on teaching.

In chapter 4 the research on teaching by instructors and the research on student perceptions are illustrated. The underlying starting-points of these investigations are described in chapter 2.

The research on teaching by instructors (n=29) tried to answer questions concerning:

- features of the instructors' task environment and the influence of these features on their teaching;
- features of the involved centres for practical agricultural education in general and of teaching practical lessons in particular;
- the nature of instructors' subjective theories which are accessible through reflections;
- suggestions for the development of an in-service programme with reference to the research on the above-mentioned aspects.

A combination of research methods and techniques has been used to collect data, namely: structured open interviews, observations, context-embedded retrospective interviews and logbooks. The processing of data took place in phases: raw data were successively segmented into protocols, systematized with the help of schemes, and interpreted. The processing of data was characterized by reduction and thick description. A summary of research results is restricted in chapter 4 to a presentation of relevant task environmental features and their influence on teaching, to teaching itself and, derived from that, to features of practical agricultural education within the centres involved. The nature of reflections of the instructors involved and the in-service programme developed are reported in chapter 5.

The research on perceptions of students (n=381) should be seen as complementary to the research on teaching by instructors. For this a model was developed from an action theoretical perspective. Based on this model it was attempted to gain insight into:

- the way in which students from senior secondary and higher agricultural schools perceive the teaching and learning situation;

- the coherence between the conditions, the teaching and learning situation and the learning effects of practical agricultural education in the centres involved.

The collection of data took place by using a prestructured and closed questionnaire, consisting of items to be judged by students on a five-point scale. The processing of the data occurred per item as well as per cluster of items. Among other things, the results led to a completion, sharpening and correction of previously gained insights from the research on teaching by instructors.

The nature and content of instructor reflections are considered in more detail in chapter 5. For the analysis of reflection as a phase of teaching a distinction is made between empiric-theoretical reflections on the one hand and normative-theoretical reflections on the other. The former reflections are reflections concerning what went well and what did not go well during the lessons given. Reflections concerning 'what went well' predominantly seem to be of a concrete nature and are directly related to the lessons given. On the other hand, reflections concerning 'what did not go well' frequently seem to exceed the concrete lessons situation.

Empiric-theoretical reflections are formulated in general as well as in specific terms. Generally speaking, empiric-theoretical reflections mostly contain indications about why something did or did not go well.

Normative-theoretical reflections are reflections concerning desired changes. They refer to goals or future images which sometimes lead to adjustments of lessons. The task environment seems to be an important factor in lessons not being adjusted.

Next an analysis of reflection as a source of information (for the investigator) takes place. In this sense reflection refers to underlying reasons or motives of teachers' actions. Subjective or practical theories are distinguished which (1) are abstract and general, (2) represent the 'model-like middle' or blueprints for acting and (3) are specific and close to action. These three-parts ideally form a cognitive structure in which subjective theories are ordered sequentially and hierarchically. Their coherence can be regulative ('top down') as well as constitutive ('bottom up'). Among other things, inconsistencies within this coherence are seemingly caused by an insufficient empirical basis of subjective theories or by subjective theories which are insufficiently thought out from an objective theoretical perspective. It has also become clear that only a few instructors who were involved in the investigation, possess general and abstract theories about teaching and learning. Partly through that it seems that 'model-like thinking' is of an intuitive nature with many instructors; proportionally many instructors act according to didactical principles, rules of thumb or recipes gained in a non-autonomous way or by tradition. These and other findings, including the fact that many instructors did not follow any teacher education, need not necessarily be connected with 'bad' teaching. Due to inconsistencies in the cognitive structure, however, teaching more often appears to be inadequate or to result in unintended effects.

Conclusions like those mentioned above contain important suggestions for the development of a didactical in-service programme, which had to be directed towards enhancing the action competency and to breaking through existing routines. Chapter 5 describes the action theoretical concepts that helped develop this programme. It is essential that this programme meets the criteria of ecological relevance and theoretical reference. The former criterion implies that the programme has to be closely related to the members' own teaching situation. The second criterion refers to the insertion of objective theory in the programme. This objective theory has a bearing upon the 'model-like' middle to give concrete form to acting and upon more general theories of teaching and learning to enable one to legitimate choices made.

Chapter 5 ends with some problems and perspectives regarding research on teacher reflections. Attention is successively paid to (1) the diagnosis of reflections, (2) the relationship between motives and reflections, (3) the differences between people in their ability to stand back when necessary and to look at their everyday reality with some distance, and (4) the use of metaphors by teachers. It is stated that these four problems and perspectives contain relevant implications for current research on teaching.

Chapter 6 deals with methodological and methodical aspects of the research on teaching by instructors. In the first place a description is given of how the informants experienced their participation in the investigation. They generally found their participation positive, pleasant and instructive. None of them seems to have held back information consciously; some instructors emphatically said that they talked about things which they are usually reluctant to discuss. They did so, because they did not want to detract from the quality of the investigation. None of the informants experienced the observation of a practical lesson as really disturbing; generally instructors as well as students acted as they do normally. This was not the case, however, for logbook keeping. Memories of later lessons appeared to interfere with those of prior lessons. It also became clear that it was not always easy to write down experiences briefly. For many instructors the logbook turned out to be a source of developing awareness and a source of change. Most instructors felt positively about some prestructuring of the logbook in advance.

The research strategy followed implied numerous considerations and choices in connection with the objectivity, reliability and validity of research results. Objectivity is seen in the research on teaching by instructors as disciplined subjectivity and scientific honesty. In this sense and combined with notions of interpretative research, much value is attached to the objective status of theory.

As concerns reliability a distinction is made between internal and external reliability. Several procedures were carried out in each case. The same applies to the internal and external validity of the research results. In general it can be concluded that there are no indications for any doubt about the reliability and validity of the research results; from the perspective of

interpretative research and the starting-points as described in chapter 2 there is talk of reliable and valid research results.

Further attention is paid to some methodological issues in chapter 6, namely: the status of the actor's point of view in relation to the importance of doing research on practical theories, the asking of 'why-questions' for gaining insight into informants' motives or reasons and the role of the investigator in interpretative research based on action theoretical starting-points.

Part III

The third part of this study consists of chapter 7, in which proposals are made for an improved action theoretical paradigm regarding research and development in the domain of teaching. First of all, however, the questions formulated in chapter 2 are answered, not in the sense of right or wrong but in an interpretative-evaluative sense.

With respect to the first question, which concerns the suitability of action theory for research on teaching, it can be concluded that this theory has a valuable heuristic function for attempts to understand and describe the complexity of teaching. Among other things, the surplus value of using action theory in the domain of teaching has a bearing upon the teacher's role in the investigation, the process of teaching, how this process can be learned in connection with demands concerning reflection and professional growth.

With respect to the second question, which concerns the relationship between research and development in the domain of teaching, it is stated that the 'voice of the practitioner' is, under certain conditions, essential in contributing to bridging the gap between theory and practice. For this purpose it is found relevant that research is practice-oriented with an innovation-theoretical perspective.

With respect to the third question, which concerns understanding the complexity of teaching through interpretation, special attention is paid to practical theories in connection with the relevance for practice of the research results in question. It is also pointed out that a 'scientific detour' is necessary in order to help practice in an accountable way; in connection with this similarities and differences between the investigator's and the actor's perspectives play an important part. Due to the complexity of the phenomenon involved, preference is given to intensive rather than extensive approaches regarding research on teaching.

The remaining part of chapter 7 deals with perspectives with reference to problems which became visible during the reconstructive study. Attention is paid particularly to the relationship between the cognitive and motivational side of intentionality and to action theoretical concepts connected with a concrete perspective of learning to teach. Related to the in-service programme developed it is also emphasized that the innovation-theoretical perspective should be seen explicitly in the context of the course-members' school. In eventual further projects and in line with the development of a research

programme these perspectives, including the importance of in-depth research, need to be elaborated in more detail.

SAMENVATTING

Deze studie wordt ingeleid met een beknopte schets van vijf ontwikkelingen die betrekking hebben op onderzoek en ontwikkeling in het domein van het onderwijzen. Die ontwikkelingen hangen nauw samen met de wens de kloof tussen didactische theorie en didactische praktijk te overbruggen. Achtereenvolgens wordt aandacht besteed aan: (1) veranderingen in het onderzoek van het onderwijzen, (2) de invloed van onderzoeksresultaten op de onderwijspraktijk, (3) methodologische consequenties voor onderwijskundig onderzoek in het algemeen, (4) ontwikkelingen in zienswijzen betreffende het opleiden van leraren en (5) ontwikkelingen in zienswijzen betreffende het onderwijzen.

In de algemene inleiding wordt geanticipeerd op een handelingstheoretische benadering van het onderwijzen, die eerder ten grondslag heeft gelegen aan een onderzoeks- en ontwikkelingsproject betreffende het didactisch handelen van instructeurs aan de elf agrarische praktijkscholen in Nederland. Dit project werd uitgevoerd van augustus 1984 tot augustus 1987. Het onderzoek richtte zich op het didactisch handelen van instructeurs. Mede op basis van de onderzoeksresultaten werd een didactisch in-service programma voor deze instructeurs ontwikkeld.

De doelstelling van de nu voorliggende studie is tweeledig: enerzijds wordt het voornoemde project beschreven, anderzijds worden de belangrijkste eraan ten grondslag liggende uitgangspunten en sleutelbegrippen onderworpen aan een reconstructie. Door middel van reconstructie wordt getracht een theoretische meerwaarde te realiseren en aldus bij te dragen aan consolidering van een handelingstheoretisch paradigma met betrekking tot onderzoek en ontwikkeling in het domein van het onderwijzen.

Deel I

Het eerste deel behelst het theoretische en methodologische kader van deze studie en bestaat uit twee hoofdstukken. In hoofdstuk 1 wordt het bovengenoemde project geplaatst in het kader van de ontwikkeling van een handelings-theoretische benadering van het onderwijzen. Gesteld wordt dat de ontwikkeling van zo'n benadering plaats vindt op basis van replicatie en continuïteit in het kader van een research-programma. Aan deze benadering wordt de wens gekoppeld de kloof tussen theorie en praktijk te overbruggen. In dit verband wordt het belangrijk gevonden (meer) kennis te verkrijgen van het onderwijzen als een complexe activiteit. Deze doelstelling wordt nagestreefd in een geïntegreerde bestudering van (uiterlijk) waarneembaar didactisch handelen, van de onderliggende cognitieve processen van dit handelen, inclusief conatie-

ve elementen die daarbij een rol spelen, en van de contextuele invloeden op het didactisch handelen.

Het genoemde project heeft diverse fasen gekend, te weten: (1) een voorbereidende studie van het agrarisch praktijkschoolwezen, (2) onderzoek naar het geven van praktijklessen door instructeurs, (3) onderzoek naar percepties van studenten van dit type onderwijs en (4) de ontwikkeling van een in-service programma. Deze fasen worden in hoofdstuk 1 beknopt beschreven. De reconstructie die in deze studie aan de orde wordt gesteld richt zich op het onderzoek naar het geven van praktijklessen en het ontwikkelde in-service programma.

Reconstructie wordt in deze studie opgevat als 'theoretische reflectie op' of 'interpretatieve evaluatie van'. Om duidelijk te maken waar het precies om gaat, wordt onderscheid gemaakt tussen verschillende niveaus van wetenschappelijke activiteit. De reconstructieve activiteit beweegt zich op paradigma-niveau, dat wil zeggen het niveau van een research-programma. Centraal op dit niveau staat de relatie tussen theorie (handelingstheoretische assumpties, inclusief metho(dolog)ische regels voor het ontwerpen en uitvoeren van empirisch onderzoek) en het domein (het onderwijzen). Deze relatie is het onderwerp van reconstructie. In deze studie wordt vanuit een handelings-theoretische invalshoek op deze relatie gereflecteerd aan de hand van het uitgevoerde onderzoeks- en ontwikkelingsproject.

De voornoemde relatie staat centraal in hoofdstuk 2. Alvorens deze nader te concretiseren, wordt aandacht besteed aan enkele algemene aspecten van het begrip handeling. Uit de bestudering van literatuur hierover blijkt dat dit begrip nogal pluriform wordt gehanteerd. Mede om deze reden wordt ten aanzien van het begrip handeling uitgegaan van het volgende:

- eraan ten grondslag ligt een visie op de mens waarin deze gezien wordt als een ethisch zowel als verstandelijk competent en actief handelend wezen; sociale wetenschap behoort, naast en in samenhang met de verwerving van kennis, aan deze visie dienstbaar te zijn;
- een handeling is een configuratie van intentionaliteit, reflexiviteit en gebondenheid aan een context, waarbij een subject wordt voorondersteld.

Vanuit deze basisnoties is inzake didactisch handelen verder vorm gegeven aan uitgangspunten en sleutelbegrippen op paradigma-niveau.

Met betrekking tot het domein van het onderwijzen worden in hoofdstuk 2 de volgende vijf uitgangspunten beschreven:

- intentionaliteit en complexiteit interacteren; intentionaliteit verwijst naar het cognitief en conatief gericht zijn van de leerkracht op diens taak en taakomgeving; complexiteit heeft betrekking op karakteristieken van de taakomgeving en op persoonlijkheidsaspecten van de leerkracht;
- in onderwijzen kunnen handelingsfasen worden onderscheiden, te weten: planning, uitvoering en reflectie; deze drie fasen kunnen worden bestudeerd en geanalyseerd in overeenstemming met de oriënterende, uitvoerende en controlerende functies van het handelen;

- onderwijzen is een activiteit waarbij tenminste twee personen zijn betrokken, i.c. docent en student; het handelen van de docent wordt voor een belangrijk deel bepaald door het handelen van de student en omgekeerd;
- leren onderwijzen vindt plaats op basis van uitwisseling van objectieve en subjectieve theorie; deze zienswijze heeft de volgende consequenties: (1) leerkrachten dienen te worden 'opgeleid' en niet 'getraind' en (2) kennisoverdracht en (leren) reflecteren zijn niet zonder meer met elkaar te verenigen;
- onderzoek van het onderwijzen is bij voorkeur praktijkgericht, dit wil zeggen onderzoek gebonden aan theorie dat zowel praktisch relevant is als bijdraagt aan de ontwikkeling van objectieve theorie; theorie heeft een zoeklicht-functie: zij stuurt het verzamelen van gegevens en is behulpzaam bij de analyse en interpretatie daarvan; het onderzoeksdesign moet voorts in overeenstemming zijn met de complexiteit van de situatie in de praktijk (ecologische validiteit), gericht zijn op een diagnose van deze situatie en de nadruk leggen op bestudering van cognitieve representaties.

De reconstructie spitst zich toe op deze vijf uitgangspunten met bijbehorende sleutelbegrippen. In samenhang hiermee wordt getracht een antwoord te geven op de volgende drie vragen: In hoeverre kan het onderwijzen worden begrepen vanuit een handelingstheoretisch perspectief? Op welke wijze is het mogelijk op onderzoek gebaseerde suggesties te geven voor de verbetering van professioneel didactisch handelen? In hoeverre is begrijpen door middel van interpreteren een adequate manier voor het benaderen van de complexiteit van het onderwijzen?

Deel II

In het tweede deel van deze studie worden aan de hand van vier hoofdstukken de opzet en uitvoering van het genoemde onderzoeks- en ontwikkelingsproject beschreven. Hoofdstuk 3 handelt over theoretische inzichten (interpretatietheorieën) die van belang zijn geweest voor de uiteindelijke opzet van het onderzoek naar het didactisch handelen van instructeurs in het agrarisch praktijkschoolonderwijs. Begonnen wordt met een schets van het historisch aspect van dit onderdeel van het project.

In de eerste plaats wordt een overzicht gegeven van researchprogramma's gerelateerd aan wetenschappelijke tradities met betrekking tot onderzoek van het onderwijzen. Veel aandacht wordt vervolgens besteed aan het recente 'teacher thinking' onderzoek. Argumenten worden gegeven voor de incorporatie van dit type onderzoek in een bredere, meer omvattende conceptie. Handelingstheoretisch onderzoek wordt geïntroduceerd als een geschikt alternatief.

In de tweede plaats vindt een nadere exploratie plaats van het handelingbegrip. Hiervoor is gekeken naar inzichten zoals die zijn ontwikkeld in de geesteswetenschappelijke of hermeneutische traditie en naar twee antropologische zienswijzen met betrekking tot leren, respectievelijk het werk van

H. Roth en de Russische leerpsychologie. Duidelijk wordt onder meer dat actuele ideeën niet altijd nieuwe ideeën zijn!

In de derde plaats wordt ingegaan op belangrijke algemeen didactische theorieën en modellen. Omdat de Nederlandse didactische theorieën en modellen hiermee raakvlakken vertonen wordt in dit verband vooral gerefereerd aan Duitstalige literatuur. Speciale aandacht wordt besteed aan de betekenis van deze theorieën en modellen in relatie tot de onderwijspraktijk.

In de vierde plaats wordt aandacht geschonken aan de discrepantie die (nog steeds) wordt geconstateerd tussen didactische theorie en didactische praktijk. Ingegaan wordt op een aantal oorzaken hiervoor en op enkele perspectieven om aan dit probleem het hoofd te bieden, waaronder het onderwijzen op basis van 'recepten' en 'alledaagse didactiek'. Beide perspectieven worden besproken en van commentaar voorzien. Onderwijzen als specifieke vorm van 'handelen' wordt naar aanleiding van deze bespreking gezien als een geschikt alternatief. Reflectie als opleidingsprincipe en het didactisch arrangement van dit principe maken een belangrijk deel uit van de interpretatie van onderwijzen als vorm van handelen.

Na dit historisch gedeelte wordt nader uiteengezet op welke wijze het op handelingstheorie gebente methodologische principe van holisme is vorm gegeven. Daarvoor is - weliswaar voorlopig - gebruik gemaakt van systeemtheoretische inzichten, die in staat stellen de complexe werkelijkheid op een bepaalde wijze te reduceren tot een overzichtelijke structuur. Tezamen met gegevens uit het vooronderzoek hebben deze inzichten geleid tot een heuristisch model voor onderzoek naar het didactisch handelen van instructeurs. Voor de inhoudelijke invulling van dit model is tevens gebruik gemaakt van de didactische theorie van Heimann en Schulz, aangevuld met inzichten vanuit de zogenaamde 'kritische didactiek'. Dit model, dat primair een structuurmodel is, is aangevuld met een procesmodel dat het didactisch handelen faseert in planning, uitvoering en reflectie. Binnen dit procesmodel zijn de aandachtspunten voor onderzoek hoofdzakelijk ontleend aan recent onderzoek van het onderwijzen.

In hoofdstuk 4 wordt het onderzoek naar het didactisch handelen van instructeurs en het onderzoek naar percepties van studenten geïllustreerd. De aan deze onderzoeken ten grondslag liggende uitgangspunten zijn beschreven in hoofdstuk 2.

Het onderzoek naar het didactisch handelen van instructeurs (n = 29) richtte zich op de beantwoording van vragen met betrekking tot:

- kenmerken van de taakomgeving van instructeurs en de invloed van deze kenmerken op hun didactisch handelen;
- kenmerken van het agrarisch praktijkschoolonderwijs in het algemeen en van het geven van praktijklessen in het bijzonder;
- de aard van via reflecties toegankelijke subjectieve theorieën van instructeurs;
- suggesties voor de ontwikkeling van een in-service programma naar aanleiding van het onderzoek naar de hiervoor genoemde aspecten.

Voor het verzamelen van de gegevens is gebruik gemaakt van een combinatie van onderzoeksmethoden en -technieken, te weten: gestructureerde open interviews, observaties, context-gebonden retrospectieve interviews en logboeken. De verwerking van de gegevens vond gefaseerd plaats: ruwe gegevens werden achtereenvolgens gesegmenteerd in protocollen, gesystematiseerd met behulp van schema's en daarna geïnterpreteerd. Dit proces van verwerking van gegevens kenmerkte zich door reductie en indikking. Een samenvatting van onderzoeksresultaten beperkt zich in hoofdstuk 4 tot een weergave van relevante kenmerken van de taakomgeving en hun invloed op het didactisch handelen van instructeurs, dit didactisch handelen zelf en daaruit afleidbare kenmerken van het agrarisch praktijkschoolonderwijs. Over de aard van de reflecties van de betrokken instructeurs en het ontwikkelde in-service programma wordt gerapporteerd in hoofdstuk 5.

Het onderzoek naar percepties van studenten (n = 381) moet worden gezien als een aanvulling op het onderzoek naar het didactisch handelen van instructeurs. Aan de hand van een op basis van handelingstheoretische inzichten ontwikkeld model werd achtereenvolgens getracht inzicht te verkrijgen in:

- de wijze waarop studenten van middelbare en hogere agrarische scholen de onderwijsleersituatie percipiëren;
- de samenhang tussen voorwaarden, de onderwijsleersituatie en het leereffect van het agrarisch praktijkschoolonderwijs.

Verzameling van de gegevens vond plaats met behulp van een voorgestructureerde gesloten vragenlijst, bestaande uit items waarop volgens een vijf-punts schaal gescoord werd. De verwerking van de gegevens geschiedde zowel per item als per cluster van items. Aan de hand van de resultaten konden eerder verkregen inzichten naar aanleiding van het onderzoek naar het didactisch handelen van instructeurs onder andere worden aangevuld, aangescherpt en gecorrigeerd.

Hoofdstuk 5 gaat nader in op de aard en de inhoud van de reflecties van de bij het onderzoek betrokken instructeurs. Ten behoeve van de analyse van reflectie als fase van het onderwijzen wordt een onderscheid gemaakt naar empirisch-theoretische reflecties enerzijds en normatief-theoretische reflecties anderzijds. De eerstgenoemde reflecties zijn reflecties naar aanleiding van wat wel en wat niet goed ging tijdens de gegeven lessen. Reflecties betreffende 'wat goed ging' blijken overwegend concreet van aard te zijn en direct betrekking te hebben op de gegeven lessen. Reflecties betreffende 'wat niet goed ging' blijken daarentegen veelvuldig de concrete lessituatie te overstijgen.

Empirisch-theoretische reflecties worden zowel in algemene als in specifieke bewoordingen geformuleerd. In het algemeen geven empirisch-theoretische reflecties veelal aanwijzingen over waarom iets wel of niet goed ging.

Normatief-theoretische reflecties zijn reflecties met betrekking tot gewenste veranderingen. Ze verwijzen naar doelen of toekomstvoorstellingen die soms leiden tot aanpassing van lessen, maar vaak ook niet. In dit laatste geval, zo is gebleken, speelt met name de taakomgeving een belangrijke rol.

Vervolgens vindt een analyse plaats van reflectie als informatiebron (voor de onderzoeker). Reflectie in deze zin verwijst naar onderliggende motieven of redenen van onderwijsgeveden om zus of zo te handelen. Er is sprake van subjectieve theorieën of praktijktheorieën die (1) abstract en algemeen zijn, (2) het 'modelmatige midden' of blauwdrukken voor het handelen representeren en (3) handelingsnabij of specifiek van aard zijn. Idealiter vormt deze driedeling een cognitieve structuur waarin subjectieve theorieën sequentieel en hiërarchisch zijn geordend. Hun samenhang kan zowel regulatief ('top down') als constitutief ('bottom up') zijn. Inconsistenties in deze samenhang lijken onder meer veroorzaakt te worden doordat subjectieve theorieën een onvoldoende empirische basis hebben of onvoldoende zijn doordacht vanuit een objectief theoretisch perspectief. Voorts is duidelijk geworden dat slechts weinig bij het onderzoek betrokken instructeurs beschikken over algemene en abstracte theorieën over leren en onderwijzen. Het 'modelmatig denken' lijkt mede daardoor bij veel instructeurs intuïtief van aard te zijn; naar verhouding handelen velen op basis van didactische principes, vuistregels of 'recepten' die men zich op een niet-autonome of op een via overlevering gebaseerde wijze heeft eigengemaakt. Deze en andere bevindingen, evenals het gegeven dat veel instructeurs geen lerarenopleiding hebben gevolgd, hoeven niet noodzakelijk samen te hangen met 'slecht' onderwijzen. Wel leidt het onderwijzen als gevolg van inconsistentie in de cognitieve structuur vaker tot inadequaat onderwijzen of tot onderwijzen met onbedoelde effecten.

Conclusies als hiervoor vermeld bevatten belangrijke suggesties voor de ontwikkeling van een didactisch in-service programma, dat gericht diende te worden op het vergroten van de handelingscompetentie en op het doorbreken van bestaande routines. In hoofdstuk 5 wordt beschreven met behulp van welke handelings theoretische begrippen dit programma is ontwikkeld. Essentieel is dat dit programma voldoet aan de criteria van ecologische relevantie en theoretische referentie. Het eerste criterium houdt in dat het programma afgestemd moet zijn op de eigen onderwijssituatie van de betrokkenen. Met het tweede criterium wordt bedoeld dat objectieve kennis in het programma wordt opgenomen. In het ontwikkelde programma heeft deze objectieve kennis betrekking op het 'modelmatige midden' om aan het handelen concreet vorm te geven en meer algemene theorie omtrent leren en onderwijzen om gemaakte keuzes te kunnen legitimeren.

Hoofdstuk 5 besluit met de weergave van enkele problemen en perspectieven met betrekking tot onderzoek naar reflecties van onderwijsgeveden. Aandacht wordt achtereenvolgens besteed aan (1) de diagnose van reflecties, (2) de relatie tussen motieven en reflectie, (3) de verschillen tussen mensen in hun bekwaamheid, waar nodig pas op de plaats te maken en met enige distantie naar hun dagelijkse werkelijkheid te kijken, en (4) aan het gebruik van metaforen door leerkrachten. Deze vier problemen en perspectieven, zo wordt gesteld, bevatten relevante implicaties voor hedendaags onderzoek van het onderwijzen.

Hoofdstuk 6 handelt over methodologische en methodische aspecten van het onderzoek naar het didactisch handelen van instructeurs. In de eerste plaats

wordt ingegaan op hoe de informanten hun deelname aan het onderzoek hebben ervaren. In het algemeen heeft men de deelname als positief, nuttig en leerzaam ervaren. Door geen der betrokkenen lijkt bewust informatie achtergehouden; een aantal van hen gaf nadrukkelijk aan zelfs over zaken te hebben gesproken waar men meestal liever niet over praat. Dat men dit toch deed was omdat men geen afbreuk wilde doen aan de kwaliteit van het onderzoek. Ook de observaties van de praktijklessen zijn door geen der informanten als echt storend ervaren: doorgaans handelden zowel instructeurs als studenten zoals ze gewend zijn. Enigszins anders was dit met het bijhouden van het logboek. Herinneringen van later gegeven lessen bleken onder andere te interfereren met die van eerder gegeven lessen. Voorts bleek het niet voor ieder even eenvoudig te zijn om ervaringen op beknopte wijze te noteren. Het logboek fungeerde voor veel instructeurs als een bewustwordings- en veranderingsbron. Enige voorstructurering van het logboek vooraf werd door de meeste instructeurs als positief ervaren.

De gevolgde onderzoeksstrategie impliceerde talrijke overwegingen en keuzes in verband met de objectiviteit, betrouwbaarheid en validiteit van de onderzoeksresultaten. Objectiviteit wordt in het onderzoek naar het didactisch handelen van instructeurs opgevat als gedisciplineerde subjectiviteit en wetenschappelijke eerlijkheid. In het kader van interpretatief onderzoek wordt in dit verband veel waarde gehecht aan de objectieve status van theorie.

Voor wat betreft de betrouwbaarheid van de onderzoeksresultaten wordt een onderscheid gemaakt tussen interne en externe betrouwbaarheid. Ten behoeve van beide vormen van betrouwbaarheid zijn diverse procedures gerealiseerd. Ditzelfde geldt voor de interne en externe validiteit van de onderzoeksresultaten. In het algemeen kan worden geconcludeerd dat er geen aanwijzingen zijn op grond waarvan aan de betrouwbaarheid en validiteit van de onderzoeksresultaten moet worden getwijfeld; er is sprake van zowel betrouwbare als valide onderzoeksresultaten vanuit het perspectief van interpretatief onderzoek en de uitgangspunten zoals die zijn beschreven in hoofdstuk 2.

Aan enkele methodologische kwesties wordt in hoofdstuk 6 nader aandacht besteed, te weten: de status van het gezichtspunt van het handelend subject ('the actor's point of view') gerelateerd aan het belang van het doen van onderzoek naar praktijktheorieën, het stellen van 'waarom-vragen' voor het achterhalen van motieven of redenen van informanten en de rol van de onderzoeker in interpretatief onderzoek dat gebaseerd is op handelingstheoretische uitgangspunten.

Deel III

Het derde deel van deze studie bestaat uit hoofdstuk 7, waarin voorstellen worden gedaan voor een verbeterd handelingstheoretisch paradigma met betrekking tot onderzoek en ontwikkeling van het onderwijzen. Allereerst worden echter de in hoofdstuk 2 gestelde vragen voor reconstructie beantwoord, niet in de zin van goed of fout maar in interpretatief-evaluatieve zin.

Ten aanzien van de eerste vraag, die betrekking heeft op de geschiktheid van handelingstheorie voor onderzoek van het onderwijzen, wordt geconcludeerd dat deze theorie een waardevolle heuristische functie heeft voor pogingen de complexiteit van het onderwijzen te begrijpen en te beschrijven. De meerwaarde van het gebruik van handelingstheorie in het domein van het onderwijzen heeft onder andere betrekking op de rol van de onderwijsgevende in het onderzoek, het proces van onderwijzen, hoe dit onderwijzen geleerd kan worden en de eisen die daarbij gesteld kunnen worden ten aanzien van reflectie en professionele groei.

Ten aanzien van de tweede vraag, die betrekking heeft op de relatie tussen onderzoek en ontwikkeling in het domein van het onderwijzen, wordt gesteld dat de 'stem van de practicus' onder bepaalde voorwaarden essentieel is om bij te kunnen dragen aan de overbrugging van de kloof tussen theorie en praktijk. Daarbij wordt het belangrijk gevonden dat onderzoek praktijkgericht is en dat daaraan nadrukkelijk een innovatie-theoretisch perspectief is gekoppeld.

Ten aanzien van de derde vraag, die betrekking heeft op het begrijpen van de complexiteit van het onderwijzen door middel van interpretatie, wordt vooral aandacht besteed aan praktijktheorieën in verband met de betekenis van desbetreffende onderzoeksresultaten voor de praktijk. Gewezen wordt op de noodzaak van een 'wetenschappelijke omweg' om de praktijk op verantwoorde wijze behulpzaam te kunnen zijn; in dit verband spelen overeenkomsten en verschillen in de perspectieven van onderzoeker en actor een belangrijke rol. Met betrekking tot onderzoek van het onderwijzen wordt in verband met de complexiteit van het betrokken fenomeen de voorkeur gegeven aan intensieve boven extensieve benaderingen.

Het resterende gedeelte van hoofdstuk 7 handelt over perspectieven naar aanleiding van problemen die tijdens de reconstructieve studie zichtbaar werden. Aandacht wordt vooral besteed aan de relatie tussen de cognitieve en motivationele kant van intentionaliteit en aan handelingstheoretische begrippen gekoppeld aan een concreet perspectief voor het leren onderwijzen. Ook wordt beklemtoond om - gerelateerd aan het ontwikkelde in-service programma - het beoogde innovatie-theoretisch perspectief expliciet in te bedden in de context van de school waar de deelnemers aan het programma werkzaam zijn. Deze perspectieven, alsmede het belang van onderzoek in de diepte, zouden in het kader van de ontwikkeling van een research-programma in een eventueel vervolgproject nader uitgewerkt moeten worden.

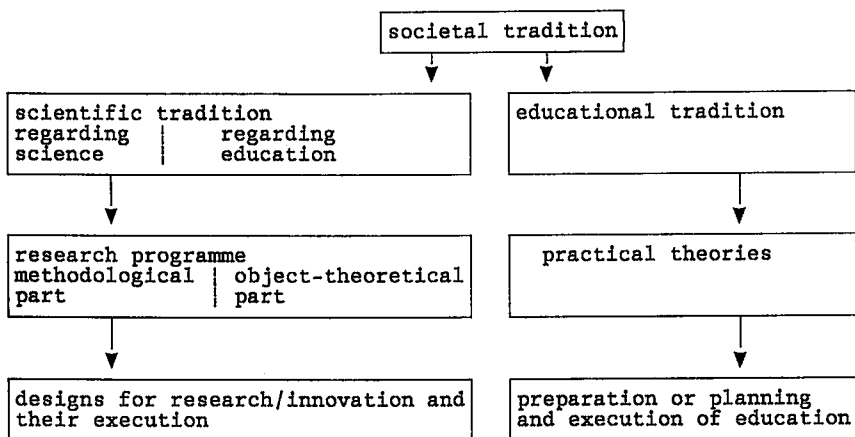
NOTES

- (1) Based on a study of Lakatos (1970), a research programme can be defined as the result of a series of mutually relieving theories, which all possess the same 'hard core'. This core is surrounded by a variable 'protective belt' consisting of auxiliary hypotheses; these are the normal focus of empirical work. Furthermore, the programme possesses a positive as well as a negative heuristics to stimulate or to reject certain avenues for research. According to Koningsveld (1976) Lakatos' methodology of research programmes can be interpreted as a refinement of the work of Kuhn (1970), who introduced the paradigm concept. Among other things, differences between both particularly refer to the growth and falsification of knowledge or theory.
- (2) In the eleven Dutch training centres for practical agricultural education, the educational personnel is called 'instructional' personnel. The instructors possess a different status from teachers in regular (agricultural) schools. Formally, until January 1986 instructors were not obliged to follow any educational programme to prepare themselves for their teaching tasks. To the principals of the schools and the Department of Agricultural Education of the Ministry of Agriculture and Fisheries in The Netherlands, this situation led to a shared concern about the quality of the practical education in the centres. For this reason, the Department of Education and Teacher Training of Wageningen Agricultural University, nowadays called the Department of Agricultural Education, was requested to contribute to the improvement of the instructors' teaching capabilities by means of research and development. Currently, and partly based on the results of the project under consideration, all new instructors have to follow the didactical in-service training programme as a prerequisite for obtaining a permanent appointment.
- (3) Until recently little or no scientific attention was paid to vocational education, including agricultural education. This indicates why most of the educational investigators did not and do not focus on this area. Moreover, most educational scientists are interested in aspects of primary and general education, including the training of teachers for these types of education. Due to the problematic relationship between education and the labour market, however, there has recently been an increasing scientific interest in vocational education. Despite these developments in educational research, it cannot be denied that the practical training centres for agricultural education in The

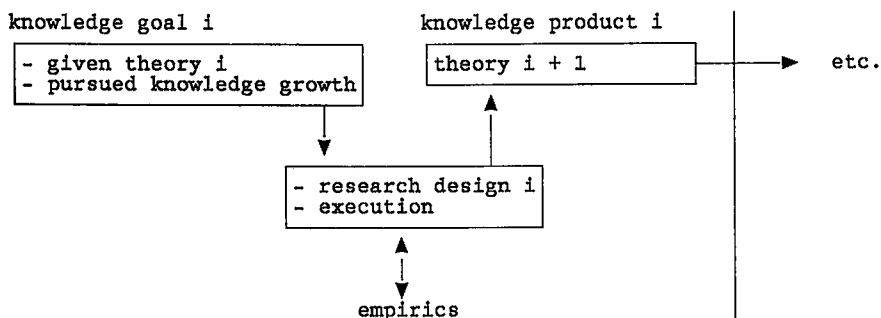
Netherlands form a rather unique, though valuable educational phenomenon (cf. Ashcroft, 1985). Together they are a vital part of the Dutch agricultural education system (Segeren, 1984; Beijgaard, 1985).

- (4) For a comparative study of practical teaching by instructors in institutions related to practical training centres, a study-visit was undertaken to the United Kingdom to study the British agricultural education in general and the training of instructors in particular. In general the instructors are trained to instruct by the Agricultural Training Board in Stoneleigh. The courses this Board runs are extensively described in a report (Beijgaard and Ettema, 1985). The training philosophy of the Board is based on the concept of using instructors from industry, who are experts in the subject in question and practiced in the skills they are teaching. Together these instructors run nearly 20,000 courses a year on 800 subjects, each with an average of one instructor for six trainees. The objective is that at the end of every course, which mostly takes place in the farmyard or the field, the trainees not only have theory, but also have experience in carrying out a task. To do their job well the instructors must have a high degree of technical know-how and they must be able to instruct. Having established several instructional techniques courses, which are continually developing and expanding, the Agricultural Training Board ensures this instructional ability. The instructors can take basis courses, but the Board also organizes updating courses for them.
- Furthermore, in Germany there exist 'Deula-Schulen', the predecessors of the Dutch practical training centres. Nowadays these German 'practical training centres' have an educational function as well as a function in the field of extension. In some of the Dutch practical training centres there is also a noticeable tendency towards an extension function in so-called 'information centres' (Beijgaard, 1985). However, to the instructors of the 'Deula-Schulen' a pedagogical and didactical training programme is also offered (Deula-Leitung, 1986). This programme is of a general nature and emphasizes the learning of teaching skills less than the British programmes mentioned before.
- In The Netherlands several industrial companies were visited, including institutions for several forms of apprenticeships with the emphasis on the way they prepare practical instructors for their guiding tasks in the field of industry (cf. SOLLT: apprenticeship for agriculture and horticulture, 1985; Buijs and Rijkers, COLO: national institute for education of trade and industry, 1985).
- (5) Habermas writes only a little about reconstruction in the preface and introduction of his 'theory of communicative action'. This work was originally published in German in 1981, entitled: 'Theorie des kommunikativen Handelns'.

- (6) It should be noticed, that this limitation is also recognized by Hetebrij himself in the last chapter of his book (cf. Hetebrij, 1983, 335).
- (7) In this context Wardekker (1986) makes a distinction between two traditions in social sciences, namely: the observers-model, which corresponds with the empiric-analytical approach, and the participants-model, which corresponds with the interpretative approach. By the observers-model social reality is approached just like the physical reality. In this approach reality is considered as essentially independent of ideas and actions of human beings: reality is ruled by laws or, at least, by lawlike connections. Human actions do not exert a fundamental influence on these connections. The knowledge the social scientist produces, however, can be used to make human actions more efficient.
- The participants-model conceives the social reality as different from the physical reality, and exists only by virtue of and on the basis of ideas and actions of human beings. Laws do not rule the life of human beings, but human beings create their own 'laws' and hence they are able to change their reality. Knowledge is obtained by being in search of ideas and actions of human beings in a certain field of reality. Ultimately, the scientist - as a human being - can be seen as a participant.
- Because science and education originate from the same 'basic notions', it is possible to make a similar distinction between two educational traditions. Wardekker distinguishes the equipping-model of education, which emphasizes the child's development as highly contingent (for example not predetermined and thus particularly dependent on the contents of education), and the unfolding-model of education, which places the emphasis on the child's development as being highly determined. Within the latter model the 'naturalistic variant' emphasizes biological determination, whereas the 'social variant' emphasizes the influence of the social environment.
- (8) The similarity of traditions in educational science and education is represented by the following figure (Wardekker, 1986, 38):



- (9) A reconstruction, though limited to and based on one project is also able to contribute to the development of theory. This can be represented as follows (Hetebrij 1983, 143):



In this figure a theoretical surplus value ($i + 1$) is demonstrated (by means of reconstruction) based on one project. In theory this process can be repeated many times ($i + 1 + \dots n$), and is of a cyclic nature.

- (10) These considerations regarding the implementation of innovation also played a part in giving rise to the 'teacher thinking paradigm' (see section 1.1). In my opinion, and in anticipation of the rest of section 2.2.1, these considerations have a more complete theoretical basis in an action theoretical conception, because this conception better enables an investigator to study the complexity of the educational reality (cf. de Corte and Lowyck, 1983; Lowyck, 1984).
- (11) It should be noticed that intentionality and intending to act are not the same. In fact, intending to act or to do something is, like an intention, only one kind of intentionality among others. It should also

many conscious states are not intentional, for example a sudden sense of elation, and many intentional states are not conscious, for example having beliefs one is not thinking about at present and one may never have thought of (this can be called an example of a so-called matter of course) (cf. Searle, 1983). In connection with this distinction between intentional and conscious states, van Parreren (1986) distinguishes four levels of intentional behaviour. According to him it is questionable whether at the lowest level an activity is accompanied by any form of awareness. This level of behaviour is found with microorganisms when they respond to physical qualities of the environment (e.g. temperature). At the second level there is awareness of a goal as a perceived object; there is no conscious anticipation on achieving or avoiding a situation. It is questionable to speak of behaviour in terms of acting at this level. Intentional behaviour at the third level is marked by a conscious anticipation in the form of representational and/or symbolic activity. Cases like these are characterized by behaviour or actions which are prepared or planned in a preceding phase. At the fourth and highest level, the subject reflects on his own actions and, in some cases, also on his own person as actor. Van Parreren calls this conscious form of acting and deciding to act intentional actions. At this level there is awareness which has a bearing upon real or imaginative moments of situations, which can be called unreflecting awareness, and awareness which also has a bearing upon the acting subject, the actor himself. The latter kind of awareness can be called reflecting awareness marked by self-consciousness.

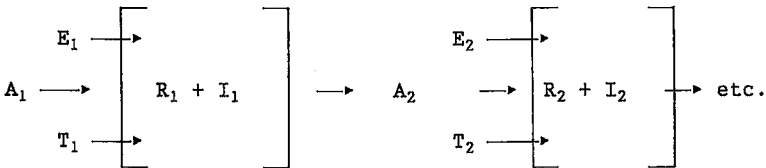
According to van Parreren (1986, 25) also adults still act at all these levels: with respect to ontogenesis it is important to notice that the lower levels do not disappear at more advanced stages of development; but higher levels are added.

- (12) Based on research on teaching, cognitions may for example be ordered according to their (Peters et al., 1983; Peters, 1984a and 1984b):
- nature or kind: general (abstract cognitions distant from acting), model-like (cognitions regarding the middle level or 'blue-prints' for acting), and specific (concrete cognitions close to acting);
 - content: empiric-theoretical (cognitions representing one's image of one's own or existing situations), normative-theoretical (cognitions representing one's image of the desirable situation), technological (cognitions to bridge the gap between the existing and the desirable situation: cognitions which represent the didactical repertoire), and determining (cognitions regarding the achievement of one's image of one's own situation: cognitions which represent goal achievements);
 - function: legitimating (cognitions regarding the 'why' of acting), guiding (cognitions regarding the 'how' and 'what' of acting), controlling (cognitions regarding discrepancies and congruences of

controlling (cognitions regarding discrepancies and congruences of acting), and interpretative (cognitions regarding oppositions of aspects of the intentionality, respectively the evaluation of the intentionality).

The functions of cognitions mentioned above can be qualified as functions of reflection on acting, which is, in turn, a function of intentionality. In a certain way, the functions of cognitions correspond with the phases of teaching, namely: the planning and execution of teaching and learning processes and the reflection on both these teaching phases (cf. Peters, 1984a and 1984b).

- (13) Until recently, research on teaching too seldom considered the teacher's personality as a variable, while, actually, teaching cannot be considered apart from the personality: personal conditions support or obstruct certain teaching attitudes (cf. Urban, 1984).
- (14) Van Parreren makes also a distinction between an internal and external state of an action, or between a mental and material activity (Leont'ev, 1980). Following the description of an action (see section 2.1), however, this distinction does not seem to be a useful one, it is self-evident that both factors are involved.
- (15) Pijning has developed this scheme for the representation of motions based on action theoretical starting-points, which also include the influence of personal and environmental aspects.
- (16) In this context 'epistemological' means that the subject possesses (intuitive) theories of reality, which he tests with concrete experiences. "By doing so, the person acts analogously to the scientist, because he generates hypotheses and tests them in reality" (Ulich, 1980, 92). As a consequence, cognitions are the object of study and the reconstruction of their structure takes place parallel to the structure of scientific theories.
- (17) Derived from Stroomborg et al. (1983) a learning process by adults may be represented as follows:



In this figure A_1 refers to acting at the beginning of a course, E_1 to the experience belonging to this acting; T_1 is the theory, R_1 the reflections, I_1 the improvement, etc.

- 18) In connection with this, I draw attention to an already old methodological issue concerning the fact that our observations or perceptions are never detached: "All knowledge is theory-impregnated, including our observations" (Popper, 1972, 71).
- (19) Lowyck et al. (1985) describe both kinds of research as different from each other. In the context of action theoretical research, however, I prefer to integrate both of them into one research design. It has to be clarified that research which emphasizes cognitive processes refers to verbalizations as such as well as to verbalizations with reference to external observable behaviour.
- (20) Usually the first and third phase are made explicit in interpretative research, namely phase one when research questions and methods are explained, and phase three by means of 'checks' on the reliability and validity of research results. It is of a great importance that attention is also paid to phase two, for example by encoding and scheduling data (cf. Miles and Huberman, 1984).
- (21) Neumann's (1987) fundamental objections against quantitative approaches are the following:
- the sophisticated mathematical and statistical tools of quantitative approaches only work properly under conditions which are very seldom realizable in research designs;
 - a theoretically interesting question is often reduced and transformed so that the hypothesis finally fits in a strict empiric-deductive modelling and is thus able to be analyzed in the procedures of quantitative-statistical methodology;
 - the reciprocal actions, processes of communication and generally the interpretive character of social interactions are not made sufficiently clear or understandable.
- As a consequence, Neumann emphasizes ethnographic and ethnomethodologic approaches which made important contributions to the methodological arsenal of qualitative research.
- (22) This may also be called a broad spectrum vision, which does not necessarily need to be limited to a qualitative method of data collection (cf. de Corte, 1982, 24).
- (23) Vygotskij lived from 1896-1934. His work was neglected during the government of Stalin as a consequence of his research attempts to show how man's acting is influenced by cultural factors. His rehabilitation occurred in later years. Nowadays his work is considered of great importance for educational theory and practice.

- (24) Both authors extensively analyse and describe the features of the socio-cultural-historical theory. Particularly van der Veer (1985) pays much attention to the original publications of Vygotsky and recent empirical research inspired by these publications. In the last chapter of his book van der Veer concludes that the socio-cultural-historical research programme meets Lakatos' (1970) demands with regard to the 'hard core' of a research programme consisting of a positive as well as a negative heuristics. In imitation of Wardekker (1986), however, it is also legitimate to speak about the socio-cultural-historical school of thinking in terms of a scientific tradition (see also chapter 1).
- (25) The differences between cognitive and action psychology concern particularly the following assumptions belonging to action psychology: the culture-historical determination of action structures and the conception of learning by 'interiorization' by way of a social and communicative process on the basis of (externalized) objects (Simons, 1987, 68). More precisely, in comparison with cognitive (American) psychology the socio-cultural-historical (Soviet) psychology can be characterized as more oriented or integrated theories, more philosophical, more genetic (developmental), more teacher/treatment oriented and more focused on cooperative learning (de Leeuw et al., 1986, 29). Furthermore, the individual is less emphasized in connection with the culture-historical determination expressed in rule-guided actions.
- (26) In this context Brezinka (1984) also needs to be mentioned, who analysed different meanings of the ways the word 'model' is used. At theoretical as well as metatheoretical level Brezinka found 15 different meanings with regard to education. As a result of his analysis it can be concluded that there exists no generally accepted conception of a model. Moreover, it is often difficult to identify the meaning of a model in a certain context; in many contexts the word model is used as a matter of form. Brezinka argues that it is legitimate to use the word model only in terms of an imitation or a duplicate in connection with the original: the first presupposes the second. Generally, the main feature of a model concerns its representation of something.
- (27) In this section it is not useful to describe general didactical models and theories in detail. This has been done in my second project report (Beijaard, 1986) based on studies of Ruprecht et al. (1976), Blankertz (1977) and Gudjons et al. (1981). However, in section 3.4 more attention is paid to (aspects of) some of these models and theories.
- (28) Action theory in itself is also of a more holistic nature than other theoretical approaches, because it pays attention to (internal and external) behaviour as well as factors which determine this behaviour. An action is intended by an individual (has meaning and sense), but also

determined (an occurrence influenced by all kinds of external factors). This implies a 'molar' conception of behaviour and, hence, a less reductionistic (or more holistic!) approach than a 'molecular' approach proper to, for example, natural sciences (cf. van Parreren, 1987).

- (29) Many of these publications are derived from the 'Maandblad voor het Land- en Tuinbouwonderwijs', a monthly magazine about and on behalf of the agricultural education in The Netherlands. These publications are of a non-scientific nature; though contain a lot of information. In the project report (Beijaard, 1985) I refer to these publications. This will not be done in this section.
- (30) Strictly speaking, 'instruction' refers to closed teaching and learning processes based on behaviourism as a scientific approach (compare for example learning by programmed instruction). Generally, learning processes based on principles of behaviourism are characterized by a connection between stimuli and responses (cf. de Corte et al., 1981). Learning theories of this nature can be criticized because of their negation of what is in the learner's mind in the period between a stimulus and response.
- (31) Strongly prestructured instructional leaflets result in closed learning processes, because the tasks to be executed by students are well-prescribed. Instructional leaflets of this nature reduce a teacher's task to a management task. Almost unstructured instructional leaflets are, on the other hand, characterized by open learning processes within which tasks depend on the teacher, students and momentary situations. In this sense it is not correct to speak of instructional leaflets.
- (32) In this context there is talk of didactics according to recipes (cf. Grell and Grell, 1979), which was rejected in the sixties as being non-scientific. Such a kind of didactics becomes normative for acting and implies a certain vision of reality, which obstructs the perception of factors which really play a part in education (Blankertz, 1977).
- (33) On behalf of practice-oriented research van Strien (1975) has developed an alternative strategy, the so-called 'regulative cycle' which roughly consists of the following phases: problem, diagnosis, plan, intervention, evaluation. In comparison with de Groot's (1975) research strategy, van Strien (1986) argues that his regulative cycle is a more suitable scheme which better enables a scientist to handle reality in an active and changing way. The individual character of this way of thinking about practice can be summarized as follows (van Strien, 1986, 18 ss.):

- the thinking process is not of a generalising but of an individualising nature; theoretical notions of a general tendency play a part when giving an opinion about the individual;
- thinking about practice does not result in scientific statements but in scientifically guided actions or interventions in situations;
- the intervening actions are guided by norms about well-being, admissible behaviour, societal order, etc.

It should be noticed that van Strien does not see nomology and hermeneutics as opposite to one another. They, however, represent two different ways of thinking. According to van Strien (1986, 100) it is, though from an outsider's perspective, possible to consider hermeneutic insights as knowledge which can be made objective.

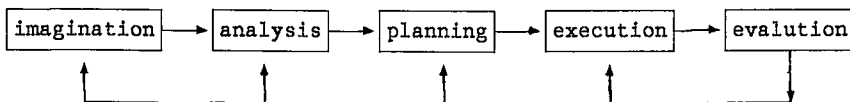
- (34) A 'course-member week' refers to a course-member's presence of one week. It occurs, for example with short running courses, that two or more course-members together form one course-member week. In reverse it is also possible, for example with long running courses, that one student forms several course-member weeks. The term was introduced by the Ministry of Agriculture and Fisheries to call the practical training centres to account for their available educational personnel (see also Beijsaard, 1985).
- (35) Based on their information processing model, Ericsson and Simon (1984, 30) are optimistic about the relationship between verbal reports and cognitive processes with reference to their study of the work of authors who have judged verbal reports sceptically. In connection with this they speak about apparent inadequacies, which, at the same time, can be perceived as a challenge for verbal reports.
- (36) However, Broeckmans (1987) argues that prestructured logbooks can also lead to incompleteness and, subsequently, be a threat to validity. For this reason he gave preference to retrospective interviews with reference to logbook notes. Personally I believe that this discussion could prove endless discussion and, therefore, that pragmatic decisions need to be made in order to complete the process of data collection.
- (37) These three activities can be summarized as follows:
- reducing data prior to the collection of data with regard to making 'analysis choices' (for example the formulation of research questions, the construction of methods, etc.) as well as during the collection of data (for example summaries, the coding of data, etc.);
 - presenting or scheduling data, that is to say "an organised assembly of information that permits conclusion drawing and action taking" (Miles en Huberman, 1984, 21);

- drawing and verifying conclusions: vague conclusions at the beginning are increasingly made more explicit, but they also need to be tested on their plausibility and validity.

According to Miles and Huberman (1984, 22) these analysis activities interact and can be presented cyclically.

- (38) As a result of choices made at the level of scientific traditions, there principally exists a difference between elucidating and understanding through interpretation (Smaling, 1987, 252). Whether or not understanding can be considered as elucidating also plays a part within action theory itself characterized by pluralism (see chapter 2, section 2.1, where, in imitation of Wigger (1983), a distinction was made between causal oriented action theory on the one hand and intentional action theory on the other).
- (39) In table 4.1 the total of 100% is exceeded because of rounding off percentages per observed lesson.
- (40) Van der Sanden (1986) and Schouten (1987) suppose that an efficient execution of a task implies the following processes:
- imagination: forming of a mental representation of the product to be made and its function;
 - analysis: distinguishing of partial tasks or problems, the translation of problems into technical terms;
 - planning (preparatory activities): determining the sequence of the actions to be executed;
 - execution: executing the planned actions;
 - evaluation: controlling all the activities and, as a result, their products.

This task analysis can be visualized as follows:



The scheme represents a rational process and implies that the execution of tasks is determined not only by psychomotor actions, but also by the quality of preceding and guiding cognitive processes.

I acknowledge the relevance of the scheme for research on practical learning, particularly from an information processing perspective. For the studying of practical learning in agriculture and from an action theoretical point of view, however, it fails:

- the model was emphatically developed for research on students' engendering of things, while, at practical training centres, it is mainly the handling of things which is emphasized;

- the model does not offer any perspective concerning the control and location of psychomotor actions and cognitive processes within an integrated curriculum of both the regular agricultural schools and the practical training centres;
- the model denies the influence of personal and situational aspects, which are important in an action theoretical perspective on learning.

(41) Maslow (1987), for example, writes that physical and emotional factors are often prerequisites for functioning well cognitively. In this context it must be noticed that instructors in practical training centres teach very different types of students (see also Beijgaard, 1986).

(42) At practical training centres orientating and standardized programmes are found most frequently. Nevertheless a substantial number of differentiated programmes were involved in the research because of a special interest in the relationship between the regular agricultural schools and the practical training centres. Differentiated programmes presuppose contacts between both types of schools.

(43) The composition of the clusters (aspects of the practice-week) took place by collecting the statements belonging to the same dimension of the research model. As a result of experiences during the completion of the questionnaire and some unexpected correlations between statements, the clusters had to be readjusted. Firstly, it appeared that a number of items could not be admitted into the clusters. Secondly, statements belonging to different dimensions of the teaching and learning process showed a coherence in such a way that the original clusters had to be changed.

Finally, the representation of the dimensions by the statements in a cluster was examined by a calculation of the reliability (Model Alpha). In a table this can be presented as follows (Kingma, 1988, 117):

Cluster (dimension, aspect)	Number of items	Cronbach's alpha
1. motivation and involvement in tasks	14	.72
2. instruction and guidance	10	.78
3. climate and atmosphere during the lesson	5	.77
4. learning effects	9	.73
5. organization of a practice-week	10	.52
6. boardinghouse	6	.36
7. actual connection between the two types of education	8	.56
8. desired connection between the two types of education	7	.55

The table shows that 14 items (statements) of the cluster 'motivation and involvement in tasks' cohere in such a way that, together, they

cover 72% of this dimension, etc. The 'boardinghouse' is an exception, that is to say that the items diverge or are not homogenous (compare for example an item about the quality of food with an item about the night's rest).

(44) Students are considered to be unanimous in their opinion when 80% or more attribute the same score to a statement.

(45) As a result of a lecture about major research findings (Beijaard, 1986) the principals of the practical training centres decided to study the research results in order to formulate five aspects each with regard to the instructors' immediate task environment connected with their practical teaching. Below these aspects are brought together in the form of questions and clusters.

- 1) The educational and didactical (general and subject-matter oriented) functioning:
 - how - based on an educational vision - can the individual instructors be stimulated to work as one school team?
 - how do general and subject-matter oriented didactics relate to each other and how - by means of in-service education - can more attention be paid to the latter?
 - to what extent can practical education be made more student-centred without affecting the quality of learning results? (considering this question presupposes a vision on practical teaching and learning).
- 2) The school organization and external relations:
 - how can the 'expensive' practical component, in terms of utilization and output, be as effective as possible in connection with preparatory activities of regular agricultural schools?
 - how can, now and in the future, the practical training centres maintain their innovative function?
- 3) The school organization and internal relations:
 - which criteria are important for a (more) structural execution of tasks by the educational coordinators in the schools?
 - in what way can tasks of the instructional personnel be lightened and, consequently, more room be created for in-service activities?
 - how can a good consultation and communication structure be set up so that, for example, 'complaints' of instructors are not only described in a research report?
 - how can the motivation and work satisfaction of instructors be encouraged by adapting to task differentiations and what are, in this context, advantages and disadvantages?
- 4) Criteria for the selection and appointment of instructors:
 - which criteria are available or can be developed on behalf of the appointment of instructors?

At a special meeting these questions were discussed intensively which resulted in an exchange of information, suggestions and ideas. It is unknown to what extent these really were implemented in practice.

- (46) For the development of this figure I was inspired by the work of Kleefmann (1985), who, among other things, in his study compares the work of Schutz and Habermas with one another from an action theoretical perspective.
- (47) This idea is derived from the idea of hierarchies in psychology. Harré et al. (1985), for example, discuss two types of hierarchies: constitutive hierarchies are built up from the bottom (parts of one level become the wholes of the next level), while regulative hierarchies refer to top down strategies in which highest-level goals determine subordinate goals right down to the steps necessary to complete some immediate task.
- (48) For those who are interested, de Vries (1988) gives an up-to-date description of these aspects. He also pays attention to some historical backgrounds of agricultural education in The Netherlands (see also Goudswaard, 1986).
- (49) With reference to these prerequisites de Jong (1988) writes that an inconsistent structure facilitates rationalizing in terms of glossing over or explaining away. According to him this can distort or retard the genesis of flexible and manoeuvrable routines and reflection on intentionality. Consequently, intentionality is then no longer an adequate 'criterion-instrument' (Peters, 1984b).
- (50) I hesitated to write down these examples, because it was not always possible to find the same metaphoric expressions in English dictionaries. In most cases, therefore, the original expressions are also written down in Dutch.
- (51) Because of two reasons the description of instructor perceptions is reduced to the first structured open interview (see appendix 1). Initially, the second interview (see appendix 5) was constructed in a similar way to the first one; consequently, there were no reasons to assume that instructors' perceptions about both interviews would differ from each other. Secondly, the latter interview took proportionally little time.
- (52) Originally it was planned that, in view of internal reliability, by way of samples taken at random a fellow investigator would independently analyse and interpret the collected data. Because of pragmatic reasons, however, this kind of investigator 'triangulation' could not be met.

- (53) Aspects of these qualities were also mentioned during a conference about action theory held in 1989 in Leusden (The Netherlands). These aspects emerged from a discussion about what characterizes an action theoretical research project.
- 54) In the research project under consideration, this task was completed by delivering lectures to the educational personnel of the different practical training centres, by informing the principals of the centres and representatives of the Ministry of Agriculture and Fisheries (see also note 45), and by publishing popularized versions of the research results in a monthly magazine for agricultural education in The Netherlands (the 'Maandblad voor het Land- en Tuinbouwonderwijs'; see also note 29). Publications appeared in the following numbers of this magazine: 27 (1985) 1, 29 (1987) 3, 29 (1987) 9, 30 (1988) 6.
- (55) For this reason, for example, it is not right to dismiss didactical models and theories as irrelevant to practice. This critique seems to be too general and may lead to precarious situations in teaching and teacher education, because it suggests that a teacher could plan and execute lessons without any reference to didactical models and theories. In addition, it is also wrong to presuppose that these models and theories often function as norms or prescriptions for acting (see also chapter 3, section 3.1.4), because most of these models and theories themselves possess empirical reference.
- (56) This danger, for example, is present in the work of Schuyt (1986) and Harré et al. (1985). According to the first author, an action has an implicative meaning: an action only has meaning in a certain system. Schuyt acknowledges that both the intentional meaning and the implicative meaning of an action are important. The former, because it informs us about the system of meaning that is handled (but which does not coincide with this system); the latter, because it provides us with explanations of actions that exceed the individual (they can be 'logically' explained from the way the system of meaning works; Schuyt, 1986, 53).
- Similar considerations are found with Harré et al. in their attempt to establish a psychology of action. Among other things, they make a distinction between behaviour, actions and acts. Behaviour refers to what just happens, action is similar to intended behaviour and act stands for the cultural integration of actions. It is impossible to decide what an action means independent of the culture in which it exists. In order to understand what people do, all three levels must be used. It is, for example, impossible to find the thought patterns behind social behaviour by studying only actions. It is necessary to identify acts. Furthermore, the relation between the three levels is important. A person, for example, can make the same movement and use it

for different actions intended for different acts. In addition, there are many kinds of acts that can be performed with the same action and there are many kinds of actions by which we can perform the same act. After this explanation and having given some examples, Harré et al. (1985, 86 ss.) elaborate their methodology in which the study of talk is of great importance.

Both the work of Schuyt and Harré et al. might possess implications for doing research (on teaching). However, as was written before, their work may also imply a danger when the 'implicative meaning of an action' (Schuyt, 1986) and 'act' (Harré et al., 1985) lead to a form of one-way thinking from the context to the individual.

- (57) It is questionable how far better demarcations and definitions can be given of the mentioned concepts when other disciplines are consulted, among which psychology (particularly social psychologists are interested in action theory), philosophy (e.g. Habermas) and - more in general - results of or developments in research on foundations of social sciences (for example studies concerning the work of symbolic interactionists, etnomethodologists and others). Despite the pluralistic nature of action theory, it might be expected that studies of these sources make the concepts mentioned more diffuse than they already are.
- (58) A lot of literature exists about problem solving and the steps to take during this learning process. Beijaard and Goffree (1986) consulted the way problem-based learning takes place at the State University of Maastricht in The Netherlands and adapted this view to learning to teach combined with the learning of subject-matter. Roth (1966), for example, writes about six steps which should be taken in order to execute a 'mature' action (see chapter 3, section 3.1.2). These steps - or 'other' steps to take during problem solving - might imply the basis structure of learning to act. In these steps the orientating, executing and controlling function of an action should be recognized.
- (59) Generally speaking, much attention is usually paid to the implementation of innovations or changes. The following phase, i.e. the phase of institutionalization, is less known. According to Van den Berg (1990), who can be seen as an expert in the field of educational innovation, less is known about this phase. With the institutionalization of an innovation or change he refers to the necessity of making decisions at school organizational level to ensure that an innovation or change is permanently integrated in educational practice. In this context schools should develop an adequate policy.

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GLOSSARY

- Abridged action.* Action in which the different functions, respectively phases of an action (orientation, execution and control) coincide as a result of a learning process.
- Action.* Core concept in certain models of man, emphasizing action as the essence of human activities and being defined as a cyclic process which consists principally of orientation, execution and control.
- Action competency.* Result of qualitative changes in the action structure. Action repertoire and action competency are strongly related: the latter forms empirical evidence for the former.
- Action orientation.* Exploration of the situation in order to identify possibilities to achieve a goal. In teaching, orientation is similar to planning in the preactive setting. Action control (in teaching: reflection in the postactive setting) may also function as an orientation in view of a subsequent action (see also action).
- Action repertoire.* Possibilities to act which are stored in memory and which, as it were, lie ready to be used. An action repertoire can be seen as an ordered possession of ways to act in certain situations (see also orientation basis).
- Action structure.* Concept that refers to a whole of partial actions, the way these are built up and related to one another, influenced by situational or contextual and personal aspects.
- Action theory.* Anthropological theory by which man is seen as a subject who reflectively strives for goals. He attributes sense to his own existence (intentionality), stimulated but also limited by his relation to objects in the world around and other people as well, i.e. the context (determination). Different action theorists often emphasize different aspects of this description, so that action theory is not a monolithic whole.
- Action validation.* Check on the practicability of verbalizations of the participants involved in the investigation.
- Actor's point of view.* Participant's knowledge, i.e. the subjective or practical theories of the subject involved in the investigation. As such, the participant's perspective plays an important part in action theoretical research.
- Automatic action.* Action which no longer needs to be guided by any cognitive activity. Automatic actions are the result of learning processes and elapse as 'occurrences'.
- Cognition.* See subjective theory. In fact, cognition encompasses the processes by which an individual comes to know and interpret. It also amounts to (a part of) one's knowledge.

Communicative validation. Possibility to check the investigator's interpretations of external observations by submitting these interpretations to the participants involved in the investigation.

Complexity. Characterization of an educational situation consisting of aspects of a teacher's personality, features of the task environment and students involved.

Conative. Refers to the will as a functional aspect of the mind, i.e. the motivational side of intentionality along with the cognitive side.

Context. This concept stands for the objective world around. A person's actions are regulated by the context, but at the same time they mould this context. Hence, intentionality and context interplay. The concept of context is a difficult one. It emphasizes that one's actions are historically and societally embedded. A teacher's task environment, for example, can be seen as a concrete specification of this context.

Domain of teaching. Teaching occurs in different settings, i.e. the preactive, interactive, postactive and extra-active setting. Together these settings form the domain of teaching. Teaching competency is expressed in these four settings.

Ecological validity. Concerns the study of actions in everyday situations, including the coercive effects these situations have on those actions.

Epistemological subject-model. Traditionally, epistemology has been defined as the theory of knowledge or as the philosophical study of the nature of knowledge. By the epistemological subject-model man is seen as a subject who acquires knowledge, which - in turn - influences his behaviour. Central theme of the epistemological subject-model concerns man's control over his environment.

Flexibility. The ability to adapt actions to changed needs and situations. Dependent on the situation, for example, a teacher must be able to handle different teaching and learning strategies. Like manoeuvrability, being flexible can be seen as an important aspect of teaching competency.

Hermeneutics. Strictly speaking, hermeneutics refers to the method of text interpretation. In a broader sense it refers to the theory and practice of interpretation and understanding ('Verstehen') in different kinds of human contexts. For research purposes, for example, it can be tried to detect the meaning underlying specific educational practices. The results of research are often given as interpretations, through which understanding is promoted (see also interpretative tradition).

Heuristics. The whole of concepts and rules which leads to making decisions about the design and the execution of research and, through that, eliminates other possibilities.

Holism. Theoretical perspective with method(ological) consequences for the designing of empirical research in order to do justice to the complexity of the everyday reality of a certain domain. This reality cannot be understood by studying merely the individual elements or 'atoms' composing the whole.

Idiographic. Related to the study of the individual, i.e. unique facts. Idiographic science is primarily concerned with descriptive interpretation.

Intention. An intention refers to a subject's goal or future image, which can be represented cognitively. An intention can be developed on the basis of a stock of knowledge, i.e. cognitions (see also subjective theory).

Intentionality. Core concept in the phenomenology. A person's intentionality consists of a cognitive and conative side. The former refers to one's knowledge, the latter to motivational aspects. Both sides of intentionality are interrelated.

Interpretation theory. The theory needed to relate the core part of the theoretical orientation to the research domain. The establishing of this interaction contains subjective choices of the investigator. In addition, interpretation theory helps an investigator to design concrete empirical research.

Interpretative tradition. Man is seen as a sense-making individual. Research based on this tradition is characterized by a commitment to understand human social phenomena from the perspective of the individual, i.e. how people define and interpret the world. Interpretative research is more descriptive than confirmatory research, because: (1) one of its purposes is to understand the inner perspective and meaning of actions and events of those being studied, and (2) words are the primary form of data which can often convey more subtle and deeper meaning than numbers. In essence basic notions of the interpretative tradition criticize those of the empiric-analytical tradition.

Knowledge ideal. Both the core part and the interpretative part of a research programme (see respectively theoretical orientation and interpretation theory) shape a certain knowledge ideal to strive after.

Levels of science. Increasingly specified frameworks (level of traditions, research programmes and empirical research) which define the meaning of concepts and, through that, determine what finally will be investigated by empirical research. These increasingly specified frameworks may also imply methodological and methodical consequences.

Manoeuvrability. Property of action structures referring to the ability to cope with variations without necessarily learning something new for that. These variations may, according to van Parreren (1983), concern the nature of a situation as well as the structure of an action itself.

Metaphor. In its communicative function a metaphor reduces undue information and unites information into recognizable images.

Nomothetic (nomological). Nomothetic science is primarily concerned with the development of general laws.

Object. Specification of a certain domain, systematically investigated by research.

Objective theory. Scientifically gained theory which must be distinguished from subjective theory because of its intersubjective and more elaborated nature. This distinction is essential, though not in terms of absolute priorities.

Objectivity. The explication of the investigator's choices involved in the research process; in this sense objectivity can be seen as explicated or

disciplined subjectivity. Through objectivity the investigator meets the demand that the research process and results are accessible for discussion by other investigators.

Orientation basis. The whole of knowledge and skills to develop a plan of action in view of an adequate execution of that action. From this perspective, an orientation basis is also relevant for the legitimation and interpretation of personal actions and those of other people.

Paradigm. Concept that has been (further) developed by Kuhn. It encompasses the whole of conceptions, norms and values as well as methods and techniques that are commonly shared by a group of scientists and guide the designing and the execution of empirical research concerning a certain domain. The concept is related to Lakatos' concept of 'research programme' which can be seen as a refinement of the concept of paradigm (see also research programme).

Practical teaching. The teaching of practical skills in agriculture, such as handling tools, using machines and implements, cutting a cow's hoofs, etc. This type of skill learning takes place in practical training centres. The teachers in these centres are called 'instructors'.

Practical theory. A personal theory, which can be seen as an integration of objective or scientific theory, everyday knowledge and knowledge based on personal experiences. Norms and values also form part of such a theory. Between practical theories of professionals in a certain field there exists a certain degree of similarity, but there will be always a personal or individual aspect to them, because practical theories are attuned to and stem from situations that are partly unique.

Practical training centres. The centres for practical training in agriculture are a substantial part of the Dutch agricultural education system. They offer practical courses to all kinds of students; these courses are organized around sophisticated equipment in order to contribute to the education of skilled people in the field of agriculture and related areas.

Practice-oriented research. Research that is practice-oriented should contribute to the solution of practical problems and to the development of theory. It is fundamental that such research is - as far as possible - connected with theory. On the other hand, an early reduction from theory must be avoided, though reduction itself is a sound scientific principle.

Process-product research. Research based on the empiric-analytical scientific tradition. In teaching this kind of research emphasizes the relationship between what teachers do in the classroom (the process of teaching) and what happens to their students (the product). Process-product research results in quantifications of performed teaching behaviour and student reactions by using categorical observation scales and control of variables.

Profession. Involves at least the following: (1) having some collective responsibility for determining the context and the standards of the work, (2) having some share in determining the conditions under which the work is carried out and (3) being responsible in some measure for the process and results of the work. A professional has a certain authority in a field,

which can be recognized by others of like interests, and a certain loyalty to this field.

Rationality. A trait which individuals or collectivities display in their thought, conduct or social institutions. Various features can be seen as marks of rationality, such as the justification of actions by a logic or consistent argumentation process governed by rules, criteria and guiding principles. In research, for example, this can be achieved by making an appeal to empirical findings and the way these are generated.

Reconstruction. Fundamental and plurally used concept. As a scientific method reconstruction refers to the realization of a surplus value with respect to the object of reconstruction. This method should, like other scientific methods, be made explicit and handled systematically.

Reflection. The ability of a person to 'think about' or to 'take distance'. Object of reflection are not only external data; a person is also able to make himself the object of reflection, including his thinking (see also reflexivity).

Reflexivity. Through reflexivity one's activities can be called actions. Reflexivity is a very general human quality and amounts to the act of thinking. This act can be defined as a function of intentionality, the context usually gives rise to it (see also reflection).

Research programme. Central concept of Lakatos' theory of science. A research programme encompasses the core and interpretative part of the theoretical orientation and generally describes properties of the research domain in terms of suppositions. A research programme contains heuristics that block certain ways of doing research and stimulate other ways, respectively, negative and positive heuristics. From this perspective a research programme also includes the concept of 'knowledge ideal' and methodical rules for doing research (see also paradigm).

Retrospection. Thinking or speaking about previous experiences. For research purposes this usually takes place immediately or shortly after the observation of behaviour in order to study underlying thoughts, often with the help of techniques like stimulated recall or context-embedded questions.

Routine. Recurrent pattern of behaviour that one performs fluently. A routine can be interpreted positively when it reduces cognitive load and expands the facility to deal with unpredictable elements of a task, and negatively in cases of standard behaviour due to a lack of acting alternatives (see also automatic action).

Scientific honesty. Synonym for objectivity and referring to the investigator's explication of the methods and techniques used as well as methodological rules and procedures.

Scientific tradition. A paradigm or research programme contains specifications of more general fundamental notions. Together these notions shape a scientific tradition. Among other things, they encompass a vision on man and science as well as on the relationship between both.

Socio-cultural-historical theory. This Soviet-Russian theory emphasizes that cognitive abilities and capacities are formed and constituted in part by

social phenomena. A theory of cognition, then, must be a developmental theory. The individual and personal presuppose the public and intersubjective. Hence, mental functions cannot be characterized independent of the interaction with the social environment.

Standard image of science. Generally accepted image of science based on the empiric-analytical tradition. In the form of a research strategy this image refers to the empirical cycle for doing research.

Subjective theory. Concept derived from cognitive psychology to emphasize personal or private theories which encompass, among other things, intentions and cognitions. Both concepts are related, but do not coincide (see respectively cognition and intention). In research on teaching both practical and subjective theories are considered as similar.

Tacit knowledge. Unarticulated or implicit knowledge which is present in and can stem from practical acting.

Teacher thinking research. Research that emphasizes teacher thinking is seen as a paradigm that focuses on teachers' personal reality interpretations. This paradigm starts from the teacher as a subjective theorist; with the help of retrospective and introspective methods and techniques, investigators attempt to gain insight into teachers' everyday teaching reality by reconstructing their beliefs, intentions, images, etc.

Teaching. Teaching should preferably be seen as a vocation in the sense of devotion to a calling and has a place among other professions, with a status in relation to medicine, law, etc. Teaching encompasses the intentional application of certain knowledge and skills in the preactive, interactive, postactive and extra-active setting (see also domain of teaching, teaching competency, practical theory and profession).

Teaching competency. The ability to apply to teaching practice the essential knowledge and skills. Being a competent teacher is nowadays connected with:

- a flexible use of different teaching and learning strategies;
- an integrative use of skills and knowledge, in which both emotional and moral aspects are involved.

Teaching competency is, for the greater part, expressed by one's practical theory. Reflection mediates this theory and leads also to its further development. A practical theory should possess a certain degree of consistency and show similarities with practical theories of colleagues (see also practical theory).

Theoretical orientation. Central assumptions and concepts which, in relationship to a research domain, form the essence of a research programme or paradigm. The core part of a theoretical orientation functions objectively or independent of the investigator. The interpretative part of a theoretical orientation concerns the interaction process between the investigator and the research domain.

Theoretical validity. The extent to which the methods used give information about the aspects of the theoretical framework that is involved in the investigation.

Thick description. Reduction of data at a higher level of abstraction with the help of theory or against the background of a theoretical framework. Thick description is often used in doing ethnography. Originally, thick description should be thought of as open-ended; a statement, for example, can always be further contexted and interpreted by a next person or investigator.

Triangulation. The application and combination of several research methods and, through that, increased data sources in the study of the same phenomenon to overcome the weaknesses or biases of a single method; no single method will ever capture all of the changing features of the social phenomenon under study. It is assumed that the most fruitful search for sound interpretations of a phenomenon must rely upon triangulation strategies. Along with methodical triangulation researcher and research triangulation are also possible.

Zone of proximal development. The distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under (adult) guidance or in collaboration with more capable peers. It is not problem solving on itself that is essential, but the guidance on the basis of which the zone of proximal development is addressed (Vygotskij).

APPENDICES

- 1 INTERVIEW I
- 2 ROUGH SCHEME FOR MAKING FIELD-NOTES
- 3 INTERPRETATION FRAMEWORK FOR THE PREPARATION OF THE RETROSPECTIVE INTERVIEW
- 4 'MANUAL' FOR THE RETROSPECTIVE INTERVIEW
- 5 INTERVIEW II
- 6 THE LOGBOOK
- 7 QUESTIONNAIRE FOR RESEARCH ON STUDENT PERCEPTIONS
- 8 CLUSTERING OF STATEMENTS PER ASPECT OF THE PRACTICE-WEEK

APPENDIX 1: INTERVIEW I

Name :

School:

Age :

Sex :

Number of years working in the school:

Function (legal status):

Subjects to be taught :

PART 1 : IN GENERAL

1. What is your previous education?
2. Did you - before your job at this school - work somewhere else?
 - a. (If so) Where did you work?
 - b. What did this work consist of? I would appreciate a brief reply.
3. Did you - before your job at this school - already have any teaching experience?
 - a. (If not) How did you learn to teach? Could you tell me something *more* about this issue?
 - b. (If so) When did you gain this experience?
 - c. What did this experience consist of?
4. Can you explain why you chose for your current job? Please answer as *fully* as possible.
5. What do your tasks at this school consist of?
6. Can you, starting from a working-week of 40 hours, estimate how many hours each of these tasks takes?
7. Are you, generally speaking, satisfied with your current function?
 - a. (If not or partly) Can you mention one or more causes for this?
8. Which aspects of your current function in this school do you like?
9. Are there also aspects of your current function in this school which you do not like?
 - a. (If so) Which aspects?
10. Are there things inherent in your function that you would like to change?
 - a. (If so) What are they?
11. Do you think that you will work at this school for long?
 - a. (If so) Why?
 - b. (If not) Why not?

PART 2: PERCEPTION OF THE TASK ENVIRONMENT

Explanation

The following groups of questions deal with aspects of the task environment as, for example, the available learning aids and lesson contents. Also students and the cooperation with colleagues form part of your task environment.

With the following groups of questions I am particularly interested in *how* you perceive these aspects *as a teacher*. Hence, I am interested in the relationship between task environmental aspects, your *lessons in general* and your *style of teaching* in particular.

A. Learning aids and equipment

For the sake of clarity it should be noticed that learning aids encompass all those things (and animals) which are used *during* lessons. Equipment is a broader concept and regards the school's available classrooms, machines, farms, fields, etc. For example: a tractor forms part of the equipment, but becomes a learning aid when it is used during the lesson. The same applies, for example, to animals, the blackboard, the video-apparatus, etc.

12. What kinds of learning aids do you usually use during your lessons?
13. What are important considerations when you choose learning aids?
14. Do you always have sufficient learning aids at your disposal?
 - a. (If so) Do you need more learning aids?
 - b. (If not) What other learning aids would you like to have at your disposal?
 - c. Do you think that this can be realized?
15. Do you make learning aids yourself?
 - a. (If so) Can you mention some of them?
 - b. Why do you make them yourself?
 - c. (If not) Why not?
16. Can you indicate the importance of learning aids in your lessons?
 - a. Is this the same for all lessons?
 - b. (If not) When not?
17. How or in which way do you use the available learning aids during your lesson?
 - a. Does this apply to all lessons?
 - b. (If not) when not?
18. Do you make use of more rooms during one and the same lesson?
 - a. (If so) Why do you make use of more rooms?
 - b. (If not) Why not?
19. Are there things regarding learning aids not previously mentioned, but which you consider important?

B. Subject-matter

Subject-matter refers to the content you teach, which has to be learned by students. This content may encompass knowledge, insights and (psychomotor) skills.

20. Has the subject-matter you teach been fixed in written form?
 - a. (If so) In what materials has the subject-matter been fixed?
 - b. Can you roughly mention what has and what has not been fixed in the written materials you mentioned?

- c. By whom has the subject-matter been fixed in the written materials?
 - d. How has the subject-matter been fixed?
 - e. Why was it decided to fix the subject-matter in written form?
 - f. (If there is no talk of any written fixation) Can you explain why the subject-matter was not fixed?
(continue with question 24)
21. (If there is talk of one or more forms of written fixations of subject-matter) Which sides of written fixation do you experience as positive with regard to your own lessons?
 22. Do you also experience negative sides of written fixation with regard to your own lessons?
 - a. (If so) Can you explain that?
 23. (If there is talk of one or more forms of written fixations of subject-matter) Are there times when you deviate from the prescribed subject-matter?
 - a. (If so) When does this take place?
 - b. Can you mention some reasons why you deviate from the prescribed subject-matter now and then?
 24. Has the subject-matter you teach regularly been altered or adjusted?
 - a. (If so) By whom is this done?
 - b. On the basis of which considerations do alterations or adjustments take place?
 25. Would you, with respect to subject-matter, like to change things for your own lessons?
 - a. (If so) What parts of the subject-matter would you like to change?
 - b. Do you think that these changes can be realized?
 - c. (If not) Why not?
 26. Are there things regarding subject-matter not previously mentioned, but which you consider important?
- C. Students/course-members**
27. The following question has a bearing upon the students' or course-members' working or educational backgrounds. Regarding these backgrounds, which categories of students or course-members do you teach?
 28. If we, for the sake of convenience, start from 40 'course-member weeks', how many of these weeks do you proportionally teach to the categories of students you have mentioned?
 29. Do you experience differences between the categories of students you mentioned?
 - a. (If so) What do these differences consist of?
 - b. How do you take these differences into account during your lessons?
 30. Students or course-members enter the school with certain starting points, that is to say they do or do not master certain things. How do you come to know that?
 31. Does it ever occur in your lessons that your assessment of the students' starting points differs from their real starting points?
 - a. (If so) Can you point out causes for this?
 - b. What does it mean for your teaching when the starting points supposed by you appear to be in disharmony with the real starting points? I would like to know how you act in such a situation.

32. Are there, with respect to students or course-members, things that you would like to change for your own lessons?
- (If so) What would you like to change?
 - Do you think that these changes can be realized?
 - (If not) Why can these changes not be realized?
33. Are there things regarding students or course-members not previously mentioned, but which you consider important?

D. School organization

The following questions deal with aspects of the school organization. That is to say the way in which the educational personnel takes counsel together, for example in working-groups, who does what and when, how the lessons are scheduled, etc. I am particularly interested in the connection between *some* school organizational aspects and your teaching task.

34. The following question deals with your period of getting acquainted with your current job. Can you remember how this period came about?
- (If so) Can you mention how this period came about?
 - Are you, retrospectively speaking, satisfied about the way this period was organized at this school?
 - (If not) What of this period would you like to change?
35. Do you, on behalf of your teaching task, cooperate with colleagues in some way?
- (If so) In what kinds of relationships and/or in what way do you cooperate with colleagues?
 - (If not) Can you mention why, in view of teaching tasks, no cooperation takes place?
36. (If there is talk of cooperation) What are your positive experiences of cooperation with colleagues?
37. (If there is talk of cooperation) Are there also sides of cooperation with colleagues that you experience as negative in view of your teaching task?
- (If so) Which sides of cooperation do you experience as negative?
38. Are there things regarding the school organization that you would like to change in favour of your lessons?
- (If so) What would you like to have changed with respect to the school organization?
 - Do you think that these changes can be realized?
 - (If not) Why do you think that these changes cannot be realized?
39. Are there things regarding the school organization not previously mentioned, but which you consider important?

PART III: THE TEACHING PROCESS

The following groups of questions have a bearing upon your teaching. Attention will be paid to the way you plan and execute your lessons as well as to your reflection upon these lesson phases.

A. Lesson planning

40. Do you plan your lessons?
- (If so) When do you find it necessary to plan your lessons?
 - When do you find that your lesson need not be planned?
 - (If there is no talk of lesson planning at all) Can you mention why you do not plan your lessons (continue with question 47).

41. (If there is talk of lesson planning) When do you usually plan your lessons?
42. (If there is talk of lesson planning) Along with the planning of lessons there can also be talk of planning of more comprehensive wholes. If this applies to you, for example weekly or monthly planning, can you explain these types of planning?
43. (If there is talk of lesson planning) What are your points of attention when you plan your lessons?
44. (If there is talk of lesson planning) With the following question I am particularly interested in the process of your lesson planning, that is to say *how* your lesson planning takes place from the beginning to the end. Can you point out how your lesson planning usually takes place?
45. (If there is talk of lesson planning) Do you make notes during lesson planning?
 - a. (If so) Among other things, of what do you make notes during lesson planning?
 - b. What are the functions of these notes for yourself?
 - c. (If no notes are made) Why do you make no notes during lesson planning?
46. Are there things regarding your lesson planning not previously mentioned, but which you consider important?

B. The execution of lessons

47. Can you subdivide your lessons into phases or parts?
48. How much time does each lesson phase take approximately?
49. Does it occur that, per lesson, the duration of lesson phases differs?
 - a. (If so) On which factors does the duration of the several lesson phases depend?
50. The following question concerns your teaching during each separate lesson phase in relationship with the *what*, the *how* and the *why* of your teaching. Can you tell me per lesson phase *what* you do, *how* you do it and give reasons for *why* you do it like this and not like that? Let us start with ...
51. Do unforeseen moments or events occur during your lessons?
 - a. (If so) Which unforeseen moments or events and how do you react to these?
52. How do you determine whether students or course-members have learned something from your lessons?
53. Are you satisfied with the way your lessons proceed?
 - a. (If so) Why are you satisfied?
 - b. (If not or partly) What would you like to change?
 - c. Do you think that these changes can be realized?
 - d. (If not) Why do you think that these changes cannot be realized?
54. Are there things regarding the execution of your lessons not previously mentioned, but which you consider important?

C. Reflection/self-evaluation

55. Do you think about the lessons you have taught?
 - a. (If so) With reference to what do you think about your lessons?
 - b. What do you do with the thoughts that arise about your lessons?

56. Each teacher possesses good and less good teaching qualities. I would like to ask you some questions about this issue. Let us first look at your good qualities. Which sides of your own teaching do you experience as good?
57. Are there also sides of your teaching that you experience as less good?
 - a. (If so) Which sides of your teaching do you experience as less good?
 - b. Which possibilities do you see for improving these less good sides?
 - c. Do you think that these changes can be realized?
 - d. (If not) Why do you think that these changes cannot be realized?
58. (If there is talk of lesson planning) does it occur that the execution of a lesson is not in conformity with the planning of that lesson?
 - a. (If so) Can you mention causes for that?
59. Are there things regarding your thinking about your own lessons not previously mentioned, but which you consider important?

PART III: THE INTERVIEW

Finally I want to ask you some questions about the interview itself.

60. Can you put into words how you generally experienced the 'conversation'?
61. Do you have possible suggestions for the improvement of the 'conversation'?
 - a. (If so) Can you mention one or more suggestions?
62. Did we discuss things which you would have preferred not to talk about or which you experienced as unpleasant to talk about?
 - a. (If so) Can you mention some of these things?
 - b. Why to talk about these things, or why did you experience it as unpleasant to talk about these things?
63. Did we discuss things which you have never thought so conscientiously about in the past, or of which you, as a result of our 'conversation', have become more aware?
 - a. (If so) Can you mention some of these things?
64. Can you indicate how you experienced me as the leader of this 'conversation'?
65. Did you, in my role as interviewer, experience me as an acceptable interlocutor?
 - a. (If not) What do your doubts consist of?
66. Has this interview led to changes in your willingness to cooperate in the rest of the research?
 - a. (If so) In which respects?

APPENDIX 2: ROUGH SCHEME FOR MAKING FIELD-NOTES

Name : Student group :
 School : Group size :
 Subject: Lesson duration:

Lesson goal(s):

1. 2.

Rough indication of subject-matter:

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Scheme for making field-notes:

time	theme/subject-matter	method/interaction		learning aids	rest/particularities
		teacher action	student action		

----- (the number of pages needed per lesson observation varied from 6 to 12) -----

APPENDIX 3: INTERPRETATION FRAMEWORK FOR THE PREPARATION OF THE RETROSPECTIVE INTERVIEW

1 GOAL(S)/INTENTION(S)

In teaching a teacher is aiming at something. Acting is always of an *intentional* nature. To a large extent this notion forms an aspect of lesson planning. Because acting is always *context-bound*, there is also talk of an aspect of the execution of lessons.

1.1 Presence of one or more goals

During lesson planning teachers do not often formulate goals, though they are *implicitly* present. Even if there is no talk of lesson planning, then each teacher still handles - implicitly or more explicitly - certain goals.

1.2 Goal(s) that is (are) pursued

The teacher is aiming at a certain *action structure* (result) with students. This may have a bearing upon knowledge/insights, (motorial) skills and attitudes. Usually combinations occur, so that there is talk of a certain *complexity*. In connection with this the extent to which a goal is more or less clear is also important.

1.3 Realization of the goal(s)

The central issue is from which it appears that (a) goal(s) is (are) achieved. *Discrepancies* between pursued and realized goal(s) may be caused by many *personal* or *situational* causes. What a teacher learns as a result of a certain awareness of possible discrepancies is essential.

2 SUBJECT-MATTER/THEMES

It is important to know on the basis of *which subject-matter* goals are realized. Subject-matter is often the most important planning component and usually strongly connected with the planning component 'teaching and learning activities'. Subject-matter is fixed for years and part of curricula or educational programmes, so that, particularly for (more) experienced teachers, the choice, order and division of subject-matter are often matters of course upon which teachers to a greater or lesser extent (still) reflect.

2.1 Place in the curriculum (if relevant)

This aspect 'forces' a teacher to bring into account his *choice of subject-matter* in function of more encompassing wholes, respectively curricula or school programmes. By numerous factors his knowledge of or insights into these more encompassing wholes can be more or less. Additionally, a teacher possesses certain degrees of freedom when choosing subject-matter, though due to many external factors this freedom is *limited*. For one person this might be obstructive, another person might experience this limitation as an advantage.

2.2 Linking-up with students' starting points

Choices of subject-matter must also be brought into account in view of students' action structure at the beginning of a lesson or course. For that purpose knowledge of this structure and of what it consists of is needed. It

is relevant to know *how* this knowledge comes about. For several reasons a teacher's presuppositions of students' starting points can be less adequate, which has *consequences* for the lesson execution unless the teacher is aware of these consequences and '*plans (again) during the execution of the lesson*'.

2.3 Order or sequence

The sequence of subject-matter can, more or less, be determined *consciously*, whether or not in relationship with the pursued goal(s), the place of subject-matter in the curriculum and the students' starting points.

2.4 Division and presentation

For students it is important that subject-matter is conveniently arranged, even if there is talk of a right sequence and an adequate attunement to the students' starting points. Not only the *written presentation of subject-matter* (leaflets, books, etc.) but also its *verbal and non-verbal presentation* as well as the coherence between both are involved. The use of too difficult words, a too hasty explanation, etc. might lead to 'speaking over heads' or not being able to hold the students' attention, etc. Division and presentation must meet students' *mental grasp* and, through that, their *motivation*. Repeating and summarizing are also important aspects of presentation.

3 METHODS

The (planned) *procedure* a teacher follows can be of a detailed as well as a rough nature; it may encompass the *main lines of a whole lesson*, but also have a bearing upon *specific aspects*. In addition, methodical aspects also refer to *considerations of technological nature*, which are translated into actions, and to *technological acting itself* that comes about more or less consciously. 'Method' is a *complex* concept and encompasses numerous aspects that mutually cohere.

3.1 Phases of the teaching and learning process

Usually a lesson consists of an introducing, core and processing part. Along with this *linear* structure, the separated parts are also found *integrated* or *cyclic*. In the introductory part a teacher usually tries to estimate students' previous knowledge, excite their interest, explain what the students can expect, what kind of student performance he expects, etc. Mostly the introduction is followed by the real learning process, dependent on chosen goal(s), subject-matter and teaching and learning activities. A teaching and learning process usually ends with a check on what or if students learned from the lesson. To summarize, each lesson part or phase clearly has its own *function* and *meaning*.

3.2 Social and spatial organization

The organization strongly depends on choices regarding the earlier described components, the *number of students*, *equipment and learning aids*. These organizational aspects to a more or less extent *determine* the composition of the total teaching and learning process. In connection with this the attunement to other components is relevant.

3.3 Teaching and learning activities

Both types of activities *mutually cohere*. It is important to know why a certain activity is chosen and on which this choice depends. To a greater or lesser extent the choice of a certain activity also *determines* the composition of the whole teaching and learning process. The *function* of an activity particularly plays an important part. An activity might be chosen more or less adequately; during the lesson execution an activity can be influenced by many *external* factors as well as by insufficient planning by the teacher himself (*internal factor*), or by non-adequate reactions of the teacher (*internal factor*) to external factors.

3.4 Methodical model

Every teacher handles a certain *didactical or teaching model* more or less explicitly. Generally this model remains implicit with *experienced teachers*. In connection with this it is known that teachers often do not plan their lessons or minimally complete this task in the sense of demarcating the subject-matter. Making implicit models explicit, for example on the basis of observation and reflection, may sometimes lead to the rethinking of aspects of implicit models (side effect of participation in research or otherwise). Handling a model that is limited in its explicitness may have *advantages* as well as *disadvantages*, depending on the extent to which a teacher is able to reflect on that in view of what he pursues with his lesson connected with the filling in of related didactical components and principles.

3.5 Didactical principles

These principles usually '*give colour*' to *didactical components*. In a certain way they shape the *depth-structure* of teaching and play an important part during the total teaching and learning process. A teacher implicitly as well as explicitly handles certain didactical principles. To an important extent his expertise depends on the adequacy in which he handles these principles, which can be *planned* in advance or be *expressions of reactions to unforeseen moments or events* during the teaching and learning process.

3.6 Organization of the teaching and learning process

This aspect concerns the preparation of the materials needed *before* the lesson starts, the placing of furniture in conformity with planned (teaching and learning) activities, etc. During the lesson execution a teacher must often *organizationally improvise* due to unexpected events. In addition, aspects play a part like delivering written materials, providing students with tasks, etc.

4 LEARNING AIDS

These aids play an important part *in support of* the teaching and learning process. Sometimes a lesson completely or largely depends on them.

4.1 What learning aids and the way they are used

It is relevant that a teacher *gives account of his choice* for certain learning aids in connection with the other components, particularly with the lesson goals and subject-matter. It is also important *how* learning aids are made use of; are they only used by the teacher, by the students or by both categories involved?

4.2 Function in the lesson

Closely connected with 4.1, the *meaning* of learning aids in view of the total teaching and learning process, respectively each lesson phase, are crucial. In this context the 'kind of support' that is offered by learning aids is important (for example as a summary, scheme, explanation, example, etc.).

5 INTERACTION

Whether or not a lesson proceeds successfully is strongly influenced by the interaction *between teacher and students* as well *between students*. The interaction strongly depends on, or is closely connected with the *teacher's choices* regarding the other didactical components. In addition, *personal* characteristics of the teacher, numerous *external* circumstances like unforeseen events and the way the teacher reacts to them also play a part.

5.1 Interaction between teacher and students

Aspects like the way guidance is given, the teacher's contacts with the students, his attitude during the teaching and learning process, his reactions to evoked and non-evoked student actions, etc. play a part. The teacher's voice, use of language, sentence structure, choice of words and the like also exert influence. Focus of attention is the (*verbal as well as non-verbal*) *communication* during the teaching and learning process as an important *determinant* of the *quality* of this process. The students' experience of this interaction or communication forms a relevant criterion for their *perception of the teaching and learning situation* and, with that, their willingness to function as might be expected.

5.2 Mutual interaction between students

During a learning process this interaction may be of a structural as well as an occasional nature and take numerous forms, respectively varying from constructive to destructive, and influenced by many *internal* and *external* factors.

APPENDIX 4: 'MANUAL' FOR THE RETROSPECTIVE INTERVIEW

Introduction (short)

1 GOAL(S)

1.1 Presence of one or more goals

1 Before the lesson you informed me about the goal(s) of this lesson, namely Did you aim at any other goals? If so, which?

1.2 Pursued goals(s)

1 According to me you were aiming at the realization of Has this been interpreted correctly? (eventually questioning through)
2 Why did you aim at this (these) goal(s)?

1.3 Realization of the goal(s)

1 Do you think that you achieved your goal(s)? (With more goals these must be checked separately)

Yes:

- On what do you base your opinion?

No:

- Why not?

- What do you learn from that?

2 SUBJECT-MATTER/THEMES

2.1 Place in the curriculum

1 Can you mention which place the subject you have been treating takes within the whole school programme? (it might be necessary to explain what is meant by this question)
2 (eventually questioning through)

2.2 Linking-up with students' starting points

Yes:

- You seemed to link up with the students' starting points by ... Am I correct?

- Are you always doing that in this way? (eventually questioning through)

No:

- I did not notice you linking up with the students' starting points. Am I correct?

- Are you always doing that in this way? (eventually questioning through)

2.3 Order or sequence

1 You successively treated Why in this order? (eventually questioning through) (a distinction must, if necessary, be made between a theoretical and practical part)

2.4 Division and presentation

1 The subject-matter students had to learn has been arranged or built up as follows: Has this been interpreted correctly? (eventually questioning through)

2 Why did you choose for this arrangement or build-up?

3 Do you hold the opinion that it was conveniently arranged for the students? (eventually questioning through; it is relevant whether or not the teacher informed the students at the beginning of the lesson about what they could expect) (if applicable, again a distinction must be made between a theoretical and practical part)

4 Do you feel that the students understood the lesson content? (eventually questioning through)

5 Do you feel that the lesson subject gripped the students' attention? (eventually questioning through)

- 6 Earlier we talked about the arrangement of the subject-matter that had to be learned by the students. The lesson was also arranged in a certain way, namely (mentioning the lesson phases)
Have I interpreted this correctly? (eventually questioning through)
- 7 Why did you choose for this division of the lesson? (eventually questioning through)
- 8 Was it, in view of the available time, a correct division? (mention the time approximately needed per lesson phase)
- 9 Do you feel that the exercises (tasks) got across well to the students? (eventually questioning through)

3 METHODS

3.1 Phases of the teaching and learning process

- 1 Let us return to the earlier distinguished lesson phases, namely Can you mention the meaning or function of each lesson phase? let us start with
- 2 Perhaps you might have answered this question before, but why did you choose to divide this lesson up into these phases?
- 3 Are your lessons always subdivided in this way? (eventually questioning through)

3.2 Social and spatial organization

- 1 Question with regard to the *grouping* of the students (eventually per lesson phase). *For example:* you only had the group together when giving instructions at the beginning of the lesson and with the evaluation at the end of the lesson. During the rest of the lesson the students worked individually. Why did you choose for this? (eventually questioning through)
- 2 Likewise, but now with regard to the available *room*. (eventually questioning through; the extent to which the teacher is satisfied with the room that was available is important)
- 3 Did you have enough learning aids at your disposal? (eventually questioning through)

3.3 Teaching and learning activities

- 1 Let me start with *your activities* per lesson phase (mention these activities and ask per phase if these activities have been interpreted well; also per phase must be asked why the teacher has chosen for these activities)
(eventually questioning through each time)
- 2 *Idem*, but now with regard to the *activities of the students*.
General remark: teacher and student activities are closely connected as will become clear during questioning through. In addition, questions must also be asked about things that are striking, for example teacher activities to maintain order or student activities to disturb this order, etc.

3.4 Methodical model

- 1 Can you mention what you experience as most important during the execution of the lesson? (eventually questioning through and, if necessary, explain what is meant)

3.5 Didactical principles

- 1 In your lessons I observed that you handled several didactical principles, e.g. I am going to mention them one at a time and ask you some questions about them. Firstly, the principle
 - a. Have I interpreted this correctly?
 - b. Why do you handle this principle?
(idem with regard to the next didactical principles)

- 2 Do you still handle didactical principles which are not mentioned but often play an important part during your lessons? (if so and necessary, questioning through for the why)

3.6 Organization of the teaching and learning process

The following questions: if applicable!

- 1 Did you prepare the materials you used in advance? (eventually distinguished per lesson phase)
 - a. If so, are you always doing that? (eventually questioning through)
- 2 (eventual other things that were striking, for example whether or not tasks have been provided well, the general course of events during the lesson and the like)

4 LEARNING AIDS

4.1 What learning aids and the way they are used

- 1 Why did you choose for the learning aids you used in this lesson? (eventually distinguished per lesson phase) I just enumerate them:
.....
Hence, why these learning aids?

4.2 Function in the lesson

- 1 Inquire after the role or meaning of learning aids (including animals!) (eventually questioning through and, if necessary, explain what is meant)

5 INTERACTION

5.1 Interaction between teacher and students

Strongly dependent on what has been observed, for example helpful, friendly, etc. Try to interpret this and inquire after what the teacher himself thinks about it. (eventually questioning through)

5.2 Mutual interaction between students

Idem as 5.1.

LAST QUESTION

Can you describe how the students experienced this lesson? (eventually questioning through)

APPENDIX 5: INTERVIEW II

PART 1 : SOME GENERAL QUESTIONS CONCERNING THE LESSON GIVEN

1. Are you, in general, satisfied with the lesson?
 - a. (If so) Because of what reasons are you satisfied?
 - b. (If not or partly) Because of what reasons are you (partly) dissatisfied?
2. Are you doing exactly the same in the next lesson?
 - a. (If not) What are you doing the same again and what definitely not?
 - b. (In continuation of a) How do you think that you will do it next time?
 - c. (In continuation of b) What should in your opinion be changed for that?
3. I will now ask you a question about teaching in general. Do you, with regard to teaching, feel the need for any in-service education?
 - a. (If so) Can you specify this need into points of attention?
 - b. (If not) Can you mention why you do not feel this need?

PART II: SOME QUESTIONS CONCERNING THE RESEARCH SITUATION

4. Can you verbalize your impressions of the way you experienced your participation in the investigation thus far?
5. Did you have the feeling of being observed during the lesson?
 - a. (If so) Can you put this feeling into words?
6. Did the investigator's presence influence your teaching, so that you taught differently from the way you usually teach?
 - a. (If so) In *what way* and *why* did you teach differently from usual?
7. Did the investigator's presence exert any influence on the students?
 - a. (If so) In *what way* and *on the basis of which* do you hold that opinion?

APPENDIX 6: THE LOGBOOK

THIS LOGBOOK BELONGS TO:

SCHOOL: _____

This is a confidential logbook. In case it is lost or left somewhere, please return it to me without further reading. My name and school are mentioned above.

My address:

Telephone:

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INTRODUCTION

The keeping of a logbook forms part of the investigation in which you participate. The purpose is that you start to make logbook notes *from the day after the logbook has been delivered to you*, and continue for the duration of one week. For example, start on a Wednesday and end on the following Tuesday, hence, five teaching days in total.

What must be noted by you? This question can, as you will observe later, be best answered by yourself. Nevertheless you will not be completely left to your fate. Later you are provided with *instructions* and *points of attention* which can help you to make notes. Therefore, I would like to ask you to read the following pages carefully.

What to do after a whole week of logbook keeping? Please return it, with your name and any other data (see page 1), to:

D. Beijaard
Wageningen Agricultural University
Department of Education
Hollandseweg 1
6706 KN Wageningen

For the sake of clarity it should be understood that your logbook notes will be treated as *strictly confidential*. The information you provide will only be seen by the undersigned. In the publication of research results the necessary care will be also exercised in order to assure anonymity. Through the reconstruction of *general patterns* any individual recognition is excluded.

I wish you much success and, in advance, thank you for your willingness to cooperate.

D. Beijaard

THE WHAT AND WHY OF A LOGBOOK

There is no description of exactly what a logbook is, at least no clear, unequivocal definition. 'Logbook' and 'diary' are often considered as identical. A diary, however, is a document in which one is completely free to write what one wishes.

The 'freedom of a diary' is limited here to make comparisons possible between participants involved in the investigation. Because of this, preference is given to the concept of a 'logbook'. The writing in the logbook will be guided by *instructions* and *points of attention*, though sufficient room is left for individual contributions.

In teacher education a logbook is often used as a *learning aid*, because it lends itself to making notes of one's own teaching experiences and, with reference to that, to reflection on these experiences. By exchanging these experiences, students have the opportunity to learn from one another.

Here the logbook has another function. It is primarily used as a *research instrument*, that is to say as a method to collect data about teaching. It aims at the gaining of information in addition to the earlier conversations and the observed lesson. Because of this I do hope that you will keep up this logbook seriously. It is estimated that this task will take approximately thirty minutes to one hour per day.

HOW TO USE THE LOGBOOK

Every day you are requested to make notes in your logbook with regard to lesson blocks you have taught that day. Your experiences regarding *practical lessons* should be the focus of attention. Notes need *not* be made of experiences that result from pure theoretical lessons.

If you are a part-time teacher, then please follow this alternative procedure:

- with some days a week: continue logbook keeping until you reached the desired five days;
- with some lessons or lesson blocks a day: make notes of these lessons or lessons blocks over five days, even when your day's work is not complete.

Hence, I am interested in logbook notes with reference to *practical lessons for the duration of five days*.

For the making of logbook notes per *practical* lesson you have taught, I request you to make use of the following categories:

category 1: group or class

You can suffice with a brief indication of the group or class you have taught, that is to say *where the students come from* and the *group size*.

category 2: lesson subject

In this category you mention *what the lesson is concerned with*. You are also requested to give a brief outline of the *subject-matter* you taught.

category 3: teaching and learning activities

Your *activities* during the lesson as well as *those of the students* need to be described in this category.

category 4: what went well and why

In this category you describe things which you feel went *well* or with which you are *satisfied*. It is important that you also describe *why* things went well or why you are satisfied.

category 5: what did not go well and why

In this category you describe things which you feel did not go well or with which you are *dissatisfied*. Again it is important that you also describe *why* things did not go well or why you are dissatisfied.

category 6: desirable changes and their realization

In the preceding categories you described what did or did not go well. In this category you are asked to mention any *changes you would like to make* and the way in which you think that these changes can be realized. I am also interested in desirable changes which cannot be realized, including the *reasons* for that.

category 7: additional remarks

This category enables you to write down other important aspects regarding the practical lesson at issue.

The first three categories imply short descriptions of *facts* and make an appeal to your *memory*. As well as making of notes of memories, categories 4 and 5 also appeal to your faculty to *further reflect* on these memories. In fact you are requested to interpret your own memories.

In principle this can be anything related to what did or did not go well. This also applies to the causes, which can be of all sorts. Try as far as possible to reflect on these things and to write down these reflections. This is not always an easy task.

At the end of this logbook (page 47) some open questions are formulated. These have a bearing upon the activity 'logbook keeping'). I also request you to answer these questions. In support of the keeping of the logbook you will find some *examples* at the end (the appendix, page 48). It might be that these examples make clear what will be expected from you. These examples are invented with reference to existing subjects.

Hereafter you will find the daily schemes for the making of notes. Again I wish you every success with the keeping of the logbook!

Day and date: _____

	Lesson/lesson block 1
1. Group/class (where they come from and size)	
2. Lesson subject and brief description of subject-matter	
3. Teaching and learning activities (your activities and those of students)	
4. What went well and why (what you are satisfied with and why)	
5. What did not go well and why (what you are dissatisfied with and why)	
6. Desirable changes and <i>how</i> you want to realize them (mention also <i>why</i> desirable changes cannot be realized)	
7. Additional remarks from your side	

_____ (totally 5 x 8 of these schemes were incorporated in the logbook) _____

SOME QUESTIONS ABOUT LOGBOOK KEEPING

By means of some open questions I would like to be informed about your experiences with the keeping of the logbook. You are requested to answer these question *after a whole week of logbook keeping*.

1. Can you describe your positive and negative experiences with the keeping of the logbook? I would appreciate it if you could also explain your experiences.

Positive experiences and reasons:

Negative experiences and reasons:

2. Did the schemes offer sufficient opportunities for individual contributions? If possible, please explain your answer.
3. Did you experience the seven categories as a help for logbook keeping or, on the contrary, as an obstruction? Please explain your answer.
4. Do you have the feeling that you learned something from the keeping of the logbook? If so, can you further describe this?
5. Do you eventually have suggestions for the improvement of the logbook when the investigation should be repeated? If so, which suggestions?

Day and date: _____

	Lesson/lesson block 1
1. Group/class (where they come from and size)	MAS-B (second class, 8 students).
2. Lesson subject and brief description of subject-matter	Poultry housing. Contents: organizing the pens, ventilation and ways of feeding.
3. Teaching and learning activities (your activities and those of students)	I briefly explained the intention of the lesson and delivered the tasks to them after that. They had to do these tasks independently. I only offered help in necessary cases.
4. What went well and why (what you are satisfied with and why)	Most students worked well. They could almost do the tasks without any help. I think that this was due to the way they experienced the subject. They usually like subjects related to animals.
5. What did not go well and why (what you are dissatisfied with and why)	One boy did not want to be at work. He continually tried to be interesting by making insipid remarks. This demanded much of my attention, so that I was less able to observe other students and, eventually, help them.
6. Desirable changes and how you want to realize them (mention also why desirable changes cannot be realized)	I am not aware of things that should be changed.
7. Additional remarks from your side	It was a nice lesson, despite that one student.

(continuation)

	Lesson/lesson block 2
1. Group/class (where they come from and size)	MAS-B (second class, 8 students).
2. Lesson subject and brief description of subject-matter	Poultry varieties. Numerous features which enable one to recognize which variety of poultry you are working with.
3. Teaching and learning activities (your activities and those of students)	I started with a brief discussion about the chickens students have at home. To me this seemed to be a pleasant start to the lesson. After that I gave them exercises to be executed in the pens, and tried to oversee these.
4. What went well and why (what you are satisfied with and why)	The students could independently execute the exercises. Actually, my help was not needed. Perhaps the exercises were a little too easy because they completed them too quickly.
5. What did not go well and why (what you are dissatisfied with and why)	The introductory conversation was disappointing, as there was little participation. This is because students and teacher did not know each other. First they must get used to each other, than a conversation is more suitable.
6. Desirable changes and how you want to realize them (mention also why desirable changes cannot be realized)	Really we should know each other better, but that is impossible. Furthermore, I must make adequate use of available time. Therefore, I am going to extend the number of exercises.
7. Additional remarks from your side	Students usually complete their exercises quickly, but not always carefully. They also copy each others' solutions, so that they do not have to find it out for themselves.

APPENDIX 7: QUESTIONNAIRE FOR RESEARCH ON STUDENT PERCEPTIONS

A. QUESTIONS ABOUT YOURSELF

To most of the questions below only *one* answer is possible. When indicated, more than one answer is permitted.

1. Name :
2. Age : years old
3. Sex o female
 o male
4. I am visiting the practical training centre
 (name) in(place).
5. During this practice-week I am staying in the school's boardinghouse, a
 guesthouse somewhere else or in a hotel
 o yes
 o no
6. This practice-week ends with a test
 o yes
 o no
7. I have already visited the following practical training centres
 in
 in
 in
 in
8. Which practical training centre, including the one you are visiting now,
 did you like most?

9. I am a student of the
 o MAS-B in class
 o part-time MAS-B in class
 o MAS-A in class
 o HAS in class
10. In my present school (MAS or HAS) I am involved in the following field(s)
 of study (*more* answers are possible)
 o dairy keeping
 o arable farming
 o animal care
 o horticulture
 o agriculture and horticulture
 o pig and poultry husbandry
 o forestry, land development sector
 o food technology
 o other, namely
11. The last type of education I passed successfully
 o LAS
 o LEAO
 o LTS
 o LHNO
 o MAS
 o MAVO
 o HAVO
 o VWO
 o other, namely

12. I chose for my present type of education for (no more than two answers are possible)
- serving the school-age
 - refused by another type of education
 - interested in agriculture
 - attractive education
 - a certain profession in the field of agriculture, namely
 - possibility for continuation of education
 - other, namely
13. My plans after having finished my present education are (no more than two answers are possible)
- looking for work, namely as
 - following courses
 - continue my study
 - do not know yet
 - other, namely
14. My father's profession is (if applicable)
15. My mother's profession is (if applicable)

The rest of this questionnaire contains statements about the lessons you have followed this week, about what you have learned, about the practice-week, and about the connection between your agricultural school (MAS or HAS) and the practical training centre.

You will be asked to give your opinion on the statements as follows:

EXAMPLE OF A STATEMENT:						
	entirely disagreed with	disagreed with	not agreed and not disagreed with	agreed with	entirely agreed with	not applicable
The instructors clearly explain	A	B	C	D	E	F

You are requested to circle the most appropriate answer. So, if you agree with the statement mentioned above then you circle the letter D as follows

A B C **(D)** E

If you want to correct an answer then you delete the first answer and circle the other that better suits your opinion. So, for example as follows:

A B **(C)** ~~A~~ E

B. STATEMENTS ABOUT ALL THE LESSONS FOLLOWED THIS WEEK

	entirely disagreed with	disagreed with	not agreed and not disagreed with	agreed with	entirely agreed with	not applicable
1. The instructors explain in an understandable way	A	B	C	D	E	
2. When working on tasks the instructors guide well	A	B	C	D	E	
3. The instructors check the way we are working on tasks	A	B	C	D	E	
4. The instructors pay attention to us	A	B	C	D	E	
5. The lessons contain too many exercises	A	B	C	D	E	
6. We have been continually occupied with exercises	A	B	C	D	E	
7. The lesson subjects interest me	A	B	C	D	E	
8. We have done many practical things	A	B	C	D	E	
9. The instructors demonstrate the way things must be done	A	B	C	D	E	
10. The instructors have prompted answers to questions on the instructional leaflets	A	B	C	D	E	F
11. The instructors are friendly	A	B	C	D	E	
12. It is not possible to ask questions and to discuss	A	B	C	D	E	
13. The exercises are interesting to work on	A	B	C	D	E	
14. The instructors know how to motivate me	A	B	C	D	E	
15. For me the lessons last too long	A	B	C	D	E	
16. The instructors give many examples from <i>real</i> practice	A	B	C	D	E	
17. When the exercises have been done, the instructors do not review them with the whole group	A	B	C	D	E	
18. The instructors teach enthusiastically	A	B	C	D	E	
19. When working on tasks the actual group size is too large	A	B	C	D	E	

	entirely disagreed with				
	disagreed with		not agreed and not		entirely agreed with
	A	B	C	D	E
20. I experience the subjects as difficult	A	B	C	D	E
21. During the lessons the instructors link up with my prior knowledge	A	B	C	D	E
22. The instructors provide us with clear tasks	A	B	C	D	E
23. The instructors are helpful	A	B	C	D	E
24. There is not enough time to complete tasks	A	B	C	D	E
25. The instructors notice when I do not understand something	A	B	C	D	E
26. I like to listen to these instructors	A	B	C	D	E
27. The lessons are varying	A	B	C	D	E
28. The instructors let us find out many things for ourselves	A	B	C	D	E
29. During the lessons the climate is pleasant	A	B	C	D	E
30. The instructors often instruct precisely how something should be done	A	B	C	D	E

not applicable

C. STATEMENTS ABOUT THE LEARNING EFFECT

	entirely disagreed with	disagreed with	not agreed and not disagreed with	agreed with	entirely agreed with	not applicable
1. This practice-week I have learned a lot	A	B	C	D	E	
2. I did not learn many new things	A	B	C	D	E	
3. I gained knowledge of and insight in aspects of the real professional practice	A	B	C	D	E	
4. Much of what has been learned can be applied in practice	A	B	C	D	E	
5. What has been learned cannot be used for the lessons at our school	A	B	C	D	E	
6. Much of what I have learned can be used for my practical	A	B	C	D	E	F
7. I have learned more than I expected to	A	B	C	D	E	
8. During this practice-week I learned more about practice than I do at school	A	B	C	D	E	
9. I learned a little from working with instructional leaflets	A	B	C	D	E	F
10. Working in small groups positively influences the learning effect	A	B	C	D	E	
11. I attended well during the lessons and I expect a positive test result	A	B	C	D	E	F

D. STATEMENTS ABOUT THE PRACTICE-WEEK

	entirely disagreed with	disagreed with	not agreed and not disagreed with	agreed with	entirely agreed with	not applicable
1. I found the practice-week pleasant	A	B	C	D	E	
2. The practice-week has been well organized	A	B	C	D	E	
3. This practice-week is tiring	A	B	C	D	E	
4. The programme has been built up well	A	B	C	D	E	
5. I attend well during the lessons because of a test at the end of the week	A	B	C	D	E	F
6. I am dissatisfied about the lesson times	A	B	C	D	E	
7. I found the presence of teachers of my own school pleasant	A	B	C	D	E	F
8. It is difficult to attend well during the lessons because of a bad night's rests	A	B	C	D	E	F
9. I appreciate the approach of the manager of the boardinghouse	A	B	C	D	E	F
10. I slept well and sufficiently in the boardinghouse	A	B	C	D	E	F
11. The food in the boardinghouse is good	A	B	C	D	E	F
12. There are too few recreational facilities in the boardinghouse	A	B	C	D	E	F
13. To me this practice-week is more of a 'holiday' than a 'learning week'	A	B	C	D	E	F
14. This practice-week I have spent more money than I expected to	A	B	C	D	E	F
15. I did not drink much alcohol	A	B	C	D	E	F
16. During the practice-week you get to know your fellow-students better	A	B	C	D	E	
17. It is a good idea to have a test at the end of a practice-week	A	B	C	D	E	
18. It is a good idea to ask students' opinions about a practice-week	A	B	C	D	E	

entirely disagreed with
 disagreed with
 not agreed and not
 disagreed with
 agreed with
 entirely agreed with
 not applicable

E. STATEMENTS ABOUT THE CONNECTION BETWEEN 'YOUR OWN' AGRICULTURAL SCHOOL (MAS OR HAS) AND THE PRACTICAL TRAINING CENTRE

- | | | | | | | |
|-----|--|---|---|---|---|---|
| 1. | I experience practice-weeks as important to my education | A | B | C | D | E |
| 2. | Students have a say in the choice of a practical training centre | A | B | C | D | E |
| 3. | I would like to have a say in the choice of practical training centres | A | B | C | D | E |
| 4. | Most lessons of this practical training centre are not connected with the lessons at our school | A | B | C | D | E |
| 5. | I would like the lessons between both types of schools to be connected as much as possible | A | B | C | D | E |
| 6. | We are not informed in advance about the subjects a practical training centre offers us | A | B | C | D | E |
| 7. | Students have a say in the choice of subjects that a practical training centre offers | A | B | C | D | E |
| 8. | It is not necessary to have a say in the choice of subjects the practical training centre offers | A | B | C | D | E |
| 9. | Most subjects of this practice-week had already been dealt with in the lessons of our school | A | B | C | D | E |
| 10. | If possible, it is preferable that subjects will be treated at our school in advance | A | B | C | D | E |
| 11. | If possible, it is desirable that our school continues what has been dealt with at the practical training centre | A | B | C | D | E |
| 12. | Our experiences of a practice-week will probably not be discussed at our school | A | B | C | D | E |
| 13. | It is regrettable that our experiences are not discussed at our school | A | B | C | D | E |
| 14. | This practical training centre and our school are closely connected | A | B | C | D | E |
| 15. | I would like to have more practice-weeks | A | B | C | D | E |

F

Thank you for your cooperation!

APPENDIX 8: CLUSTERING OF STATEMENTS PER ASPECT OF THE PRACTICE-WEEK

Below statements of the parts B, C, D and F of the questionnaire are ordered in conformity with aspects of the practice-week. Each cluster represents one aspect of the practice-week. The numbers correspond to the numbers of the statements of the questionnaire.

PART B: STATEMENTS ABOUT ALL THE LESSONS FOLLOWED THIS WEEK

ASPECT: *Motivation and involvement in tasks:* the statements 5, 6, 7, 8, 12, 13, 14, 15, 19, 20, 21, 24, 27, 28

ASPECT: *Instruction and guidance:* the statements 1, 2, 3, 4, 9, 16, 17, 22, 25, 30

ASPECT: *Climate and atmosphere during the lessons:* the statements 11, 18, 23, 26, 29

PART C: STATEMENTS ABOUT THE LEARNING EFFECT

ASPECT: *Learning effects:* the statements 1, 2, 3, 4, 5, 6, 8, 9, 10

PART D: STATEMENTS ABOUT THE PRACTICE-WEEK

ASPECT: *Organization of a practice-week:* the statements 1, 2, 3, 4, 6, 13, 14, 16, 17, 18

ASPECT: *Boardinghouse:* the statements 8, 9, 10, 11, 12, 15

PART E: STATEMENTS ABOUT 'YOUR OWN' AGRICULTURAL SCHOOL (MAS OR HAS) AND THE PRACTICAL TRAINING CENTRE

ASPECT: *Actual connection between the regular agricultural school and the practical training centre:* the statements 1, 2, 4, 6, 7, 9, 12, 14

ASPECT: *Desired connection between the regular agricultural school and the practical training centre:* the statements 3, 5, 8, 10, 11, 13, 15

CURRICULUM VITAE

Douwe Beijaard, geboren in 1953 te Buren (Ameland), was na zijn opleiding aan de Rijks Pedagogische Academie te Leeuwarden enige tijd werkzaam in het lager beroepsonderwijs.

Van 1976 tot 1982 studeerde hij onderwijskunde aan de Rijksuniversiteit in Groningen. Tijdens zijn studie en ook daarna was hij enkele jaren werkzaam als docent aan een AVO/LBO-scholengemeenschap en mede-begeleider van een BOVO-project. In 1984 trad hij als onderzoeker in dienst bij de toenmalige vakgroep Pedagogiek en Didactiek van de Landbouwuniversiteit in Wageningen. Bij deze vakgroep, nu vakgroep Agrarische Onderwijskunde geheten, is hij belast met het verrichten van onderzoek, het geven van onderwijs en het begeleiden van onderzoeksprojecten.

Zijn wetenschappelijke interesse en publikaties liggen op het terrein van scholing van onderwijsgevenden, onderzoek van het onderwijzen en achtergronden van praktijkgericht onderzoek.