

# Remedial Education for Black Children in Rural South Africa:

# An Exploration of Success Using Evolutionary Innovation Theory

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# 1. Introduction

The Siyabuswa Educational Improvement & Development Trust (SEIDET) is a communityinitiated and -based remedial education project for black secondary school children in Siyabuswa, a rural town about 130 km North-East of Pretoria, South Africa. The project was started in 1992 as a response to the poor state of the Bantu education system in the region. During the apartheid period, many secondary school teachers had received little or no training to teach exact sciences. Because of this situation, very few black students managed to enroll in – let alone graduate from – universities and Technikons (polytechnics), especially in the science fields. SEIDET was initiated in order to alleviate this state of affairs.

The purpose of this paper is to assess SEIDET's achievements in the first 10 years of its existence, and to explore the main factors that drove its attainments. There is no doubt that the project has indeed become very successful. The response from the entire community to the project from its inception has been beyond expectation, indicating that there was a need for it, and that the need was perceived as such by the community. Teaching has been expanding ever since the first classes started back in 1992. New programmes have been added, new branches have been established, and computer literacy courses have been made part of the programme. Currently SEIDET owns a community education centre in Siyabuswa, while two other branches of the project are hosted at other institutions. The main centre in Siyabuswa has grown into a multipurpose facility providing a variety of educational services and developmental programmes to the local community in association with several other institutions, including the South African Department of Education. ICT was introduced at SEIDET in 1994, when the Executive Committee approached the Department of Informatics at the University of Pretoria. Ever since, a mutually beneficial relationship has existed between the department and SEIDET. The first full computer laboratory was established in 1998, and the computers on the main centre were connected to a LAN and the Internet in 2000. Currently there are plans for establishing an IT support centre and to provide Internet and end-user services to the general public on a commercial basis.

Remarkably, all these achievements have been driven by local community volunteer work. The project was initiated and set up without any involvement of external development organizations, and the tuition is entirely provided by volunteer teachers, public servants, entrepreneurs and people working in the private sector from within the community. Even more remarkably, none of these volunteers had any relevant experience to start with. The project thus had to develop from scratch, without the benefit of any tried and tested methods. SEIDET as a full-fledged organization with defined operating principles and project philosophy emerged only years after its inception, as a result of a lengthy process of experiential learning on the part of its participants.

Improving university and college enrollment of disadvantaged black secondary school children from a poor, neglected homeland in South Africa constitutes a major effort even when adequate financial resources and relevant knowledge and experience would be available. The longentrenched social and economic conditions within which such a project has to be built do not exactly foster local development. Therefore, when we take note of the fact that SEIDET's attainments were brought about by a bunch of inexperienced and resource-poor volunteers, SEIDET's attainments have to be considered truly remarkable. Importantly, the SEIDET experience demonstrates that success can be achieved when local people in the community decide to mobilize themselves. Therefore, pinpointing the factors that gave momentum to that mobilization process, and understanding how the local community overcame obstacles in the course of the project's development, may hold out useful lessons and offer inspiration for other community development projects that foster similar ambitions. Additionally, the exercise may throw up fresh insights for SEIDET's participants themselves. It may assist them to capitalize more consciously on their strengths, and deal with new challenges that inevitable present themselves as they set about expanding and further developing their programme. The research reported in this paper is based on a detailed field study undertaken in 2003 by Tom Siebeling, then a final-year MSc student in the Technology and Society Programme of Eindhoven University of Technology in the Netherlands. The study was undertaken in collaboration with staff from the Department of Informatics at the University of Pretoria (UP) who had established ongoing collaboration with SEIDET for the purpose of the installation of its computer facilities. Intrigued by SEIDET's functioning and achievements, the UP staff were interested in commissioning a study involving "*SEIDET as an organization, as well as the process it is engaged in*", and using "*adoption/diffusion studies within a community development context*" for this purpose.<sup>1</sup> These terms of reference formed the starting point of the research on which this paper is based. Accordingly, the research sought to establish a link between SEIDET's performance and its underlying organizational principles and its community management processes, and these issues were examined from the perspective of an innovation adoption & diffusion framework.

The paper is structured as follows. Section 2 contains essential factual information about SEIDET's establishment and main activities. SEIDET's achievements are assessed in Section 3. Section 4 introduces the conceptual framework that we use to investigate how these achievements came about. We chose an evolutionary innovation model developed by Douthwaite (2002) and Douthwaite *et al.* (2002) for this purpose, since this model was found to provide a realistic explanation for success in innovation adoption and diffusion from a process-based perspective, and also because the model points towards a range of plausible determinants of project success that could be subjected to empirical research. In section 5, we trace the historical development of SEIDET and some of its sub-projects in detail, distilling a range of success factors from the empirical case data (still without reference to the theory). In section 6 we assess SEIDET once again, but, in contrast to section 5, here we take the Learning Selection model as our conceptual lens. This yields a second list of success factors. We find that both lists constitute partial and complementary explanations of SEIDET's success. The two lists are compared and synthesized in section 7, resulting in a more comprehensive explanation of SEIDET's achievements. An overall summary of the insights and some important lessons are contained in the concluding section 8.

# 2. SEIDET's Establishment and Main Activities

In 1992 the initiators of SEIDET wrote a founding problem statement, in which they gave a broad analysis of the political, social and educational situation of South Africa at the time. This document is important because it provides us with a peek back into history to the time when the project was set up. The document contains two premises upon which SEIDET was built. The first one is that the political and economic problems which South Africa experienced at that time were strongly linked to inadequate education at all levels, especially in science and mathematics. The second one is that the largest resource of the country is its human resource potential. These two premises were then combined to conclude that "*this resource will remain largely untapped until all its people are educated and trained to function optimally in a modern technology-based society*."<sup>2</sup> The two premises were substantiated with some alarming statistics:

- Of the 40,000 degrees and diplomas awarded by universities annually, only 1.8 per cent represents the mathematical sciences.
- For every 10,000 black children who enter first grade, only one graduates with an exemption in science that gives access to university.

<sup>&</sup>lt;sup>1</sup> Text from the original e-mail correspondence with Jackie Phahlamohlaka, June 2002.

<sup>&</sup>lt;sup>2</sup> Citation from SEIDET's founding problem statement, 1992. Quoted in "SEIDET Annual Report 1992/93", 1993, page 2

• Less than two per cent of all the people who function as science teachers in black secondary schools had obtained any post-secondary school training themselves.

The cause of this situation was concluded to lie mainly in the poor education standards in black schools. Physics was not even offered as a subject at the great majority of black schools. This precluded a large proportion of black secondary school learners from training in tertiary fields such as medicine, agriculture, engineering and natural science, although many learners did have the intellectual potential to pursue tertiary education in the sciences. Linking this conclusion to the central premises of the project, the initiators went on to say that "The loss of this unexploited talent can be ill afforded by South Africa. It is clear therefore that to exploit this potential, science education at high school must be upgraded dramatically in a short period of time. If this is not done, the chances for economic growth and for political and social stability are slim indeed."<sup>3</sup> Although concerned individuals and companies had started extracurricular programmes for educationally disadvantaged children in some areas of the country, these initiatives touched but the tip of the iceberg. Thousands of rural communities spread out across the vast South African hinterland remained beyond their reach. Therefore, the people of Siyabuswa and the surrounding areas decided that the time had come to help themselves. They took destiny into their own hands and no longer waited and hoped that something would happen, or that someone would come along to change their fate. They were determined to shape the future of their children themselves.

The initial idea to establish the project came from several people from the Siyabuswa community. In May 1990, concerned members of the community approached the person who was later to become the champion of the project, about the need to establish a community-based educational improvement project. After a few consultations with some individuals and organizations doing similar work elsewhere in South Africa, a steering committee was formed. After a number of meetings, it was decided that a science project be formed under the name Science Education Focus, in keeping with initial suggestions from the community members. Virtually no senior secondary schools in the area taught science and mathematics, and thus the whole community was deprived of any possible career in the sciences.

The ideas about the possible establishment of such a project spread rapidly within the area. Some members of the community who had small businesses showed a lot of interest, and some pledged financial support for such a project. Many other people, mainly from the teaching professions and the public sector, were also very enthusiastic. However, the initial process of planning and consultations progressed very slowly due to financial constraints. The committee members contributed from their own pockets, and got by with some small donations from a few other individuals.

By April 1991, many more people were aware of the preparations made by the committee, and wanted to be actively involved as well. Many came from disciplines other than the sciences. New ideas and interest came from individuals in the private sector and some universities. For this reason, it became necessary to slightly modify the initial focus of the project so that it could accommodate the expertise of other people who came from commerce, management and general humanities. It was decided that the project be composed of small sub-projects focused on different disciplines and that the name of the project should be changed into Siyabuswa Educational Improvement & Development Trust.<sup>4</sup>

From the start, therefore, SEIDET was set up in modular fashion, with new activities carried out in semi-independent subprojects, but always under the umbrella of the SEIDET organization. Each sub-project had its own responsibilities, needed to develop leadership in the sub-project, and

<sup>&</sup>lt;sup>3</sup> *Idem*. Page 2

<sup>&</sup>lt;sup>4</sup> Information adapted from the Preamble to the SEIDET Constitution, 1992, as amended and adopted on 10 November 2001.

later on was also given some financial and policy responsibilities. The following sub-projects have been established to date:

• *The Saturday Tuition Program:* This has been, and always will be, SEIDET's core activity. On Saturday mornings, high school learners and teachers assemble in one of the three SEIDET branches to work on the qualifications of the learners. The Saturday program is supplementary to the normal Monday to Friday tuition a learner receives at his or her local (feeder) school. The learners can receive supplementary teaching in various subjects, but the emphasis of SEIDET is still on science, mathematics and commerce. The learners pay a small fee to the organization and the teachers receive compensation for their travel expenses. The Saturday programme includes a basic computer literacy course to familiarize the learners with ICT.

• Youth and Adult Basic Education and Training (YABET): During weekdays, youth who dropped out of secondary school and adults who did not complete their education can receive tuition to qualify for the national secondary school exams. The YABET participants also pay a fee to SEIDET, which is used to pay the SEIDET YABET teachers and to register the YABET learners with the examination board. This program also includes the basic computer literacy course to familiarize the YABET learners with ICT.

• *The Primary Schools Science Project (PSSP):* Although not formally part of SEIDET, this collaboration between primary schools and the University of Pretoria was run under the wings of SEIDET. Primary schools science teachers from the region and staff from the University of Pretoria worked together to improve science education at primary schools. The teachers together wrote new assignments and worked with the UP staff to simplify the experiments from the textbooks for application in the rural areas. This project has been temporarily suspended due to financial constraints.

• Unischool SEIDET: This sub-project was initiated by the SEIDET teachers directly after the computer laboratory at Siyabuswa was established. The teachers, who had just become computer literate themselves, wanted the whole community to be able to become computer literate as well. With the help of Unischool, a supplier of accredited computer literacy courses, this sub-project was set up and some SEIDET teachers received further training on computers and computer teaching. This program trains the participant to a starter level of ICT skills. On completion, the participants receive a certificate accredited by the UP. In the 2002 the sub-project gained organizational independence from Unischool and is now a profitable sub-project of SEIDET.

In addition to the above, a number of supplementary sub-projects have been set up, which supply facilitative services to the core sub-projects. These include:

• *The Computer Committee:* The Computer Committee was established as a result of the introduction of computers at SEIDET. The computer teachers got together and established the committee to take care of the practicalities surrounding the computer laboratory and look after the computer laboratories at the three branches. They also produced a teaching syllabus for themselves, engaged in research activities together with UP researchers, and trained the teachers at SEIDET.

• SEISPRO (SEIDET Student Project): At the UP, the SEISPRO students help former SEIDET learners and others students from disadvantaged backgrounds with all the changes both in study and life when students start studying at university. They also engage in career guidance activities at SEIDET, together with the SEIDET Career Guidance Committee (SCGC). SEISPRO projects were also set up at two other tertiary institutions, but these projects have been less successful than the UP one.

• *The SEIDET Career Guidance Committee (SCGC):* Many learners and their parents have no experience with high school, let alone further education. Therefore they are sometimes reluctant to take up further education. To counter this, a career guidance committee was set up just after SEIDET was established. Career guidance started out as a separate project, but is now

partly integrated into the Saturday classes. Besides the career guidance in the Saturday classes, the parents of the Saturday learners are educated by the career guidance teachers and students from SEISPRO during parental meetings so they can make better choices in further education.

• *The Social Unit (SEISU):* The SEIDET Social Unit was set up to provide social support in bad times to SEIDET volunteers. The idea behind the establishment of this sub-project was that, because SEIDET volunteers are very busy with their activities at SEIDET, there was not a lot of social backup in the project for emergencies like illness or death. It is SEISU's task to step in at such moments, by providing support to family and friends. However, this sub-project never really took off.

• *SEIDET News:* SEIDET News is a quarterly news magazine for everybody involved in SEIDET. SEIDET volunteers bring success stories and news to the attention of the SEIDET community with the intention to inform and enthuse the volunteers and the community.

# 3. SEIDET's Achievements: An Assessment

We now go on to establish how successful SEIDET has been at achieving its overall goal of increasing the number of graduates from tertiary institutions in science, mathematics and commercial studies. We speak of "success" when indicators of output and/or impact support the occurrence of a significant positive effect of SEIDET's actions on the problem. For activities where specific targets were set, we evaluate outcomes against those targets, but this could not be done for all SEIDET's activities.

We use both with/without and before/after comparisons in our data analysis.<sup>5</sup> Using a combination of these two types of comparisons will minimize the risk of drawing wrong conclusions.

An analysis of the main output and impact indicators of SEIDET yields the following results:

• In June 2002, about 150 former SEIDET learners had graduated from universities or technikons.<sup>6</sup> Another 400 former SEIDET learners were studying at various tertiary institutions at the time. Before SEIDET's existence these figures were close to zero. This clearly suggests that SEIDET's initiatives on career guidance and its placement activities have been successful.

• The graduation achievements of the three SEIDET branches are well above (between 17 and 36 percentage points) the performance of their respective districts as a whole. The three branches together perform 25 percentage points higher on average than the three combined districts in which they are located.<sup>7</sup>

• If SEIDET were to be ranked as a school in the government's list, it would outperform 73 to 86 per cent of the schools in the respective regions. With a 66 per cent pass rate, the SEIDET students are clearly performing better than the average student in the combined districts (41 per cent pass), the province (51 per cent pass) and even the nation (56 per cent pass). The provincial average is better than the SEIDET average in only two out of the nine provinces in the country. This is significant, because Mpumalanga province in which SEIDET is located, ranks seventh out of nine, while SEIDET achieves averages that can compete with the more affluent, urbanized and white provinces in South Africa.<sup>8</sup>

<sup>&</sup>lt;sup>5</sup> For details about the methodology, see Gaillard and Bouwman (2001).

<sup>&</sup>lt;sup>6</sup> In June 2002, graduation of 102 students had been confirmed and graduation of an additional 48 students was being awaited.

<sup>&</sup>lt;sup>7</sup> Source of regional and district statistics: Government of South Africa (2001).

<sup>&</sup>lt;sup>8</sup> The pass rate is the percentage of students receiving a diploma that gives them access to college or technikon (polytechnic), but not university. To be able to enroll at a university, a student's diploma must be marked with an exemption. As SEIDET's ultimate goal is to increase the number of graduates from tertiary

These output and impact indicators indeed suggest that SEIDET is a very successful project. However, some qualifications are in order. First, SEIDET is merely a supplementary education activity to the regular education service. Thus, we cannot entirely discount the possibility that some improvements may have been made in the regular secondary school science curriculum after 1992, which could have induced improvements in learners' achievements irrespective of SEIDET's activities. This could affect the interpretation of the before-after result. Another possible problem, which affects the with-without comparison, is that the composition of the 'SEIDET sample' of pupils and the student population of the districts and province as a whole may not be strictly comparable. It is conceivable that SEIDET attracts the brightest and most motivated students in the area, as well as those who hail from families that are able to pay for the fee. Less able and eager students who belong to very poor families that are least able to pay for SEIDET education might be underrepresented in the SEIDET learner group. Taking things to extreme, the above statistical results could merely arise from a situation in which SEIDET attracts the very brightest and most hard working pupils in the region, but does not teach them anything at all.

While we cannot entirely disprove the operation of these kinds of interfering effects, we can nevertheless state with confidence that their impact on the statistics would be minimal. First, SEIDET has consistently attracted many learners during its years of operation (Table 1), and it would be hard to believe that pupils would stay with SEIDET for at least a year, pay the fee, give up their free Saturday, while not learning anything and not spreading bad publicity in the community. Second, it would be highly unlikely indeed if professional teachers, who also teach during the week, would not be able to teach students anything during Saturdays. It would be even harder to accept that these teachers would do this for almost no money on their free Saturday, fail to notice that they are not improving the knowledge and skills of their pupils, and just keep at it. Third, it would be very hard for an organization which is not adding value to stay in business and not receive a bad name among the population it serves. When we look at the achievements of SEIDET over the last ten years, we see that, the number of pupils involved with SEIDET in their final year steadily increased year after year till they reached a peak in 1998/99. After that, the numbers settled to around 420 pupils per year.

					,					
Year	1992/3	1993/4	1994/5	1995/6	1996/7	1997/8	1998/9	1999/2000	2000/1	2001/2
Nr of										
branches	1	1	2	3	3	3	3	3	3	3
Nr of grade										
12 students										
at SEIDET	89	181	266	304	335	442	586	423	417	409
Nr of										
passes	44	115	203	218	280	352	429	250	269	280
Nr of										
exemptions	15	25	82	77	92	262	283	187	90	55
Nr accepted										
at UP	1	8	12	15	26	53	68	20	13	10
Accepted at										
other										
tertiary	3	20	100	115	200	112	152	38	47	64
% pass	49,4	63,5	76,3	71,7	83,6	79,6	73,2	59,1	64,6	68,5
% exempt	16,9	13,8	30,8	25,3	27,5	59,3	48,3	44,2	22,3	13,4

# Table 1: SEIDET's performance over the years

(Source: SEIDET 10th Anniversary Account)

institutions (college, polytechnic, as well as university), ideally its success should be judged by both the pass rate and the exemption rate.

Our conclusions are firmly backed up by personal testimonies from SEIDET learners. A Human Science Research Council evaluation of SEIDET concludes (HSRC, 1998) that almost all [97%] the respondents associated with SEIDET projects, SEIDET administration or management in some way "...consider their participation in SEIDET as being worthwhile. The main reasons mentioned were that this involvement provided them with an opportunity to help others (43%), to learn (20%), and to perform specific actions (16%)" (HSRC, 1998, page 7). Moreover, 97% of the respondents liked being associated with SEIDET. The same study also "reveals that 79% of the respondents agreed in full [with the statement that SEIDET is achieving its objectives], while a further 16% also agreed, but qualified this to some extent by stating that there were still some objectives that had not been achieved fully. The main reason given by the respondents why they thought that the objectives were being met [...] was the success that SEIDET students were showing, e.g., by attending university and passing exams. Other reasons mentioned included the dedication and enthusiasm of stakeholders, increasing community involvement, and general progress in its activities." (Ibid., page 9)

The reasons stated are clear evidence that SEIDET does add value, and that it outperforms the regular schools in the region. Teachers want to teach for SEIDET and are proud of it; the pupils want to learn with SEIDET; and the volunteers are volunteering for SEIDET. This is the best evidence that these people believe, and experience, that SEIDET is successful. It might be true that SEIDET attracts slightly brighter pupils that are above averagely motivated and, because of the (modest) fee requirement, not the poorest of the poor. This bias in the sample however cannot explain the highly significant differences between the SEIDET learners, and the average student in the combined districts, the province, and even the nation.

In conclusion, therefore, we feel confident in stating that SEIDET has been successful at improving the pass and exemption rates of its pupils significantly. This, supported by the successful career guidance and placement activities leads us to conclude that SEIDET has managed to increase the number of graduates from tertiary educational institutions in the fields of science, mathematics and commerce. Its service offerings have enabled young black people to overcome deeply entrenched societal barriers to career advancement. The intriguing question is how this could have been achieved entirely by inexperienced local volunteers without adequate resources. A suitable conceptual tool kit with which we can attempt to answer that question is introduced in the following section.

# 4. Conceptual Framework for the Exploration of SEIDET's Success

Without doubt, the educational services set up by SEIDET together represent a highly innovative solution that is well attuned to the local educational problems faced by the Siyabuswa community. But what exactly is the secret to the effectiveness of these services? What characteristics do SEIDET's services have that makes students want to use them, and teachers and associated people to provide them?

In our view, the key to answering that question lies in understanding the underlying organisational model that underpins the provision of the services. We have to understand the functioning of SEIDET's organisational processes that somehow produce the services that we observe, and how and why these processes emerged and evolved into their current form. Knowledge of these issues is also essential for assessing the prospects for further upscaling and diversification of SEIDET's activities, as well as addressing possibilities for replication of its model in other needy communities.

Theories that conceptualise and explain the generation, adoption and diffusion of innovations from a process perspective could thus be expected to offer a useful conceptual instrument with which to study SEIDET as an innovative organisation. We briefly review some important strands

of innovation theory before zooming in on the one particular model that we will use for analysing the SEIDET case.

# Linear versus evolutionary perspectives on innovation

Older innovation models – roughly before the 1980s – adopted a linear perspective on the innovation process. Rogers (1995) provides several prime examples of these models. Innovation is typified as an orderly phenomenon which goes through distinct stages. It begins with research, followed by development, which in turn leads to production, and finally to marketing. In the classic linear interpretation there are no feedback loops in the system, and there is a clear division of labour between the different stages, particularly between activities geared towards 'knowledge seeking' and 'knowledge use' (Clark, 1995, p. 250), i.e. between the production of innovations and their diffusion.

The main advantage of these models is that they are easy to understand. However, the 'pipeline' notion has proved to be of limited validity in a messy world characterised by imperfect information. Innovation is inevitably an iterative process full of trial and error, and it requires incremental adaptation at every stage. An especially important contribution of more recent innovation theories (which has been widely corroborated by practice) is that making *users* active partners in innovation leads to higher uptake of new products and services, because continuous feedback leads to innovations that better fulfil user needs. This evolutionary, non-linear view of innovation has gained widespread acceptance (e.g., Lundvall, 1988; Gardiner and Rothwell, 1985; Rothwell and Gardiner, 1989; Kline and Rosenberg, 1986; Douthwaite *et al.*, 2001; Douthwaite, 2002; Douthwaite *et al.*, 2002; Clark, 1995). In some industries, for example in scientific instruments production, users even assume the leading role in the development of innovations, while the suppliers who are ultimately responsible for producing the innovations play only a subsidiary and facilitating role (Von Hippel, 1976, pp. 220-1).

The importance of active user involvement applies to high-tech innovations in economically advanced countries as much as to simple adaptive innovations in poor developing countries and regions of the world, and it applies just as much to the development of new artefacts as it does to innovative organisational models. This is shown in Douthwaite (2002) and Douthwaite *et al.* (2002) with examples of Danish windmills, Philippine farm equipment, Linux open source software, and Local Exchange Trading Systems. What these innovations shared is that they were allowed to evolve, giving them sufficient time to be perfected. More often than not, this incremental adjustment process took years. There are manifold other cases of close user-producer interactions contributing to innovation success in developing countries that exhibit the same pattern (for example, Biggs, 1989; and Gamser, 1988).

In addition to producing suitable new innovations (i.e., *artefacts*) that will meet customers' needs, active and ongoing user involvement in the innovation process also enhances research *capability*, that is, "...the ability of the informal systems to do research, and of informal systems to request information and services from formal ones" (Biggs, 1989, p. 8). Lundvall (1988) points to the importance of adequate (re)search capabilities of users for a well-functioning national innovation system as a whole. In his words "...lack of competence of users and the tendency of producers to dominate the process of innovation might be as serious a problem as lack of competence on the producer side" (p. 358). Clark likewise points out that building the capacity for assimilating, processing and using relevant information which is crucial for economic competitiveness and sustainable growth, cannot depend on hierarchical organised systems. It needs to rely on local actors as they alone have the expert knowledge of their local context that is the key to successful innovation (Clark, 1995, pp. 255-6). Bruton (1985) even goes so far as to identify the acquisition of such widespread innovation search capability by all major stakeholders, including end-users, as the essence of the development process in an economy.

This being said, companies cannot realistically expect to create ongoing partnership relations with their whole customer-base. Some customers – perhaps even the majority – may not be interested in, or capable of, establishing and entertaining close contact with their suppliers on an ongoing basis. Innovation diffusion models have widely noted that the initial uptake of new products and services tends to be driven by a few highly motivated pioneer adopters. These people can handle risk and have an inherent interest in co-experimentation and contributing to incremental improvement of early prototype designs, without caring much about short-term financial gain. The key to successful market development for a supplier lies in identifying these key lead users, who will be prepared to act as its early development partners. More risk-averse users will be enticed to adopt the innovation once it has evolved into a more or less robust design, when they are able to observe its practical usefulness through demonstration by the early adopters (Rogers, 1995).

# The Linux case: Bazaar-like development

The contrast between the pipeline model and the evolutionary view to innovation has been aptly typified by Raymond (1998) with respect to the development of computer software. He speaks of the difference between "the Cathedral" and "the Bazaar" approach. He showed how the Bazaar mode applies to the successful development of the Linux operating system, and its inventor, Linus Torvalds. Raymond, a veteran Cathedral developer himself, used to believe that Bazaar-like development was bad policy for larger than trivial projects, because early versions of software programmes are almost by definition buggy and you do not want to wear out the patience of your users by releasing imperfect versions all the time. But about the Linux community he observed: "*No quiet, reverent cathedral-building here - rather, the Linux community seemed to resemble a great babbling bazaar of differing agendas and approaches* [...] out of which a coherent and stable system could seemingly emerge only by a succession of miracles. The fact that this bazaar style seemed to work, and work well, came as a distinct shock. As I learned my way around, I worked hard [...] at trying to understand why the Linux world not only did not fly apart in confusion but seemed to go from strength to strength at a speed barely imaginable to cathedral-builders". (Raymond 1998, p. 2).

According to Raymond, the Bazaar approach worked in the Linux case because Torvalds cultivated his base of co developers and leveraged the Internet for collaboration harder than anyone else. He kept his users/hackers constantly stimulated and rewarded – stimulated by the prospect of having an ego-satisfying piece of the action; rewarded by the sight of constant (even daily) improvement in their work. Users were observed to be not merely good debuggers, but also good contributors and inspirators.

Raymond lists a number of key factors that led to the success in Linux and in an experiment that he himself conducted. Leaving out the project's software-specific factors, these include:

- 1. The innovation must scratch a developer's personal itch. The best innovations start out as personal solutions to the developer's problem and spread because the problem turns out to be typical for a large class of users.
- 2. Know what to reuse from other projects; there is no use in re-inventing the wheel.
- 3. You often do not really understand the problem until the first time you implement a solution. Plan to throw one solution away.
- 4. When you lose interest in the project, your last duty is to hand it over to a competent successor.
- 5. Release early (the product does not have to be finished in any way), release often (so that people can experiment often) and listen to your users (as they are your biggest source of ideas).
- 6. If you *treat* your users as if they are your most valuable resource, by encouraging people to participate, polling them about important decisions and praising them when they send

feedback, they will respond by *becoming* your most valuable resource by providing rapid improvements and effective debugging.

- 7. Given a large enough co-developer base, every problem will be identified quickly and be fixed by someone.
- 8. The next best thing to having good ideas is to recognize good ideas from your users. Sometimes the latter is better.
- 9. When you hit a wall in development, it is time to ask not if the answer is right, but whether you are asking the right question.
- 10. Legal constraints of various licenses, trade secrets, and commercial interests hinder bazaar development.

Aside from these factors that led to (or hindered) the success of both projects, Raymond pointed up some preconditions that have to be in place for the Bazaar model to work:

- 1. Since it is very hard to originate a project in a bazaar mode, the initiator needs to be able to present an initial plausible promise to the development community. The solution does not have to work particularly well. It can be crude, buggy, incomplete, and poorly documented, but what it must not fail to do is convince potential co-developers that it can be evolved into something really neat in the foreseeable future. Furthermore it has to be testable for the co-developers to play with.
- 2. It is not critical that the coordinator be able to originate designs of exceptional brilliance, but it is absolutely critical that the coordinator be able to recognize good design ideas from others.
- 3. It is essential to keep an initial design robust and simple. The problem with being clever and original in design is that it gets to be a habit you start reflexively making things cute and complicated.
- 4. A bazaar project coordinator or leader must have good people and communications skills. In order to build a development community, you need to attract people, interest them in what you are doing, and keep them happy about the amount of work they are doing.
- 5. Cheap Internet was a necessary condition for the bazaar model to evolve, but it was not in itself a sufficient condition.
- 6. Another vital factor was the development of a leadership style not based on power relationships combined with a set of cooperative customs that allowed developers to attract co-developers, through the enhancement of reputation amongst others and ego satisfaction of their own. In other words, an efficient market in "ego boo"[sic!].

Clearly, the Bazaar style of development needed frequent and cheap ways of interaction between lots of people, which is just what the Internet provided. An implication of the Bazaar style of development was that the clearly defined line that once existed between developers, testers and users was fading rapidly. Users who just wanted to use the product for free could do so, users who wanted to test and report bugs could do so, and because the source of the product was available any user whishing to become a developer could start developing from the minute he or she decided he or she wanted to do so.

# Douthwaite's Learning Selection model

Useful as Raymond's insights on software development are, they fall short of a coherent innovation model with applicability in different sectors. This is where Douthwaite's "Learning Selection" approach (Douthwaite, 2002; and Douthwaite *et al.*, 2002) has made a major recent contribution to the evolutionary innovation literature. We will use Douthwaite's model for analyzing the SEIDET case.

Douthwaite et al. (2002) start by criticizing the Transfer of Technology (TOT) approach, which we immediately recognize as the linear approach. He says that the TOT approach is based on the positivist paradigm that underpins conventional science and considers that to be objective,

independent and based on natural laws that science can uncover. In this view, scientific methods can be used to understand the reality and design technologies that are finished and will work in reality. Local knowledge might be important for fine-tuning, but this can be done during on-site testing prior to release. The technology should not be released before it has been perfected, by which time the researchers have finished their job and it is up to the extensionist to deliver the package to the user. Users then either adopt it or not, but are not expected to make any innovative changes. Douthwaite found that the TOT model did not capture the complexity of the process that goes on when users adopt and adapt innovations to their local needs, nor has the model been shown to be able to explain diffusion of more complex technologies that require changes in the behaviour of the users.

Douthwaite analyzed the innovation, adoption and adaptation of farming equipment and observed a cyclic process whereby the technology slowly grew to a broadly usable product that was then widely adopted. He theorized that this process might resemble an evolutionary process in which the early adopters of the technology are involved in the evolutionary process that, through many cycles, evolves into a more useable product. He used the analogy between technological chance and Darwinian evolution principles that Nelson and Winter (1982) and Mokyr (1990) had used before. He reasoned that, if this analogy were true, something similar to natural selection must occur, and he called this process *learning selection*, since learning is central to innovation. Based on experimental learning cycles described by Rosenberg's (1982) learning by doing and learning by using, he constructed a learning selection cycle (Figure 1) that consists of four stages:

- **Experience:** knowledge that a certain outcome is more beneficial than others.
- **Making sense:** identifying the possible solutions to achieve this more beneficial outcome.
- **Drawing conclusions:** picking one of the possible solutions.
- **Action:** testing the solution in real life.

Although the analogy between natural selection and learning selection is imperfect<sup>9</sup>, the semblance is close enough for learning selection to exhibit the three steps necessary in an evolutionary system, namely:

- **Novelty generation:** which occurs when different users try different solutions.
- Selection: which occurs when a participant concludes if an adaptation is useful.
- **Promulgation and diffusion:** which occur when users interact and tell each other about their experiences.

Moreover, a fourth non-critical step in evolutionary systems is also observed:

• **Recombination:** which occurs when different experiences are brought together to create a hybrid solution.

Douthwaite assumes that if a lot of participants go through these learning selection cycles many times, the outcome from these cycles will be that the "fitness" of the technology improves

<sup>&</sup>lt;sup>9</sup> Douthwaite states that the analogy of learning selection with natural selection is not perfect, but more an 'analogy as a heuristic'. In natural selection, the selection process is mindless or blind, while in learning selection the changes occur purposively; they are designed. Another problem with the analogy, according to Ziman (2000) and Jablonka and Ziman (2000), is that in technology there is no real equivalent to the biological gene. A "technology-gene" called a 'meme' has been proposed as an elementary concept of a technology that endures over a long period of time, replicates itself and shapes the actual artifact. However, this 'meme' is a shaky and rather academic concept that does not seem to exist in the real world. A third problem with the analogy, probably the most troubling for Darwinists, is that the direct changes from the environment can be reproduced into the next generation of these technologies. In other words, technological phenotypes - the context-dependent realization of a technology - carry hereditary information and therefore show Lamarckian features which are considered strictly forbidden in biology.





novelty generator and selector

**Participant** *j* behaving as a *novelty generator* and *selector* 

Figure 1: The Learning Selection cycle

(Source: Douthwaite, 2002, p. 47)



Phases in the invention, innovation and diffusion process

Figure 2: Stages in the innovation process

(Source: Douthwaite, 2002, p. 19)

Douthwaite states that, independent of an innovation undergoing a linear or a cyclic evolutionary process, the stages in the life of an innovation are the same (Figure 2). The debate, then, is not so much on whether or not there are stages in the innovation process, but over the involvement of researchers and users in the various steps in the process. From the case studies Douthwaite carried out, he found that much innovation took place *after* the release of the new technologies and that the conventional TOT model did not really fit reality; scientists and engineers were not able to produce useful technologies fit for instant use; they could only come up with prototypes that promised to be successful. In the TOT-like or linear models, researchers hand over their technology to the extension worker at the beginning of the adaptation phase, thus never coming into contact with the adopters. As a result, the development of the technologies gets stuck at the prototype stage. In contrast, in the learning selection model there is a period of co-development between the researcher and the adopter.



Phases of the Innovation Process

# Figure 3: Evolution of knowledge and changing stakeholder participation during the innovation development trajectory

(Source: Douthwaite, 2002, p. 218)

On the basis of detailed case studies of several successful innovations, Douthwaite conceptualized a model (Figure 3) in which the technology begins its life as a **bright idea** from a small R&D team. At this moment in the process, the R&D team drives the innovation process and the key stakeholders are consultants, if at all they are engaged in the process. The key stakeholders are the people who will ultimately take ownership of the idea, replicate it and make it work.

This bright idea is then developed into the developers' **best bet** and leaves the laboratory. The best bet is a prototype embodiment of what the R&D team believes will benefit the key stakeholders. During the start-up phase the R&D team demonstrates or lends the technology to the key stakeholders to get feedback on its best bet and tries to develop it further into a **plausible promise**. Following Mokyr (1990) Douthwaite says that creating a 'plausible promise' is an

attack by an individual on a constraint that everyone else has taken for granted. This is not something that lends itself to a broad consensual approach. The essential difference between the plausible promise and the best bet is that the latter is defined by the R&D team, while the plausible promise is defined as such by the stakeholders. At this point the plausible promise does not only incorporate knowledge from the R&D team, but also from the stakeholders (depicted by the white part of the gear in Figure 3).

The adaptation phase begins when the most innovative stakeholders start to invest in the innovation and adopt it. The R&D team should stay with its invention to facilitate learning selection by guiding and helping the key stakeholders, filling knowledge gaps, selecting beneficial modifications, promulgating them, and also carrying out their own learning selection iterations. A period of equal partnership between the key stakeholders and the R&D team begins. During this period, learning selection will change and improve the innovation, or when the innovation is not important enough in the eyes of the key stakeholders, the innovation will slowly die.

According to Douthwaite, conventional theories usually regard this period of adaptation as a black box that one cannot look into. However, with the combination of the learning selection model and the phases of innovation, we can look inside, and we then see something like Figure 4. It shows the plausible promise, which is largely created by the R&D team, evolve into a fitter and more widely adoptable technology through many learning cycle iterations.



Figure 9: Inside the 'black box'' – How a 'plausible promise' evolves into a widely adoptable technology

(Source: Douthwaite, 2002, p. 219)

After the innovation has become fit enough after some time for the first early adopters to adopt the innovation, this also marks the moment the R&D team should hand over to the key stakeholders. At this point market selection becomes predominantly important and learning selection will give way to learning by modeling. Adaptations are not carried out directly on the technology, but are modeled and learning occurs from virtual tests rather than from field experience.

Based on this analytical model, Douthwaite defines seven prescriptive principles for setting up and managing a successful learning selection process. These seven principles will form the basis of our research instrument that will be used for examining the SEIDET case:

- 1. Start with a 'plausible promise'.
- 2. Keep the 'plausible promise' simple, or: "Keep It Simple Stupid (KISS)".
- 3. Find a product champion.
- 4. Work in a pilot site or sites where the need for the innovation is great.
- 5. Work with innovative and motivated partners.
- 6. Do not release the innovation too widely too soon.
- 7. Know when to let go.

Although at first sight the sixth Douthwaite principle, "do not release the innovation too widely too soon", and Raymond's Bazaar principle, "be open to the point of promiscuity", seem to contradict each other, this is not the case. The Bazaar style of development that Raymond described is actually a special case of Douthwaite's Learning Selection approach. The difference is that in the Bazaar model it is possible to accommodate most learning selection processes in an automated system (like for example CVS, Concurrent Versions Systems). In this system information and outcomes of learning selection can be stored and users can communicate with each other. This CVS system is specific to software design and facilitates and sometimes almost mimics the user-innovation community that is needed in Douthwaite's model. In contrast, since the Douthwaite model is not specific to the software sector, the champion of a Douthwaite style project must be able to cope with all the information requests and learning selection outcomes him- or herself. That is why Doutwaite warns against too wide a release at a too early stage.

In short the model Douthwaite uses is one of 'innovation by the users': Do not believe that the R&D people can provide you with an innovation that is finished, because history has shown that they frequently cannot. Start with a small and simple in-progress innovation and see if there are enthusiasts who are willing to use it, comment on it, and 'play' with the innovation. Let them free in what they want (and do not want) to do with it and supply them with a channel to communicate their experiences and enhancements back to you. This will generate a lot of diversity in the innovation. Through a selection procedure the best changes and extras are then built into the next prototype and returned to the users. In this way, the innovation process becomes an iterative process between and among many users who are at the same time co-developers. The innovation is owned by everybody who participates, but no-one in particular. Because of the fact that many people can take ownership of the innovation and can shape it their way, diffusion of this innovation is much simpler. Also, NIMBY ("Not In My Back Yard") reactions are less likely to occur, as people do not perceive the diffusion as something foreign that is being forced on them.

# Possible relevance of the Learning Selection approach to SEIDET's experience

When we look at SEIDET from the perspective of the Douthwaite model, it seems that the model indeed depicts the kind of processes that SEIDET has gone through.

Firstly, SEIDET qualifies as an innovative project, in several different ways in fact. The things that SEIDET does can be seen as innovations in themselves. For example the recent addition of computers, a LAN and Internet to the SEIDET project are an innovation to both the SEIDET project as well as to the communities that SEIDET serves. The ways in which SEIDET provides these services are also innovative. And the way in which the project SEIDET has been organized

and run, may also prove to be an innovation. Moreover, there was some circumstantial evidence (mainly from UP) before embarking on this research that these innovations did not happen overnight. They evolved over a period of time and there was a lot of experiential learning involved. This might point towards the occurrence of something akin to Douthwaite's learning selection mechanism.

Secondly, the concept of "key stakeholders" used by Douthwaite (i.e., the first users of an innovation that can become its co-developers) is applicable to SEIDET. Its key stakeholders are essentially everyone who directly uses SEIDET's *services*; everyone who adopts, uses or works with the SEIDET-service *concept*, as well as those who experience the *benefits* from SEIDET's work. The key stakeholder list includes:

- All people working or volunteering for SEIDET.
- The learners, parents, feeder schools and others on the input side.
- The colleges, universities and other tertiary institutions on the output side.
- The community at large that benefits indirectly from SEIDET.

The most likely people to become important co-developers are the people who work or volunteer for SEIDET (i.e., the adopters of SEIDET's teaching and learning concept), and the learners that have gone through SEIDET (i.e., the users of the teaching services themselves). These two groups possess detailed information that enables them to engage in learning selection. Moreover, also individuals from the community, parents and individuals from tertiary institutions have proven to be co-developers in SEIDET, as we will see later on.

Thirdly, the history, the current activities and the future plans of SEIDET (now running for over 10 years) show all kinds of similarities with the key factors of success from the Douthwaite model. Some of the similarities observed are:

- SEIDET was set up as a modular and 'open project'.
- The idea was generated by 'the users'; i.e. the initiators felt a need and tried to solve it.
- The initial idea was simple, progress was slow and initial investments were made by the initiators on an incremental basis.
- More and more people became aware of the initial idea as time went by.
- The initial idea was then changed/extended quite rapidly by 'the users' as more and more people became involved and the initiators became 'controllers'.
- The project was (and still is) run and owned by 'the users'.
- 'The users' are driven by enthusiasm, not financial reasons.
- When the project proved to be successful, external partners joined.
- The project has continued to change, and it still is unfinished, ten years after the start.
- Now that the project is maturing, some commercialization is about to take place.

On the face of it, then, the Learning Selection framework could be a suitable conceptual device with which we can shed more light on SEIDET's achievements and unravel the contributions by various actors and factors to its performance.

# **Operationalisation of the Learning Selection approach**

In his book, Douthwaite (2002) lists ten key success factors in innovation projects. In addition, through in-depth study of his model, several more factors can be identified. Within this total list of factors, we distinguish (a) prerequisites for learning selection, and (b) other key factors of success. The difference between these two types is that *all* the prerequisites need to be in place in order for learning selection to be *possible*, while the presence of the other key factors makes it *more likely* that successful learning selection will occur. We could call these facilitating factors.

For our purpose, the factors type (a) and (b) are formulated in the form of 15 hypotheses, as follows:

1. All four learning selection prerequisites (factors type a) are present when:

- a. Participants are free to join and they select themselves.
- b. Adopters are able to modify the innovation.
- c. Evaluation of modifications is possible.
- d. There is an unbiased selection mechanism for the modifications.

The hypotheses based on key factors type b are:

- 2. The initial idea is formed by a small team of individual(s); *the initiators*.
- 3. This small team of individual(s) generates a 'best bet' prototype of what the key stakeholders want.
- 4. They demonstrate this 'best bet' to the stakeholders and the stakeholders are convinced that it constitutes a 'plausible promise' of benefiting them.
- 5. The 'plausible promise' is simple, flexible and robust.
- 6. There is at least one stakeholder who is highly motivated, knowledgeable, communicative and 'low on the ego side' who champions the process, fills in the knowledge gaps and functions as a selector.
- 7. Nothing with a resale value is given away for free.
- 8. Early adopters (from within the stakeholders) understand the concept and are sufficiently motivated to modify and carry out sensible *learning selection* on the 'plausible promise'.
- 9. Stakeholders gradually take over the ownership from the initiators.
- 10. The pilot project is in an area where the need for it is high.
- 11. *Start-up:* The innovation is not released too soon to too many learning selection participants.
- 12. Innovation is not patented or protected in any other way.
- 13. The product champion lets go in time before the expansion and market takes over.
- 14. *Expansion*: Innovation becomes mainstream; adopters want the innovation to work reliably and profitably.
- 15. A shift from 'learning by doing' to 'learning by modeling' occurs, when adaptations are not carried out directly on the technology but are modeled, and learning occurs from virtual tests rather than from field experience.

In section 6 we will attempt to answer the question to what extent the Douthwaite model can explain the success of the SEIDET case, by examining each of these hypotheses in the light of the available evidence.

# Data collection and analysis

Not all the data to answer the research questions were available from secondary sources. Moreover, the secondary documents that were available were not written for the purpose of this research and might include errors, omissions or have a misleading scope. Therefore the available secondary project data needed to be supplemented and tested by primary sources. The basic research design comprised a case study of the project based on first-hand observation and study of secondary literature sources, complemented by interviews and a survey among various stakeholders. In all, 18 interviews were conducted. These were loosely structured conversations with people or groups, including 3 teachers, 3 managers, 6 board members, 3 ICT project members and 3 other people linked to SEIDET (The King, the SEISPRO board and a PSSP organizer). Before every interview a list of respondent-specific questions was drawn up, but during the interview these questions were not rigidly adhered to, because other interesting subjects would come up or because of the specific knowledge the interviewee showed to possess. Notes were taken during the interviews, and as a rule the interviews were written out as soon as possible. If possible these transcripts were submitted back to the interviewee for approval.<sup>10</sup>

<sup>&</sup>lt;sup>10</sup> The interviews can be found in Siebeling (2004), Appendix 8.

Roughly, the six interviews with the SEIDET board members focused on the history of the project and the changes that occurred over the years. The interviews with the six teachers and managers focused on "the community"; both in the sense of "SEIDET family" and the larger community, and on the gratification the interviewees got from their work. The three interviews with the ICT sub-project members focused on the history and the future of the ICT sub-project within SEIDET, and the remaining interviews focused on the specific roles the respondents played within SEIDET.

Using the data from the various sources, time lines were constructed for SEIDET as a whole, as well as for important sub-projects. Through these timelines, the case was made for changes that were made to SEIDET's organization and activities during its ten year existence, and from this the key factors were distilled that led to the success of the project directly and key factors that made learning selection possible in SEIDET. The result is a list of key factors that explain the success of the SEIDET case that can be compared to Douthwaite's 15 hypotheses listed above. For every hypothesis that is applicable to the case, a conclusion is drawn. The overall conclusion of this exercise will show whether it was possible (i.e., whether the prerequisites were met) and likely (i.e., whether the other key factors of success were in place) that learning selection took place in SEIDET. The result of this exercise should show if the Douthwaite model is able to explain all successes and failures in SEIDET (i.e. if all SEIDET key factors are present in the Douthwaite model).

It is possible that there are factors of success in the SEIDET case that cannot be explained by the Douthwaite model. This could mean either that (i) the Douthwaite model is incomplete and has to be further extended; or (ii) the extra key factors of success constitute peculiarities of SEIDET and are not critical to all Douthwaite-like cases; they might be case-specific factors that facilitated success. We examine these issues in section 7.

# 5. Learning Selection Cycles in SEIDET

In this and the following two sections we analyze SEIDET's experience in order to establish what its key factors of success have been. First, in this section we conduct an *inductive* analysis: We examine four major learning selection cycles in SEIDET, and identify, *purely from the empirical data*, a list of key factors that enabled and contributed to the success of these cycles (as well as any factors that may have contributed to SEIDET's success directly, i.e., not through any learning selection cycles). We analyze four major learning selection cycles in detail, namely: (1) the organizational, management and strategic aspects related to the initiation and setting up of the SEIDET organization; (2) the development of the Saturday tuition programme, (3) the development of the ICT sub-project; and (4) the development of the Primary School Science Project. Several additional learning cycles were in fact identified in the research<sup>11</sup>, but data about these are not abundant. Therefore, we singled out the aforementioned cycles for in-depth analysis. This section is therefore a largely descriptive historical account of SEIDET's success, based on richly detailed facts upon which some minimal logical order (but no theoretical framework) has been imposed.

After this, we perform a *deductive* analysis in section 6. We take Douthwaite's Learning Selection model as our point of departure, and we view SEIDET's experience explicitly through that theoretical lens. We structure the analysis according to the conceptual tool kit of that model, by testing the relevance of the 15 hypotheses formulated in section 4 to the SEIDET case. What we get from this exercise is an explanation of SEIDET's success that is based on underlying theoretical premises from the field of modern innovation theory.

<sup>&</sup>lt;sup>11</sup> For details, see Siebeling (2004), Section 4.1.

As might be expected, the two types of explanation show considerable overlap, but an easy and perfect match between the two does not suggest itself. We therefore devote a separate section 7 to the matching of the findings from sections 5 and 6. This throws up several additional insights. A synthesis of all identified driving forces of the success of SEIDET is given in the concluding section 8.

# Learning Selection Cycle 1: The initiation and start-up of SEIDET as an organization

# • Personal experience of the problem

From 1983 to 1987 Jackie Phahlamohlaka, one of the initiators and the later champion of the project, studied at the university of Zululand. This was by no means easy at the time for any young black male. Jackie persuaded and helped a handful of other black students to study at the University of Zululand. This group of students met frequently and discussed where they came from and what problems they and their people were facing. They were concerned about the fact that the matriculation results from their fellow students back home were poor; and this, combined with a lack of local awareness about what university education was about, resulted in very few people from their region enrolling in university. They discussed what they could do about this after finishing their university degrees, but they had no plan on how to tackle the issues. Jackie and some others gave some extra tuition to secondary school children during the winter break once or twice, but nothing developed during this period.

We want to highlight the fact that there was a very long period between the moment the problem was identified by the initiators (at about 1983) and the moment the solution was actually in place (1992). This long run up to the solution may have had a few advantages. Firstly, during this long period the initiators themselves were faced with the problem. This added to its perceived seriousness, and led to a realization that it was necessary to solve it. Secondly, they discussed and analyzed these problems extensively. They saw that they were only the lucky few that had made it into university, and were only too aware of the problems their fellow students were faced with. And thirdly, they experimented with career guidance and supplementary education to secondary school children. They taught at a secondary school during the winter and tried to persuade other black students to come to university. In other words, they underwent learning selection cycles by experimenting with the basics of the project (supplementary education and career/study guidance) before the project's inception.

# • The community challenge

Another important moment in the history of the project came when Jackie P. came home in 1990 from an MSc scholarship in Canada and was faced with his local community that did not really understand what he had been doing overseas. The community did grasp, however, that what he had been doing was very exciting and good for the community, and they felt that more people in their community should get such opportunities. Because Jackie had been so lucky to be given such a change, the community – through some important community members and friends of Jackie – challenged him to do something about their community's situation. They did not say or know what he could do, but they challenged him by stating that he *could* do something. One of the entrenched truly African values is that of "Ubuntu". It is based on the notion that "I am, because you are", a highly communal way of living in which one always extends a helping hand to another person in need. The concept of "helping others in one's own community" has always been something "that one does", and this naturally extended to the SEIDET initiative.

# • Concept solution design by a small diverse team

Jackie did not endeavour into this challenge all by himself. He quickly gathered a group of people around him (the steering committee) that had been through the same problems as he

himself had experienced. He also made sure that this small group of people had the diverse knowledge needed to set up a project to deal with these problems.

From the moment the steering committee was formed it was clear that the members wanted to undertake a *science-based* project, because that was their area of expertise. Giving supplementary science classes was the natural conclusion. The steering committee did not have a broad meeting with the community at that time, and the committee members did not know if the community would be interested in what they were preparing. However, having experienced the difficulties along the road themselves, they knew what type of assistance they themselves would have valued, and worked towards that. In this way they designed a first solution that was good enough to survive the start up problems any project will face.

With the drawing up of the first official plan for the project, the first learning cycle in the project's organization and management can be seen. The initial idea focus was on science education, but because individuals from different fields (commerce and English) also wanted to contribute to the project, the focus of the project was broadened to include these subjects. Years later in the project, geography and agricultural science were also added. The steering committee was self selecting during the period when the project was set up. Some initial members left because of differences in opinion or lack of motivation, while new members joined. At the official start of the project, a highly motivated team with a common focus had formed.

# • Achieving community ownership through consultation

At this stage Jackie P. took a step that was very important to the project. He started to "consult" the community on a large scale; he talked to many people about the plan and was invited to various community meetings. With only an outline of what would later become SEIDET, he visited these meetings and spoke about his ideas and got direct feedback from the people. These meetings were not called for the specific purpose of talking about SEIDET, but were regular meetings onstituted a long learning selection cycle involving different parts of the community. All the meetings he attended gave him insight into problems and solutions. These consultations were to continue until 1993/1994 because "we did not know what we were doing". The consultations ended only in 1993/4, when SEIDET had been clearly defined and stable, and when the concept would not fundamentally change anymore.

The consultations with community members helped to shape the project into the kind of project that was truly needed in the community. Through the consultations Jackie also built a large support base for the task he was engaging in. Furthermore, by communicating with the community he transformed *his* challenge into a challenge felt by the *whole* community. It was not *his* project he was setting up, it was the *community's* project that Jackie was leading, but did not own. To further ensure that the community's interests were looked after, a board of trustees was established to represent the community. Although the board of trustees was hand picked, not democratically chosen, the board members were recognized and respected by the community as their representatives because of the representative nature of the board.

# Linkages

Soon after the initial idea was formed, meetings were arranged with universities both in South Africa and Canada. This was important because of the need for (forward) linkages: Students that successfully graduated from secondary school needed to be placed in tertiary institutions. Because of these meetings, the universities were aware of what SEIDET was doing, and helped to enroll SEIDET learners. At a later stage in the project, these links led to a variety of learning selection cycles, for example during the establishment of the computer literacy courses and the PSSP project. These linkages also acted as a catalyst for action, by generating time-pressure to set up the project quickly, because of an impending visit of a Canadian delegation. The UP helped SEIDET search for funds, and later in the project the linkages proved a valuable source of

knowledge and experience in, for example, setting up the computer literacy courses. The institutional linkages with the University and Technician in Pretoria were formalized in 1994.

# • Learning from others, not copying

After the start of the project (1992), similar projects were visited and through a learning selection cycle, some practical solutions were adapted – not copied – from these projects, such as the constitution and reimbursement policies. Also, because SEIDET was already in operation when these projects were visited, the solutions, methods and culture that SEIDET had already developed were not influenced by these projects. The solutions that SEIDET chose were theirs, and not copies of ideas from others. Also, visiting these projects boosted the confidence of the initiators that such a project could be successful. Some help was received in the form of teacher training and teaching materials.

#### • Celebrating success with the community

After the first half year in operation, a fundraising day was organized. This was very important to the project because it was a moment for the community to look back at what it had achieved, feel proud, celebrate, and wish SEIDET well. It was the moment for people to identify themselves with something good, and through this day the community gave SEIDET a stamp of approval. The people who contributed in various ways to this day also received a certificate. All this established the "SEIDET family" feeling.<sup>12</sup>

# • *Committed leadership 'from the back'*

Jackie describes his own leadership style as informal, in keeping with his informal personality. He leads from the front only when it is necessary, which is not usually the case. He is more a facilitator, leading by giving ideas, through encouragement, by being critical, giving criticism and by checking if everyone is still on the right track. Jackie explained that these are the core values of SEIDET; a challenging atmosphere in which everybody can challenge everybody. Jackie regards himself as a "down to earth" type of leader, not the type of leader that wants his presence to be felt or wants to be seen as the leader.

An example of this leadership style is that Jackie never actually chaired an EC meeting in the ten years that he has been part of the committee. When interviewing him for this research, Jackie was asked if work could be "mandated and enforced by the leader(ship)". He answered that this was not the way in which SEIDET worked, except for the tasks that are stated in the various portfolios for, for example, the Managers and the EC members. Talking about these tasks, Jackie describes himself as "a pushy guy when it comes to deliverables". His informal style should not be confused with weak leadership. When it comes to obligations in the EC, he has been uncompromising.

Another aspect of SEIDET leadership is that there is awareness that leading positions should not become entrenched with particular individuals. If one stays in the same position longer than is necessary, ideas stagnate, thought patterns get entrenched and innovation becomes impossible. After ten years, the first EC therefore handed over its duties. The EC members were tired after serving 10 years, and did not want to become "African leaders" who stayed in power too long. They also wanted to ensure continuity in the organization by giving new people a chance to lead, watch SEIDET grow further from the sidelines, and let the EC change along with SEIDET's

<sup>&</sup>lt;sup>12</sup> An account of the 10 year' celebration can be found on: <u>http://up.ac.za/announce/1610021e.html</u>. Jackie, this link does not work anymore! Do we have any other source for this? One year later, there was another celebratory event as SEIDET was awarded a trophy by King Mayisha III of the Ndebele Nation for its achievements in community upliftment. See: <u>http://informatics.up.ac.za/sitnews.htm</u> (viewed on 30 June 2005).

development. "Our role is to support and to encourage them", Jackie said about the new generation of leaders.

In a University of Pretoria Working Paper (Snyman and Phahlamohlaka, 2002) Jackie is described as "exceptionally driven and absolutely committed to improve the quality of life in his community. His ambition and zeal are combined with a caring personality" (pp. 12-13). In the same working paper, the EC, as a group, is characterized as "a composite social entrepreneur [...], e.g., building something out of nothing based on a desire to improve conditions in their community" (p. 18). The EC members are described as extremely committed, sacrificing their own needs for the greater need of the community and expecting the same from others.

# • Work ethic

An important management principle is that positive things are emphasized while negative ones are not allowed to be in focus for long. For example, when people leave the project, Jackie does not express disappointment but rather thanks them for the work they have done, and he would not have hard feelings towards them. In the interview he explained that he feels it is important that people volunteer for SEIDET because they really want to do it. He does not want to develop a negative attitude towards people who want to stop contributing or who do not want to contribute at all. Therefore he does not have negative feelings when people leave, even when somebody promises to do something but quits midway the job. He explains that it is the nature of volunteer work that people come and go. If this is not taken into account, one would keep people in one's organization that are not so interested anymore, which does not have a good influence on the atmosphere. Only the SEIDET teachers are treated somewhat differently, because SEIDET must be able to count on them. Therefore they are asked to commit themselves for a year.

Focus on positive performance also manifests itself in the role played by various positive incentives. People in SEIDET are rewarded through certificates that are handed out from time to time. Furthermore Jackie always ensures good catering during the board meetings. He ensures that people can enjoy the food, and that their transportation is paid for. Moreover people are rewarded through recognition and a feeling of belonging.

• Summary of the key success factors arising from SEIDET's initiation and start up The key success factors emerging from this account about the manner in which SEIDET was initiated and set up can be summarized as follows:

- 1. The project initiators had experienced the problems first hand, and they had had ample time to analyze them and experiment with some solutions on a small scale. Therefore, it was relatively easy for them to come up with a promising solution. They knew that their solution was something that they themselves would have wanted to have access to at the time when they were in school.
- 2. The principle, "helping others in your own community is something you do", is deeply established in the local Bantu culture.
- 3. Because he was challenged by the community (rather than an individual), and because he was in a position to help, Jackie P. felt obliged to accept the challenge.
- 4. A concept solution was designed by a small, diverse team that had personal experience of the problems.
- 5. The project initiators (the steering committee, and later the EC) selected themselves during the start-up phase.
- 6. Ongoing community consultations shaped the concept into a project that truly fulfilled the community's needs.
- 7. Ongoing consultations and the establishment of a representative board built a broad support base in the community, and helped the community to assume project ownership.

- 8. Linkages with tertiary institutions facilitated placement for SEIDET learners; generated performance pressure; helped to obtain funding, and helped to access expertise and knowledge at a later stage.
- 9. SEIDET avoided re-inventing the wheel by learning and adapting but not copying things from similar projects. Other projects were studied only after the own SEIDET framework had been established. The solutions which they chose to implement were truly their own, thereby preserving the SEIDET culture and atmosphere.
- 10. Celebration was important, not only as a morale boost to all project contributors, but also to establish a feeling that the community is taking its future into its own hands.
- 11. Where authoritative leadership could have quickly crushed new ideas and initiatives, the committed, ambitious, self-critical and sacrificing style of leadership by the steering committee, and later the EC, has inspired others and nurtured new initiatives.
- 12. The 'no hard feelings' and rewards-based approach to volunteers have prevented deterioration of the atmosphere in the organization. By not trying to persuade people who have lost interest to stay on, the people who do continue are the highly motivated ones. The value of such "go-with-the-flow" and incentives-based strategies in a volunteer organization seems obvious, but managers' natural reaction is often to try to hold people to their commitments with sanctions, as one would do in non-volunteer organizations.

# Learning Selection Cycle 2: The Saturday tuition programme

# • Managers for the Saturday classes

In the beginning of the project, the EC performed the tasks of managing the Saturday classes. This was manageable when SEIDET consisted of just one branch, but it became unworkable after the establishment of the two additional branches. The EC had to travel every Saturday to all three branches to take care of the everyday management of the classes. This soon proved too much for its members. The bottleneck induced a new learning selection cycle, involving the appointment of Saturday branch managers and assistant managers who would be nominated by he teachers, and selected by the EC through an interview process. The managers were made responsible for their own budgets, but since the managers themselves came from the pool of teachers, a flat management structure developed, in which the budget for the Saturday program is drafted and decided upon by all Saturday staff members.

A regular meeting of the managers from the three branches was also established, in order to share practices, discuss problems and draw up SEIDET-wide plans. In KwaMhlanga, one of SEIDET's branches, the fluctuation of activities over the years can be attributed to the inconsistency between the policies of consecutive branch managers. The KwaMhlanga branch has not run smoothly ever since the beginning. Although the branch is still functioning and there is a steady flow of learners, it has been involved in a lot of "SEIDET politics". Jackie P. feels that the managers and teachers fight for more recognition, but it is unclear whom they would want more recognition from. There have been a lot of management problems, and the EC has tried to solve these with the various managers and teachers, but their efforts have not helped much.

# • New branches

The establishment of the two new campuses did not result from an idea internal to SEIDET. When people in Vaalbank and KwaMhlanga heard about SEIDET, they wanted such a centre too, and contacted SEIDET. The first thing the SEIDET people did was to assess the actual level of interest in these local communities, because establishment of a new centre can only succeed if there is a lot of initiative from the new campus community. When the EC thought there was a large enough interest, they offered advice. However, the actual work to establish the new branches had to be done by the local people themselves, otherwise the centres would not become sustainable. In order to ensure sustainability, it was considered of utmost importance for people to be recruited locally and not brought in from other centres. The SEIDET management's motto for new branches is therefore: "Lead, but don't do it yourself".

From the establishment from the second campus (KwaMhlanga), the EC learnt that setting up a new branch is a very demanding process. Even if the actual work of starting up the branch had to be done by local people, it took a lot of time to explain, get commitment and lead the process. The reason why it takes so much effort lies in the fact that SEIDET is not a product that can be copied easily, in contrast to for example a piece of farm equipment. The "SEIDET product" is a social constellation of people with shared values, knowledge and skills. Copying this is far more difficult than copying a piece of technological hardware.

Therefore, even though various other communities throughout the region have also approached SEIDET with the request to help establish branches in their area, the EC has been very careful not to attempt to expand the project too rapidly, mainly due to considerations of management and resources, as well as the standards already achieved by the project. This learning cycle thus shows why the growth in SEIDET branches has been slow, and why no new branches were set up after the initial years.

# Common initiatives

The three branches developed many common initiatives in the Saturday programme during the mid 1990s. Examples include the study guides, the common test papers, inter-branch meetings of teachers, and the subject performance plans. Although the study guide project failed and some negative remarks were made about the inter-branch meetings and the organization around the common test papers, the attempts at collaboration of the teachers definitely led to learning selection.

Once or twice a year all SEIDET teachers come together and group themselves according to the subject they teach. They then identify the most difficult sections and discuss how each of them presents these difficult parts. They do not try to arrive at conclusions concerning the 'best solution' at the end, because the best solution differs for each teacher and learner. They share ideas and each takes from the meeting what he or she think will work for him or her. In every branch there are also regular staff meetings in which the staff work on the syllabus, discuss slow learners, learn about new memoranda from the department of education, plan work, and sometimes discuss teaching methods.

These common initiatives, which are all learning cycles in themselves, point up an important success factor, namely that the different branches be kept in a continued dialogue so they can learn from each other and develop SEIDET as a whole. Small differences between the branches are good, because they reflect tailor-made solutions in response to differences in local circumstances and personal preferences. In this way, different solutions can be seen to be functioning well side by side. At the same time, it is considered vital that the branches keep functioning inside one mother organization, in order to prevent "forking". If forking were to occur, the branches would become too different from each other to be able to learn effectively from each other.

# Personal learning selection

Learning selection in the teaching programmes also occurs at a more personal level. One interviewed teacher told that SEIDET is giving him the opportunity to develop himself, by training and expanding his teaching skills, and learning new things like managerial skills that are required to keep the SEIDET school running. These are things that he is not able to develop in his regular teaching job at school during the week. It was only at SEIDET that he started to invite other teachers to his classroom to see how they explained certain problems he was struggling to explain to the learners. Now he also does this in his regular job, in which he teaches mathematics. Another thing he had learned is that mathematics became more popular among the learners when

he tried to make the subject simpler, began to incorporate jokes into his lessons, and tried to introduce some playfulness into the lessons.

Another teacher observed that he learned from other teachers how to communicate better with the learners, and make them feel at home. He learned this by talking to, discussing with, or asking other teachers and observing the behaviour of the learners during classes given by other teachers. A third teacher told that working at SEIDET had taught him to work in a team. Also a teacher by profession during the week, he learnt a lot of things at SEIDET that he had been unable to learn in his weekday job. He explained that there is a big difference in working atmosphere between SEIDET and his weekday school. At his weekday school there is a lot of tension and jealousy among the teachers because of competition between teachers for promotion. In SEIDET, on the other hand, the teachers work as a team and there is no jealousy. Teachers help each other because there is no striving for a promotion. He said he was learning continuously, both inside and outside meetings. There are monthly staff meetings where progress and problems are discussed, as well as content questions are raised. These learning cycles are important on different levels. On the overall project (or branch) level they improve the core business of SEIDET, i.e. teaching. But on a personal level, too, these learning cycles have many effects. They improve the skills of the person undergoing the learning, which may lead to enhanced enjoyment and better results in their weekday job, sometimes even leading to promotion. Besides, and maybe even more importantly, the learning itself gives people a great sense of achievement, pride and pleasure.

### • The importance of parents and feeder schools

In 1996, SEIDET realized there was still ground to be won when it came to the effectiveness of the Saturday tuition program. The relationship between SEIDET, the parents and the feeder schools (i.e., the schools that the learners attend during the week) could be improved. A better relationship with the feeder schools would prevent learners from choosing incomplete streams, and better information would make the parents partners in persuading their children to pursue tertiary education and prepare them for their children's higher education. Parental meetings were organized which were attended by about 70 per cent of the parents. During these meetings, issues such as the fees payable to SEIDET and advance saving for registration fees for tertiary education institutions were discussed. Besides, the parents were educated about the different streams the learners could choose, and on the implications of those choices for the further education of the learners. SEISPRO also attended these meetings so the parents could obtain first hand stories from the SEISPRO students. These meetings proved to be very helpful for enhancing parents' understanding of SEIDET, and as a bonus they also served to enhance the motivation of the learners. The parents also started to play an active and constructive role in SEIDET as well as in the education of their children. The parents unreservedly gave their suggestions on how this project could improve. This learning cycle shows (again) that linkages are important. Not only forward linkages with universities (for placement of learners), but also backward linkages (parents and feeder schools). And, as with forward linkages, backward linkages can provide opportunities for ideas and advice.

# • The level of the tuition fee

In 2000, the fee for the Saturday tuition was increased from R210 to R550. From 1992 to 1995 learners paid only R10 per month (R100 per year), and from 1995 to 2000 they paid R210. In 2000 it was decided that it was necessary to review the fee in order to reflect the changing circumstances in the education sector in South Africa. There are now alternative possibilities for learners in the urban areas, which are perceived to be of better quality simply because they cost more. It was considered necessary for SEIDET to position itself in this same category. Expensive is perceived as good, and SEIDET did not want to be left behind because of its cheaper rates and

therefore perceived lesser quality. Jackie P. acknowledges that a small percentage of learners drop out of the programme for financial reasons, but he says that however poor people are, experience shows that they are able to find the money if they really think it is necessary.

# The Study Guides for the learners

The study guides project is probably the biggest failure in the SEIDET project that this research was able to detect. The idea was to write twenty-two guides for all the subjects in all years that SEIDET teaches, plus guides on enrichment, life skills and guidance and computer literacy. The main objectives of the sub-project were to update, motivate and assist learners; share expertise and experience among tutors; involve communities, students and expertise in a creative way; and establish a "learning culture". When Jackie P. was questioned about this sub-project, he readily acknowledged its failure. The intention had been that the teachers would develop the material. A donation of R20.000 was made, workshops were held, but in the end all the money had been spend on transportation costs and nothing had been produced. When asked for the reasons for failure, Jackie P. replied that it had been much harder than anticipated to put things in writing. "It is a job with high skill requirements". The teachers were challenged about the (lack of) results, and they admitted their failure and felt bad about it. In retrospect, the aim set in this sub-project was probably too ambitious.

# • Summary of the key success factors arising from the Saturday tuition programme

- 1. Trust between the teachers, managers and the EC had to exist for the project to function properly. The trust was built by letting the teachers nominate candidates and the EC to select the managers from among these, so both parties had a say in the matter. However, even this system could not prevent personal matters ('politics') from intervening in the smooth running of one branch.
- 2. New branches were established by the people who would ultimately run them, while the current organization assumed an advisory capacity but did not involve itself in the actual work.
- 3. Care was taken not to expand the project too rapidly in order to avoid overstretching of capacity.
- 4. Continued dialogue between the different branches was institutionalized, so they could develop SEIDET as a whole, while "forking" was prevented.
- 5. At the same time the teachers and branches were given enough freedom within the common framework to decide what was best for themselves.
- 6. An open and non-threatening atmosphere promoted personal learning selection.
- 7. Meetings gave individuals an opportunity to share the things they had learned.
- 8. Not only forward linkages, but also backward linkages can provide opportunities for ideas and advice.
- 9. Asking a reasonable price for the quality delivered improved people's valuation of SEIDET, commensurate with the quality of its services.
- 10. It is good to aim high, but not too high.

# Learning Selection Cycle 3: The ICT sub-project

The establishment of computer (-based) education has been the result of protracted experimentation involving several false starts, jumbled initiatives with dead ends, and fresh restarts. This sub-programme is an example of learning selection *par excellence*.

# Prior awareness of the need for computer literacy

From the moment the initial project idea of SEIDET was established, computers and computer literacy courses were considered a necessary supplement to (predominantly science) education,

and thus a logical component of the SEIDET concept. During the start-up of the project, the possibility of a merger between SEIDET and a computer literacy project was even discussed. The merger did not materialize, because of political issues in the funding of the computer literacy project, not because of a difference in focus between both projects. In the end, it took several years before computer literacy courses and a computer laboratory were established, and it involved outside help. However, the idea that computer literacy was needed came from within the project. This means that external initiatives on computer education, such as the ICT-related research activities that were to take place in 1995 and 1997 (see below), fell on fertile ground.

# • Relationship with professionals

Some time after the failed merger discussions, the importance of computer literacy was reiterated by the board and Jackie P. in 1994. Through the linkages that had been established with the University of Pretoria, UP Professor Roode was contacted, who – through his work for the Human Science Research Council – had come to believe that ICT was the way forward in social-economic development of the rural areas. A relationship between Jackie P. and Professor Roode grew, and in 1995 SEIDET set itself the goal to obtain a computer for computer-aided education. The relationship between SEIDET and professor Roode led to research initiatives by many UP researchers and PhD students in collaboration with SEIDET, which supplied SEIDET with expertise.

# • *Test cases before the establishment of the laboratory*

UP researchers carried out two research activities (in 1995 and 1996/7) around computer-aided education (called "Computer Supported Cooperative Learning"). In the first research activity the role of the SEIDET teachers was still quite passive; they were the object of research, while the research was carried out at the university. The teachers were divided into two groups and came to the UP for an experiment. One group was taught Word using CSCL, and the other group was taught in the form of conventional lectures. Although the two groups did not show any significant difference in knowledge about Word, the CSCL-group had enjoyed the instruction far more than the lecture-group.

In the second case study in 1996/7, CSCL was used to instruct teachers how to teach mathematics to their learners. Twelve teachers participated, and four computers were bought and driven to and from Siyabuswa for the nine weeks of the experiment. One researcher talked to the teachers about CSCL and while another helped the teachers to acquaint themselves with the mathematics software that had been installed on the computers. Although the teachers were very excited about CSCL, which helped them in designing their lessons, they did not adopt the innovation (let alone that any further diffusion took place). Achieving adoption (and studying this) had been a major goal of the research, so in this sense the experiment had not been successful. The obvious fact that there were insufficient computers available to the teachers after the experiment, and the expensiveness of the software package were responsible for this. Even so, some teachers were using bits and pieces from what they learned during the research.

When an overseas researcher visited SEIDET in 1996 and heard about the failed CSCL adoption, he observed that *for adoption to take place, a computer laboratory on the SEIDET campus would have to be established.* In 1996 an external computer literacy programme was run at the centre (under the supervision of the Kwandebele Computer Education Centre, KCEC), using the three SEIDET administration computers and 3 KCEC computers. Moreover, discussion was taking place in SEIDET about the establishment of a computer laboratory through the Students & Youth Into Science Technology Engineering & Mathematics education project.

The KCEC program was unsuccessful in finishing the syllabus on time, but preparations for the establishment of a computer facility went ahead. In 1998 a donation for 23 computers was secured. Together with the computers from the KCEK experiment (which had ended by then) and a donation for the physical adaptations to the site, the computer laboratory could be established.

The ICT facilities were not 'designed' as such; an existing building was adapted so that it could house the computer laboratory. The layout of the room dictated the set-up of the laboratory. There was no perceived need for a network, since there was no telephone line and thus no Internet connection could be made available. Therefore it was decided that initially a stand-alone setup was to be established. A network could be established later.

The computers were bought through UP channels, so issues of quality and reliability were taken care of. The people who later were to become the members of the computer committee took care of the organizational issues. Two air conditioners were installed to shield the computers from the heat. Dust and the electricity supply were not seen as a problem, and this has proven to be correct. The computers were installed by engineers from the UP, and IT support was to be given from the UP as well. However, this proved to be impractical since Siyabuswa is a two hour drive from Pretoria. Therefore, later on in the project, local computer teachers received support training and took over the support.

In conclusion, the establishment of the computer laboratory was a long learning selection process that started with the research activities in 1994/5, culminating in the establishment of the laboratory three years later. But this process was to be only the beginning of a far longer learning selection process in the ICT sub-project, as will be discussed below.

# • Guided introduction and democratic handing over of the lab

Right after the establishment of the computer centre an important six-month action-research project named 'Computer Ndaba' took place, which roughly translates from Zulu into "*a topic of conversation*, or *affair*". (Scheepers, 1998; Scheepers and Mathiassen, 2000, p. 43). This word was chosen because the teachers came together to discuss, formulate and plan ideas on how to use the new IT facilities. The goal of this exercise was to help the forty SEIDET tutors identify what they could do with the computers, how they wanted to use and manage the computer laboratory, and at the same time become computer literate. The challenge was to use the laboratory to its full potential. In order to ensure this, emphasis was placed on the teachers' and community's own needs and their opinions.

The Computer Ndaba worked very well. The tutors became computer literate, gained hands-on experience, and talked about important teaching issues such as the new curriculum and CSCL. Furthermore, the management of the laboratory and the use of the laboratory in the work of the centre came up for discussion, and decisions on maintenance procedures and management were taken: A computer committee was to be established to organize all practicalities surrounding the computer laboratory and function as a concentrated hub for relevant knowledge. Maintenance training for two teachers also was to be organized.

The computer Ndaba group wanted the whole community to benefit from the laboratory, through a computer literacy course for everyone in the community who was interested. In response to this, the SEIDET board asked UP researchers and UniSchool, a supplier of computer literacy training to disadvantaged individuals, for a programme for the community. This initiative emerged purely from the local community.

This was probably the most important phase in the sub-project. The hardware was there, but hardware alone is no help if you do not know what you *can* and *want* to do with it. Through the computer Ndaba research initiative, a "non-expert" approach was taken to identify priorities in this respect, and figure out how to go about addressing these. The Ndaba helped to *guide* and *coach* the teachers to discuss the relevant issues and make decisions themselves. They were not told what to do by the SEIDET management. This "bottom-up" approach built the perfect environment for the teachers to engage in learning selection.

# • The importance of using local teachers

The request to Unischool and UP led to four teachers being trained by Unischool Pretoria to be able to teach an accredited UniSchool computer course at SEIDET. The teachers also attended

some workshops at the UP in lecturing techniques and marking exams. The first Unischool course was a two-tiered affair. It was presented by a UP teacher through a satellite connection that was in place by then, and the four local teachers were tutoring their learners and receiving instructions from the UP teacher. However, the satellite connection broke down and the local teachers had to take over. Professor Roode, who was observing the performance of the local teachers, realized that things actually worked better when the four teachers were teaching the classes. The pace at which the UP teacher lectured was too fast, and the local teachers were much more "in touch" with the way of thinking of the students. Therefore, after six weeks the local teachers took over and finished the first course on their own. When asked why the satellite-based system had been used in the first place, rather than just relying on the four fully qualified teachers from SEIDET from the beginning, professor Roode could not think of any definite reason, except that the satellite connection was there anyway, and provided something special to the kick off of the first course. Moreover, he hypothesized that the satellite teaching would help the local teachers to watch a class being taught, and learn from it.

# • Organizing it locally – the Computer Committee

The four Unischool-trained teachers quickly became the 'caretakers' of the computer laboratory because they felt responsible for it. When 'the four' felt they had accumulated enough knowledge it was therefore only a natural development that they organized themselves as the Computer Committee (CC). Later the CC membership grew to seven people, with two CC members for each SEIDET campus and one CC member as the central administrator.

The presentation of the course changed quite a bit over the years. Initially, the teaching was rather ad hoc, with a focus on "teaching what you know" and filing the things taught for the next year. After some time the activities became more systematic: The CC came together to transform the filed presentations into a proper course syllabus. They learned a lot from observing how the learners responded to their teaching and adapted the way of teaching to these responses and perceptions of the students. In 2003 the syllabus was revised and improved.

To deal with the impractically distant support structure a computer repairs workshop was planned for interested SEIDET participants. An initial attempt came in the form of a workshop presented by a UP Masters student, but this did not take on, and no action was taken afterwards. Fortunately, funds happened to be available at that time for some SEIDET personnel to undergo technical computer training, and the four (initial) CC members underwent the A+ Support Engineering Course at Damelin, which made them capable of looking after the SEIDET computers on all the campuses.

In 1999 a second computer laboratory was established by the CC on the KwaMhlanga campus, with twenty-two second-hand computers that were refurbished with donated money. Later that same year, the third SEIDET campus in Vaalbank took over an existing computer centre with another ten used and repaired computers with funds from the same donation.

We can see the gradual development of in-house expertise and confidence through various learning selection cycles in the Computer Committee. An ICT project that started out as one dominated by external expertise, evolved the technological and organizational capacity to independently establish new computer laboratories, produce own teaching syllabi. Later on, the CC also acquired capability to participate in research activities and develop commercial plans for the ICT facilities (see below).

# Research as a catalyst for change

In line with SEIDET's objectives, the SEIDET board established a research committee in May 2000. The aim of the committee would be to initiate, encourage and sustain research related activities, so as to enable members to better assess externally initiated research efforts.

The establishment of the research committee heralded the beginning of a research culture and research capacity within SEIDET. Soon after the committee was started, regular research sessions

between UP and the SEIDET CC began to take place. In the second half of 2000, as a result of the first research session, the idea was born "to do something with networking" in the computer laboratory. Students from the UP briefed the CC about networking theories, and three students came to Siyabuswa to establish a local network together with the computer committee in a sort of practical learning session. The students also provided some advice about maintenance and upgrading. The network topology was a client-only network setup, because there was no computer available that would be fast enough to act as a server in a client-server model.

Unfortunately, on 26 March 2001 the centre at Siyabuswa was burgled and all the computers and LAN equipment were stolen. Remarkably, the whole infrastructure was re-established only two months later. Ten second-hand computers for the Siyabuswa centre were bought, and installed by the CC. In Phahlamohlaka and Lotriet (2001), it was noted that the participants in the research "... saw the re-establishment of the LAN and the Internet connection after the hardware theft as a self-training [learning selection] opportunity. The research served as a catalyst for action at SEIDET [...]. The participants developed the necessary confidence to set up the LAN and Internet connection on their own after the theft" (p. 8).

The outcome of the next research session was that the CC wanted SEIDET at large to be engaged. A scheme was adopted in which UP researchers gave workshops to the CC and the CC then gave workshops on the same topics to the SEIDET staff. Some examples of these workshops are: networking, database for learners, and uses for the laboratory. Furthermore, an analysis of the experiences during the establishment of ICT at SEIDET was carried out by Jackie P. and two CC members (Phahlamohlaka *et al.*, 2001). They deduced a three-step strategy for introduction of ICT for education purposes from the SEIDET experience:

(1) Identify an already existing and reputable educational community organization, and engage it through discussions, workshops, seminars and training sessions, raising awareness about ICTs and highlighting how the organization's operations and objectives can be enhanced through the use of these ICTs.

(2) Identify a core group of *willing* skilled local professionals who are part of the organization and offer them extended community-oriented ICT training. The core group then should teach other members in the organization. Link the organization to a nearby university through this core group [...] and encourage research.

(3) Make provisions for using the ICT infrastructure for a variety of services/functions and charge a commensurate fee for services rendered. Solicit external resources and partners while keeping the local community informed about the progress and the increased quality of service.

On 11 May 2002 a SEIDET Research Day was organized. About 50 SEIDET tutors, 14 board members and a few community members participated. Each researcher involved in SEIDET gave a presentation on his or her work. The participants then worked in groups to probe deeper into each presentation, and gave their own perspectives on the work as well as their own thoughts on how the work *did* or *did not* contribute to further community development. This was a rare opportunity in which academic work was open to critical scrutiny from the community. It gave the same time, it contributed to research capacity building at SEIDET and underlined to the community the importance of research in contributing to community development.

Clearly the research efforts by UP researchers not only yield academic output, but for SEIDET they also act as catalysts for change. Through the research sessions, knowledge is gathered and ideas are exchanged by the CC and (through local replication and the research day) by SEIDET as a whole.

# Urban-rural movement, and the value of local organization

Around the turn of the century, Unischool saw its attendance drop in the urban centres where it had been operating since inception. Some parts of Unischool split off or closed down and a slow

transition from the urban areas to the rural areas began. In March 2002 Unischool stopped all urban training.

SEIDET had been Unischool's first rural satellite, and this experience had been invaluable for enabling the urban-rural transition of its activities. By 2003, 11 rural Unischool ICT training centres were running. These other rural Unischool branches did not necessarily start as a result of direct diffusion of the SEIDET initiative, but SEIDET had shown both Unischool (the organization) and the prospective rural Unischool satellites that it was possible to establish Unischool centres in the rural areas. Although SEIDET has its shortcomings (for example, the fact that there has not been any movement beyond computer literacy courses), it has always been a living and shining example that it is possible to establish rural computer centres.

At the end of 1999 Unischool asked SEIDET to draw up a business plan so that SEIDET could become a Unischool franchise. This meant that from then on, Unischool would only be responsible for the supply of teaching materials, marking exams and accrediting certificates. Everything else is organized by SEIDET, which also retains a part of the profit. The franchise agreement took three years to take effect, at the beginning of 2003.<sup>13</sup> Professor Roode from UP thinks this long period might be due to the fact that the negotiating and finalizing of the agreement had been delegated to the four CC teachers, while it would have been better to deal with these matters at the level of the SEIDET organization as a whole (which was the original intention). Possibly, the four teachers wanted to avoid giving the impression that they were behaving like entrepreneurs benefiting from the community effort put into SEIDET.

Once the agreement had been settled, SEIDET played an important role in Unischool's shift from urban to rural areas, by showing Unischool through learning selection that it was possible to run centres in the rural areas under franchise agreements. Moreover it inspired professor Roode to embark on a mission of his own (see below).

# • Lessons not always learned

In October 2001, professor Roode came up with the idea to pro-actively establish computer literacy centres in rural areas, independent of the SEIDET initiative. The problem with Unischool, according to Professor Roode, is that it provides computer literacy services to rural communities only on the request of these communities or local entrepreneurs. That is why growth in computer literacy in rural areas is slow, too slow to make any real impact on South African socioeconomic change. Prof. Roode thought that things could be speeded up by establishing many centres in a short period of time.

To do this, he wanted to start by planting a few centres (like 'seeds') that would grow up to provide seed themselves. Through this process, professor Roode hoped that after a few years of seeding, there would be enough internal reproductive capacity for the system to carry on by itself. His original plan was to establish ten seed centres during the first project year, with ten facilitators to start up the centre. After the facilitator had been helping the community to run the centre for one year, the local community would take over the running of the centre and the facilitator would move to a new centre.

Three hundred and sixty unemployed people from the previously disadvantaged areas all over South Africa applied for the job of facilitator, and eight of these now work in four centres that have been established. The communities where the centres were set up were found through the Mpumalanga government. Representatives from three regions were asked to nominate communities, which were then selected and visited by Professor Roode to see if it was indeed possible to establish a centre there. For the approach to work, Professor Roode argues it is

<sup>&</sup>lt;sup>13</sup> More information on Unischool's rural activities and its important relationship with SEIDET can be found on: <u>http://www.inbekon.com/Sustainable%20Development%20Initiative.html</u>; and <u>http://www.inbekon.com/News.html</u> (both viewed on 30 June 2005).

necessary that a community entity exists that is representative of all the people at the start of the project, whether that be a project similar to SEIDET, a school-community or another initiative, as long as it is seen by the whole community as 'their own'.

Since then, Professor Roode has undergone a learning selection process of his own. He now realizes that he should have first selected the communities, and then searched for teachers within those communities, instead of selecting the teachers first. In this way, problems related to language and people having to relocate to a different community can be prevented.

Although Professor Roode was heavily involved in the setting up of the SEIDET computer laboratory, he cannot recall any lessons that he took with him from this experience. The problem is that in the SEIDET case, some important choices were made intuitively and they proved to be the right ones. In Professor Roode's computer centres project, that same intuition was not there, and in the absence of guidelines wrong choices were made.

Professor Roode is aware that he could potentially play an important role in transferring lessons from SEIDET to the new centres. But in practice he does not find it easy. During the first year of establishing the new computer centres, professor Roode noticed that it was not so easy – compared to SEIDET – to persuade people to become computer literate. This might have definite causes: the villages are further away from the urban areas, and working in the city is not an option. Professor Roode is now thinking about ways to get jobs to the rural areas. This might not be too far fetched, as there is at least one company willing to transfer (part of its) call centre to the deep rural areas. On the whole, however, it seems that the approach of trying to kick-start development by initiating services that external agencies believe to be useful does not work well. Although clearly well-intentioned, it constituted a clear break with SEIDET's "go-with-the-flow" philosophy. This was done knowingly and for a reason, but other lessons from SEIDET were also not applied, or not perceived as such (even though research had begun to point up these lessons by then). Not surprisingly, then, the start of the initiative was hampered by problems such as removal of the facilitators and difficulties in finding people willing to take computer literacy lessons.

## • First signs of commercialization

In 2000-2001 the CC developed a plan of establishing an IT Support Centre to provide internet and end-user services to the general public. The focus was on helping people who were computer literate to acquire affordable re-assembled PCs, upgrading PCs, as well as troubleshooting. The plan was to establish this subproject as a business to be run by people who were to make a living out of it. The project was intended to be a sub-project of SEIDET, yet run independently from the mother project.

A year later the members of the community could access various end-user services such as document typing, editing & printing, internet browsing, exploring & downloading as well as email retrieval & sending at very low, affordable rates. Also special computer literacy training for groups, companies, private institutions and people with disabilities were made available through the CC. But the technical support services to help candidates acquire affordable computer sets and help them upgrade, update and troubleshoot their computer systems were still in a planning phase. In 2002, its third year of existence, the CC still faced a lot of challenges in the process of introducing and developing ICTs within SEIDET. The committee underwent intensive training and research (under the auspices of researchers from the University of Pretoria Department of Informatics) on the use of ICTs in developing/rural communities, and the CC started workshops to discuss the things they learned. In 2003 the ICT workshop was registered, but the form of registration might not have been the right one, as SEIDET was a non-commercial body whereas the ICT workshop was registered as a commercial entity. Although slow, the first signs of commercial initiatives linked with SEIDET became visible. The committee members had to search for a balance between being part of SEIDET and yet being financially independent. This proved to be a precarious combination. As with the Unischool franchise agreement, the slow

progress was probably due to the fact that the committee did not want to be seen as entrepreneurs benefiting from the community effort put into SEIDET.

# Summary of the key success factors arising from the ICT sub-project

- 1. Although external help was used, the notion of the importance of launching the ICT subproject came from within SEIDET itself.
- 2. Linkages with professionals gave direct access to knowledge and expertise that helped the sub-project to develop, and motivated the participants to take matters into their own hands.
- 3. Instead of a "telling them what to do" approach, SEIDET adopted guided introduction and a "non-expert" approach (the Computer Ndaba), which *guided* and *helped* the participants to discuss and decide themselves how to use the new hardware.
- 4. Using local teachers worked better than employing distant experts through a satellite link. The local teachers were more in tune with the learners due to a shared culture, and could understand the problems of the learners better because they themselves were freshly trained. Also, the local teachers could directly see and sense the reaction of the learners to their explanations.
- 5. In-house expertise was built through (in-house) training and learning by doing.
- 6. Confidence was built through practical learning by doing sessions and self-training, and slowly taking over responsibilities.
- 7. Action-research acted as a catalyst for change: (i) It motivated the teachers at SEIDET to look into the possibilities of Computer Literacy courses and the establishment of a computer laboratory. (ii) It helped the research partners (UP and SEIDET) to get acquainted with one another and learn from each other. (iii) The shared research experience and trust enabled the partners to design an effective solution when the external computer literacy program did not deliver. When funds were found to establish a computer laboratory, both SEIDET and the UP researchers were ready for it. Although UP was a large external partner in the establishment of the laboratory, SEIDET quickly made the laboratory its own. The felt need for computer literacy courses, the experiences during the research activities, the experiments with the KCEC program and the involvement of all the SEIDET teachers in the computer Ndaba programme that followed directly after the laboratory was established, all contributed to this.
- 8. When commercializing a sub-project, care must be taken to find a balance between the requirement of financial independence and serving the community's needs in harmony with the aims of the 'mother' project. One problem faced in this respect was that the participants involved in the commercialization of the sub-project did not want to be seen as entrepreneurs benefiting from the community effort put into the project.
- 9. SEIDET showed UniSchool that it was possible to run a Unischool centre in the rural areas under a franchise agreement.
- 10. Important lessons from SEIDET were not applied, or not perceived as such, in the subsequent computer centre development project launched by UP.
- 11. Although an overlap in personnel existed between SEIDET and the latter initiative, this overlap was not used to its potential, so that cross-project learning remained limited.

# Learning Selection Cycle 4: The PSSP sub-project

# Initiative from the grassroots

The idea for the PSSP sub-project emerged during a Committee of Principals meeting of the KwaMhlanga District, where SEIDET reported on its work with secondary school pupils. The primary school principals saw what SEIDET was doing for secondary school learners, and felt that the benefits to secondary school learners from the Saturday tuition program were so evident that perhaps primary school learners could benefit from SEIDET too. They approached SEIDET for assistance because of several reasons. First, they felt challenged by the new rule that science

should be taught in English from grade 4 in all schools. Second, schools generally lack adequate laboratory equipment or a secure space for apparatus and chemicals if they do have them, particularly schools in rural areas. Third, teachers are often required to teach science while they have received no training in it themselves. The principals asked SEIDET if this organization could organize something for the primary school teachers.

# Linkages

SEIDET was not ready to fully meet this request, but did start consultations. The Mpumalanga Department of Education was approached to see if there were suitable programmes in place already, but at that time there were only preliminary plans. The Department gave a "go-ahead" to SEIDET to see what it could do within its means, and SEIDET approached one of its board members (Joe Molai), who also worked at the Department of Education, to lead the initiative. Before the establishment of the PSSP project there were already some links between the UP and SEIDET through the marketing department of the UP, the placement activities and the research on CSCL. Jackie and Joe Molai came to the UP and there was a meeting with the science dean, the head of the Exploratorium (Johan van Staden), Max Braun (who had been involved in academic development) and Moira Kirsten of the UP Fundraising section of the Marketing Department, who was also involved in fundraising for SEIDET. The Centre for Science Education at the UP agreed to participate, the principals were asked to generate publicity for the project among their teachers and schools, and TELKOM Foundation was approached for financial assistance, which was granted.

# • Problem analysis by experts and teachers

Guided by Joe Molai of SEIDET, Max Braun, Moira Kirsten and Johan van Staden visited several primary schools in Siyabuswa. During the visits they concluded that several teachers did know and understand the primary school subject content, although many did not. They also found some teachers who, faced with an absence of equipment for demonstrations, had designed their own alternatives. These teachers, who had dealt with a lack of equipment by finding locally available substitutes, were in themselves a valuable resource for the project. The visitors were also told several times that language or history teachers, who were required to teach a science class, had been taught biology but had no knowledge of the physical science content. As a result they would only teach the biology section of the syllabus, or pupils would be told that science is too difficult to do, or simply that no equipment was available and was thus impossible to do. Furthermore they found that teachers felt threatened by Curriculum 2005 and Outcomes Based Education. This new system gave them the responsibility to develop locally relevant examples of the broad subject content, whereas in the old teaching system they were supposed to strictly adhere to the textbook.

It was concluded that nearly all teachers would benefit from a shift in approach from pure "textbook teaching" to one in which pupils get an opportunity to conduct experiments and make observations for themselves while working in small groups. An organizing committee was established, composed of three SEIDET members, four teachers and two UP staff. The four representatives of the primary school teachers came to UP to discuss how to tackle the problems they had found. From the beginning the "experts" took the standpoint that the teachers were in control of what should be done, and the experts were there to facilitate the process. The teacher representatives suggested that the theme of workshops should be "Moving from textbook teaching to active learning". A sub theme emphasized that science is not an activity confined to a stainless-steel-and-glass laboratory, but in fact presents many examples in daily activities and in the direct environment. From this it was concluded that the three pillars of PSSP should be: (1) learn from each other; (2) do group work; and (3) contribute and share.

In short, an in-depth analysis by the experts of the challenges faced by the teachers was an invaluable learning selection step in determining the scope of the project. Together with teachers'

representatives, the theme for the workshops and the outline for the project were set. The external analysis of the problem was important because it clarified the problems that the teachers themselves might not have identified clearly.

# • The approach

The approach the experts took was to focus not on teaching but on *learning*. The aim was to let the teachers try out what they learnt and to make them realize that the whole of nature is a science laboratory, thereby trying to change the attitude and the approach of the existing teaching methods. The experts did not come with preconceived "solutions", rather they facilitated a process in which teachers developed locally relevant solutions to their problems and were empowered to teach primary school science. The attitude was not that teachers cannot do, or do not know and therefore have to be "fixed", but that they can do, and mostly do know. This attitude affected the attitudes of teachers positively. The teachers worked in small groups, essentially modeling the type of approach "the experts" encouraged them to take. Tasks from the syllabus and textbooks that lent themselves to display that approach were chosen, but only the rudiments of equipment were provided. This challenged the teachers to find ways of using waste items or common items (such as bottles, jars, tins, rulers, candles, string and balloons) in order to demonstrate effects and lead discussions, or allow groups to do experiments for themselves. The vision behind this approach was that teachers would be encouraged and empowered to seek and use low cost equipment, and use fellow teachers as a resource. Subject content was also covered, although in a selective way. The approach was important in that it showed the teachers the new method of teaching by undergoing it themselves. This showed the teachers how the process worked and how much fun it was. Because the teachers were not presented with preconceived solutions, they had to develop the content themselves and learned along the way. They were learning by doing it!

# Phase 1: Pilot project – Teachers in the driver's seat

The first year was to be considered as a pilot project. Therefore participating teachers were drawn from schools within a limited radius of the SEIDET centre in Siyabuswa. The same group of teachers was invited to three consecutive workshops, allowing strong group bonds to develop and providing maximum opportunity for open exchange of ideas. As everyone was in a learning process, it was felt that the group should not exceed 30 teachers. This allowed five or six groups to be formed for group work, and fit comfortably into the venue. Feedback through questionnaires on practical issues and needs from the teachers were used to adjust the program constantly. The content covered during the first two years (1996 and 1997) can be described as "general science". The first years' workshops centered on group work and the usefulness of demonstrations and hands-on experiments by school children. Pauline Stoop from the University of South Africa<sup>14</sup>, who had recently extracted all primary school science experiments from a science textbook and redesigned these experiments so that all experiments could be performed with household equipment, was a key presenter.

As a result of the learning selection in the first year, the focus in the second year changed a bit to address outcome-based education and Curriculum 2005, developing local curricula and strengthening knowledge of the teachers themselves, again with a focus on materials and resource development by teachers. The teachers reported back on their experiences and the experts gently pushed towards the implementation of the ideas in schools. Questionnaires were again used to get feedback on methods used, problems encountered and ideas for next year.

<sup>&</sup>lt;sup>14</sup> The University of South Africa (Unisa) is the largest university in South Africa and one of the largest distance education institutions in the world.

<sup>[</sup>URL] http://www.unisa.ac.za/

At the end of the year the principals reported that the workshop experience had moved into classrooms. Plans for 1998 were discussed with the teachers and some principals. The workshops addressed real needs and in a way which was accepted (and directed) by the teachers and was non-threatening to them. The teachers were in the driver's seat, and when they asked for biology to be discussed, the experts organized that. Twice a year a plan for the next half-year was made. Once a year the group went on an excursion. During the first excursion, the teachers came to the UP and were shown how to do preservation of animals and plants with limited resources. In the second year they visited a nature reserve and practiced "biology in your back-yard". The experts tried to find local themes and the teachers were pushed to take responsibility for their learning. After the first two years, enough learning selection had taken place to move into the next phase of the project: the production of guides and a booklet by the teachers.

# • Phase two: Production of guides and a booklet

At the request of the teachers, the content of the workshops in the third year was expanded to include two additional subject areas: mathematics and technology. A major thrust during 1998 was moving into phase two of the project, where teachers took responsibility for the design of their own curriculum modules. Based on the ideas of previous workshops, the teachers were challenged to produce sets of activities that they could use in their own classrooms. Working in groups and guided by John Rogan of the UP's Centre, three such sets were produced around the themes electricity, magnetism and acids/bases. The ideas sketched out by the teachers were given to a professional editor, who produced the materials in an electronic form. Kits were then assembled to allow learners in the participating schools to work through the activities in small groups. At the end of the year the teachers-groups had written three complete and ready-to-use teaching modules. Response forms were again used to gather evaluation information and ideas for themes to be addressed at future workshops.

In the next year, the project was guided by Diane Goodwin, a student of environmental education at UP. The teachers, together with Diane, explored the possibilities, problems and challenges around the establishment of a school garden. They tried different things, gave feedback to each other and wrote a booklet on the school garden project, including things like a timetable for planting the plants in the garden. The teachers also started to receive computer literacy courses in this period. In 2001, about 200 teachers in the Mpumalanga Department of Education were made computer literate through the help of the Computer Committee. A very high percentage of these teachers continually consult with the CC to advance themselves and their schools in Information Technologies. In 1999 an external evaluation by Corporate & Social Market Research concluded that the expectations that teachers had had before the course had been realized, the course had had a positive impact on the vast majority of attendees and the respondents were able to apply the knowledge they obtained in their work environment.

In short, after the initial start-up year and a year of stability, Phase 2 served to put the learned things into practice. During two years the new methods were concretized and made directly applicable in the classroom by making the teaching modules and the booklet. This was an important phase in the project, because it materialized the learning from the previous years and prevented it from being forgotten.

# Phase 3: The Curriculum Implementer

The four years described above can be termed the "first" PSSP project. The "second" PSSP project started in 2000 with a donation from the National Developmet Agency and was different from the first in some aspects. It was more supply driven, relied heavily on the government Department of Education that supplied a Curriculum Implementer for the project, and it ran in the other two SEIDET branches. At the same time the second project built on the experiences gained in the first project in Siyabuswa. The teachers designed modules and trialed them in selected schools, observing each other and giving feedback. Through the process they gained hands-on

experience, confidence, experience in group work and brainstorming and group assessment capabilities. They also received computer literacy courses. A new element in the second project was the 'Peer-Teacher Learning', in which the teachers studied their peers and came up with comments and looked for solutions on the problems experienced together. This worked very well and the teachers were very open to each other. The 'peer teacher learning' was borrowed from the MSSI (Mpumalanga Secondary School Initiative) project, a partnership between the Mpumalanga Department of Education, the Japan International Cooperation Agency, and the UP's Centre for Science Education. Dr Khumalo and Ms Thembi Ndlalane, who ran the KwaMhlanga project for the UP's Centre for Science Education, had been heavily involved with the MSSI project and introduced the Peer-Teacher Learning component from the MSSI into the KwaMhlanga project. The project was designed to run for a year in both branches, but the Kwamhlanga project could be stretched to 18 months, while the Vaalbank project closed after one year, after a three month interruption when the Curriculum Implementer Charles Mtetwa fell ill. The Kwamhlanga branch also performed better because it had less transport problems and better accommodation for the project than the Vaalbank branch did. Moreover, the teachers in Kwamhlanga had a sense of ownership of the project because their principals had asked for the project. This was not the case in the Vaalbank branch, where there were also fewer resources for the project. In Kwamhlanga the teachers were divided up into four geographical clusters and met once a month under the coordination of the UP and the Curriculum Implementer Four-Ten Khumalo, but also on their own initiative and in their spare time, depending on needs.

# • What future for PSSP?

At the moment the PSSP project has terminated due to financial reasons, but it might some day be revived again. For the Kwamhlanga branch it is basically a problem of funding, because the teachers there already have made it clear that they want to continue. For the Vaalbank branch, there first has to be an initiative from the teachers themselves, before professor Braun would find it worthwhile to start it up again.

# • Overview of the key factors arising from the PSSP sub-project

- 1. The initiative for the programme came from the beneficiaries themselves, and was instigated by their problems and challenges faced at their workplaces.
- 2. This sub-project could develop only due to established external links (UP). SEIDET itself was unable and unwilling to run this sub-project by itself.
- 3. The SEIDET and UP "experts" took the view that the participants were in control and the experts were there to facilitate.
- 4. An in-depth ex-ante analysis by the experts of the challenges faced by the participants served to identify and delineate the main problems and to identify participants who could play leading roles.
- 5. An organizing committee composed of all stakeholders (primary school teachers, UP staff, SEIDET staff) determined the scope of the project.
- 6. The experts did not come with preconceived solutions.
- 7. The participants were learning by undergoing it themselves. Their motivation remained high because they discovered the usefulness of new practices through personal experience, rather than through being told by others.
- 8. At the start the project was kept small, in order to keep it manageable.
- 9. The project team realized that everybody, including "the experts", was learning as they were going along.
- 10. The project was kept on the course the participants wanted through frequent feedback.
- 11. The sub-project addressed real needs, in a way that was non-threatening to the participants.
- 12.Learning was materialized in written form at some point to prevent it from being forgotten, and in order to make it directly applicable.

- 13. The experiences gained in the first phase of the sub-project in one SEIDET branch were used to replicate the same activities in the other two SEIDET branches.
- 14. Through overlap in personnel between the project and an external project, a new method was successfully introduced.
- 15. The SEIDET branch from where the request for the PSSP project originated was more successful than the other one. The participants in this branch also started to have meetings on their own in smaller geographical clusters. Unfortunately there was not enough internal organization and drive to continue these meetings after project funding ran out.

# Recapitulation of the results

The above analysis of SEIDET's history yielded no less than 47 factors which in one way or another had an effect on its ultimate success, almost all of them positively. In order to summarize the main insights from these results, we now regroup these 47 factors into eight broader factor-categories. We do this mainly intuitively without imposing any pre-conceived conceptual order, by letting the empirical data speak for themselves, as it were. The following categories suggest themselves:

# 1. The concept, the initiators and the start up:

The SEIDET initiators had experienced the problems first hand, analyzed them and experimented with some solutions. A small, diverse team with personal experience of the problems then designed a solution. The initiators selected themselves during SEIDET's start-up phase, because people were free to join and leave. A committee which involved all stakeholders determined the scope of the project (and sub-projects). At the start, the project (and its sub-projects) was kept small in order to remain manageable.

The initiative to establish SEIDET (as well as its sub-projects) came from the beneficiaries themselves, and was clearly driven by problems they experienced in their daily lives and/or at work. The more initiative these potential users showed, the more successful their efforts were. For instance, the branch from where the request for the PSSP project originated was more successful than the other branch; the participants in the former branch also started to have meetings on their own in smaller geographical clusters.

An in-depth analysis was carried out by experts on the challenges faced by the participants (PSSP). This helped to get a clear focus and delineation of the problem to be tackled.

# 2. The community:

"Helping others in one's own community" is part of the cultural concept of *Ubuntu* and has always been something "that you do". Because the champion was, in a sense, challenged by that *community* (rather than by an individual), he felt obliged to accept the challenge.

Ongoing consultations with the community helped to shape the initiative into the kind of project that was truly needed in the community. Furthermore, ongoing consultations and the establishment of a representative board built a broad support base in the community, and helped the community to assume "ownership" of the project in due course.

# 3. Linkages:

Establishing forward linkages with tertiary education institutions was crucial for placement of SEIDET learners, generated positive performance pressures, and facilitated access to funding and expertise and knowledge. Backward linkages, too, provided opportunities for ideas, expertise and advice, and motivated participants to take matters into their own hands. The PSSP sub-project in fact was made possible only because of the existence of external sources whose expertise could be tapped. SEIDET itself could not and would not run the sub-project itself.

Horizontal linkages were also useful: SEIDET learnt and adapted (but did not copy) from other similar projects. But they did this *after* setting up their own framework for the project first, so that they were able to preserve their own ideas and goals. Useful ideas from others were suitably modified to as to be able to fit into something that was uniquely their own. But horizontal linkages did not always work well. An overlap in personnel between SEIDET and Prof. Roode's computer centres dissemination project could have been usefully exploited for cross-project learning but this did not happen. Lessons from SEIDET were not applied, or not perceived as such. However, cross-project links were exploited when a new method was successfully introduced through overlap in personnel between an external project and the PSSP sub-project.

Also, the experiences gained with PSSP in one SEIDET branch, were utilized in the set up of the same programme in the other two branches. And finally there was also a "franchise-link" that worked: SEIDET showed UniSchool that it was possible to run a Unischool centre in the rural areas under a franchise agreement.

#### 4. Leadership and atmosphere:

The SEIDET management understood that people who offer their services for free cannot be managed as if they were working under contract in a commercial organization. A 'no hard feelings' approach to volunteers kept the atmosphere in the organization from falling below par, by not trying to keep people in the organization who were not too interested anymore. Trust between individuals, managers and the initiators had to exist for the management structure to function properly. It was built up through democratic selection of people for particular jobs, and through ongoing consultations with all stakeholders. And for individual volunteers to be able to engage in self-development and enjoy it, an open and non-threatening atmosphere was necessary.<sup>15</sup> All these things were made possible through a committed, ambitious, self-critical and sacrificing style of leadership, which inspired others and nurtured new initiatives.

Celebration of achievements acted as a morale boost for all people who had contributed to the project and established a feeling that the community as a whole was taking control of its future.

#### 5. Learning selection methods:

First and foremost, the project addressed real needs in a way that was non-threatening to the participants. The way in which to achieve this, was to let local initiative be the basis and the driving force for the establishment of new initiatives throughout the project. E.g., the two new SEIDET branches were established by the people who would ultimately run them, in response from needs expressed in their own communities, with the extant project management assuming an advisory capacity but no direct involvement in the work. Through this advisory work, experiences gained in SEIDET's first branch were used to advantage when the two other branches were set up. The same happened in the case of the replication of sub-projects across branches.

In-house expertise and confidence among the volunteers was built through training (including self-training) and practical learning-by-doing. This learning was materialized at some point to prevent it from being forgotten, and to make it directly applicable. The participants learnt, and remained motivated, by undergoing the discovery process inherent in doing "it" themselves, not by being talked to or by being criticized. A guided introduction to new ICT hardware, followed by a "non-expert" approach to decide on its use (the Computer Ndaba) *guided* and *helped* the participants to discuss and decide themselves, instead of being told what to do. External "experts" also took the standpoint that the participants were in control, and saw their own role as facilitation of participant learning. They helped their learning through problem identification and –problem-delineation, and by refraining from advocating preconceived solutions. The project

<sup>&</sup>lt;sup>15</sup> Phahlamohlaka and Friend (2004) document an experimental participatory problem structuring method that has been applied to SEIDET's annual planning process. It is a good example of how the open, facilitative management style espoused by SEIDET works out in practice.

team realized that everybody, including "the experts", was learning as the project developed. Practice-oriented research, carried out together with external experts, was a useful instrument to enhance this learning progress. It functioned as a catalyst for change.

Expansion of project activities was also undertaken gradually. Participants would take over responsibilities in a gradual process. Shortcuts to progress (i.e., ready-made external "gap-filling" solutions) were avoided.

The project learnt to aim high, but not too high. One needed to work towards achieving something non-trivial, which gives participants a sense of real achievement, but at the same time had to avoid raising expectations that are impossible to meet, which can only lead to disappointment and a sense of failure.

# 6. Communication:

The project was kept on the course the participants and the community wanted through frequent feedback.

The different SEIDET branches were kept in close communication, so that they could develop the project as a whole by learning from each other, and no "forking" would occur. At the same time, individuals and branches were given enough latitude to decide what was best for themselves within that common framework. Meetings gave individuals an opportunity to share the things they had learned.

Using local teachers to instruct learners worked better than employing external experts (through a satellite link), because the local teachers could relate better to the students.

# 7. Commercialization:

When the time came to commercialize a sub-project, it was found that a careful balance needed to be struck between still being part of the overall project (with its non-profit, community-serving motive) and at the same time achieving financial independence. A complicating factor was that participants did not want to be perceived as private entrepreneurs benefiting from the community effort that had been put into their project.

# 8. Everything of value should have its price:

The project learnt that underpricing its services was a bad way to compete, because people erroneously associated low fees with low service quality.

# 6. Viewing SEIDET from the Perspective of Douthwaite's Learning Selection Model

After delving into the details of SEIDET's establishment and the evolution of the three subprojects, we now proceed by trying to recast this information under 15 headings that correspond to the hypotheses about Douthwaite's Learning Selection model, as formulated in section 4. Each hypothesis is held up against the available information, and rejected or accepted on that basis. With all fifteen hypothesis tested, we reach a preliminary conclusion about the ability of the Douthwaite model to explain the success of the SEIDET case.

• *Hypothesis 1: Presence of the four Learning Selection prerequisites.* 

According to Douthwaite, these four factors need to be present together in order for Learning Selection to be possible:

a. Participants are free to join and they select themselves. At the stage when SEIDET was born, freedom to join and leave was especially evident in the manner in which the SEIDET steering committee constituted itself. And even now, although some people in SEIDET receive a small allowance and are selected for the job, SEIDET is still very much a volunteer organization. Even the people who are selected or paid a small fee regard themselves as volunteers. SEIDET is still open to anyone who wants to participate, and as Jackie P's comments about the "no hard feelings" approach show, the volunteers are free to leave SEIDET whenever they wish. For the teachers there is one exception: they are selected and given a one year contract with SEIDET, which is evaluated at the end of the year. This is because SEIDET needs to be able to count on the teachers, because the students count on them to be there.

b. Adopters are able to modify the innovation: SEIDET has a culture that encourages experimentation, and this has been so right from the start. Initially, this was evident in the manner in which the project welcomed fresh inputs from new steering committee members, based on their areas of expertise; and in the open manner in which the project has tried to take on board suggestions from teachers, and encouraged them to make contributions for improvement to the project by organizing forums for exchange. The nature of the project – developing a social structure rather than a piece of hardware – in fact makes it easy for everyone involved to try to modify the structure, as there are no natural or technical restrictions other than the law and financial constraints to what people can change within SEIDET. There are, however, some restrictions on what modifications are accepted by other participants. Modifications are possible without any formal decision from a formal body if they are small and within the authority of the modifier. For example, teachers can and do modify the way in which they teach their lessons, and the different branches can conduct experiments locally in response to their own needs and according to their own ideas. Bigger modifications need to be approved (selected) by a formal body like the Executive Committee or the board. This applies for example to the modification to start with computer literacy courses.

*c. Evaluation of modifications is possible:* Evaluation within SEIDET is done regularly. It is helped a lot by the direct measurements that are obtained every year from the matriculation results. These results, compared to schools in the region, the feeder schools the learners come from, and/or compared to results of the branch in previous years, give SEIDET a direct, easy, objective and relatively fast evaluation of the programme as a whole, or per branch. As the results of all students are published in the newspaper, every teacher is also able to evaluate his or her work with SEIDET too. More subjective evaluations can be made within the classroom by the teachers themselves or by peers. Evaluations of modifications are also possible and relatively easy through the matriculation results of every learner. SEIDET in fact also encourages evaluations of all its activities through continuous feedback from, and consultation with participants. Action research has also been used as a means to ensure scientific evaluation.

d. There is an unbiased selection mechanism for the modifications: In the very early stages, the steering committee had to function as a selection mechanism for all adaptations, but with the establishment of the board, an unbiased selection mechanism was established. The board is comprised of people that add value to the organization. This can be through their skills, abilities, knowledge or standing in the community. The board members are sought through an internal general advertisement and then a panel interviews the people who apply and the best candidate is chosen on the basis of the value the member will add to the board and SEIDET in general. The board represents (and must represent) the interest groups that SEIDET has; traditional authorities of the community, the academic world, the media, gender issues, regional representation and business representation. Because of their representation and the acceptance of the board by the community, the board can act as an unbiased selector of adaptations. However, for the day-to-day decisions these powers are delegated to the Executive Committee. A representative and unbiased selection mechanism thus exists through the SEIDET board and EC. SEIDET has largely avoided being captured by empire-seeking individuals who protect and promote their own pet ideas at the expense of others, and suppress promising new initiatives that threaten to unseat the status quo. Improvements are therefore allowed to come up and evolve naturally, through true democratic processes.

The main conclusion that can be drawn from this is that all four prerequisites are met, and the first hypothesis is confirmed in the case of SEIDET. This establishes that Learning Selection in SEIDET was possible in principle.

• *Hypothesis 2: The initial idea is formed by a small team of individual(s); the initiators.* As Douthwaite (2002) says, "the R&D team may ask the key stakeholders ... for some advice, [but] they [i.e., the R&D team] are *driving the process*" (2002, p. 218). This has to be the case because, according to Mokyr, the process of inventing plausible promises is by its nature something that occurs within individuals. Creating a plausible promise is "an attack by an individual on a constraint that everyone else has taken for granted" (Mokyr, 1990, p. 9, as cited in Douthwaite, 2002, p. 219). This is not something that lends itself to a broad consensus approach.

If we replace R&D team by initiators, or even more concrete, by steering committee, the description fits SEIDET well. SEIDET started after a very long time (from 1983 to 1990) in which a small group of students were well aware of the problems, but did not act on the problems. Work on a solution started when the leader of this 'R&D team' (Jackie P.) was challenged by the community in May 1990. As a response to the challenge Jackie gathered around him a small group of three people he knew and trusted. The three people he picked were selected for their specific knowledge and skills. This group became the project initiators. Called the steering committee, they started to work on a solution. The steering committee had two meetings before Jackie had to return to Canada to finish his studies. With the return of Jackie to Canada, we can mark the time in which the initial project concept was established. This idea would later be changed slightly, but in these first few months the blueprint of SEIDET was drawn up. The steering committee was clearly the driving and deciding force behind SEIDET. The steering committee members initiated the search for a solution, informed and mobilized the community and decided on the activities and organizational structure of the project. Although they interacted frequently with the community (the key stakeholders) they decided the main thrust of what SEIDET would be, and the decision making process at that time did not involve democratic processes. The second hypothesis is therefore also accepted.

# • *Hypothesis 3: This small team of individual(s) generates a 'best bet' prototype of what the stakeholders want.*

In full, Douthwaite states that "At some point in time, the R&D team crystallizes the knowledge they have generated into a *prototype*: their *best bet* of what the key stakeholders want" (Douthwaite, 2002, p. 219). When we look at SEIDET in the early beginning, we see that the steering committee members complemented their own knowledge with the feedback they got from formal and informal meetings with community members, community leaders and professionals. From the moment the steering committee was formed, it was clear that they wanted to undertake a science-based project, because that was their area of expertise. Giving supplementary science classes was the natural conclusion. Having experienced the problems personally meant that the steering committee was well aware of the problem and the possible solutions. This knowledge made unnecessary a big investigation by the steering committee into the problems and the needs of the community. With only an outline of what later would become SEIDET, Jackie P. visited many community meetings and spoke about his ideas and got direct feedback from people. All these formal and informal meetings were a sort of long brainstorming session with different parts of the community and gave him insight into the problem and possible solution. These consultations would go on until 1993/1994 because "we did not know what we were doing". In the steering committee meeting of September 19, 1991, Jackie presented a document he had drafted in Canada, in which the plans for SEIDET were laid out. This document differed from earlier plans because a number of people had wanted to contribute their skills and this had necessitated a small change in the focus of the project. These changes came about as a result of Jackie's ongoing consultations. In other words, the ongoing consultations led to the

crystallization of the knowledge already possessed, and the plan that was drafted was the steering committee's best bet on how to tackle the problem. The third hypothesis is therefore accepted.

• *Hypothesis 4: The initiator(s) demonstrate this 'best bet' prototype to the stakeholders and the stakeholders are convinced it makes a 'plausible promise' of bringing benefit to them.* 

According to Douthwaite: "Then, in what marks the beginning of the start-up phase, they begin to *demonstrate their best bet* to the key stakeholders. It may take several prototype iterations before the R&D team has received and incorporated sufficient feedback for at least a few innovators to adopt. It is this adoption, based on the belief that the new technology makes a *'plausible promise'* of bringing benefit, which marks the beginning of the adaptation phase. It also marks the beginning of a period of co-development and learning selection..." (Douthwaite, 2002, p. 219).

Demonstration of a 'best bet' was not easy in the case of SEIDET. The innovation in this case concerned a service, itself also part of a whole new service concept. This is clearly more difficult to demonstrate than a physical technology. The essential characteristic of services is that their production and consumption are inextricably linked. They are being consumed during the act of production. Therefore, demonstrating a prototype of a service like SEIDET would only be possible after establishing the whole organization first. But in that case one could hardly still speak of a prototype. The closest one can get to a demonstration of a prototype service of this type is a presentation of *the plans* of the service and the concept, which did occur at length in the case of SEIDET. And if we interpret adoption by a few early innovators in this case as a commitment by a few people to the proposed project (either by joining, or investing time, money or otherwise), Douthwaite's depiction of the start-up phase is an accurate description of what took place in SEIDET at the time.

But was the best bet also a plausible promise to the stakeholders in this case? Indeed it was. We only have to look at the response and commitment that the "best bet" received from them:

• When Jackie consulted "all people interested in education improvement in Siyabuswa" and organized a "meeting of professional people in the vicinity" for general membership of SEIDET, "the spirit that emerged afterwards was purely supportiveness". [Minutes of the Steering Committee]

• The Universities of Pretoria and Fort Hare and the Technical College of Education of KwaNdebele promised support to the project, either officially or through personal commitments. It has to be said that the start of SEIDET occurred at an opportune time. By the beginning of the 1990s it had become clear that the Apartheid system had had its longest time, and that sooner or later, power would have to be shared with the black population. This might have induced these institutions to take a pro-active stance towards this black rural initiative. It would give these white institutions something to show when the time for the transfer of power would come.

• A lot of influential people, both from the white academic community and the black traditional authority, joined the SEIDET board of trustees. This showed that they also believed that SEIDET made a 'plausible promise'. This carries all the more weight because these people put their reputation at stake for an unproven project.

• The first teachers were surprisingly eager to join SEIDET when told what it was all about. In the KwaMhlanga branch, even some white teachers also joined SEIDET.

• The people who joined SEIDET as volunteers did not only contribute their time and energy, but they also had to pay a membership fee to the project.

• The first SEIDET Saturday classes began with 265 students and 35 teachers.

• On the fundraising day in 1992, the community was broadly represented, thereby conferring on SEIDET "a stamp of approval".

All these responses and commitments from the community, from the early stages of the project until the first year of operation (and continuing thereafter), show that the community saw that SEIDET made a 'plausible promise'. No prototype iterations are visible during this period, meaning that the initiators got the basic idea right the first time. Straight after the start of the project, learning selection started with, for example, the addition of career guidance to the project. There is ample evidence to accept the fourth hypothesis.

• *Hypothesis 5: The 'plausible promise' is simple, flexible and robust.* 

"Keep it simple, stupid (KISS). [...] a plausible promise should be simple, flexible enough to allow revision, and robust enough to work well even if not perfectly optimized", to quote Douthwaite (2002, 229).

Judging whether a plausible promise is simple is not as easy as it sounds. It could be done by comparing it to other similar services, but that would entail a lot of extra research work. Alternatively one could compare the plausible promise to the service after it has fully developed (i.e., after learning selection has taken place). The latter approach was used here in view of time constraints. When we compare SEIDET at the start of the project and SEIDET after 10 years, we can see that the core activity of SEIDET is still the Saturday tuition. Other activities that were added (career guidance, computer literacy training, ABET, SEISPRO, PSSP) are the result of learning selection cycles, as discussed earlier. Therefore, it is reasonable to conclude that SEIDET at the start was a relatively simple concept; it only focused on the core activity of Saturday tuition. Furthermore, the core activity was organized in a simple manner (i.e. without teacher manuals) and with limited resources (i.e. without own buildings) that added to the 'simplicity' of the project during the start.

The flexibility of SEIDET is proven by the fact that SEIDET was able to incorporate many different additions and changes throughout the years without running into major problems. Through a modular structure of sub-projects and branches, activities could be easily added to or removed from the project as long as they did not conflict with each other. Flexibility ("go-with-the-flow") was also part and parcel of the mindset of the management of the programme. The steering committee, and later the EC, took an accommodating attitude to new ideas and initiatives emanating from participants, and they made efforts to facilitate their development.

The robustness of SEIDET can be shown by what happened in the first year. In May 1992, the number of tutors dropped to 20, down from 35 at the start. By June, only 15 tutors had survived the pressure of having to sacrifice financially in terms of their transportation allowance. These 15 tutors, however, gained more pride and decided to continue with the project until the very end, and these tutors became a source of inspiration to the project. The number of students also dropped drastically during the first year. By June 1992, their number had dropped from 265 to 115. According to Douthwaite, such drops in "fitness" of an innovation are common when an innovation is first implemented. Teething troubles occur, mistakes are made, and changes are introduced that are detrimental. Many innovations do not progress beyond this point. The fact that SEIDET did survive this drop in fitness testifies to the robustness of the project. The robustness can be primarily attributed to the high drive that the volunteers, teachers and students showed. In turn, this high drive can be explained by the high need in the area for a project like SEIDET; the opportunity that the project afforded to various stakeholders to "make a difference" by doing something that they were good at; and achieving something constructive together as a community. The fifth hypothesis is thus accepted.

• Hypothesis 6: There is at least one stakeholder who is highly motivated, knowledgeable, communicative, and 'low on the ego side', who champions the process, fills in the knowledge gaps and functions as a selector.

A product champion needs to be, according to Douthwaite, "highly motivated and have the knowledge and resources to sort problems out. Someone [from the R&D team] that developed the

plausible promise [...] is likely to be suitable because they are likely to have both the necessary technical knowledge and the motivation, as they already have a stake in the technology. He or she must also have good people and communication skills as, in order to build a development community, they will need to attract people, interest them in what they are doing, and keep them happy working for a common cause. Their personality is therefore crucial." (2002, p. 229). And "for someone to do this well, he or she should be low at the ego end" (2002, p. 129). Furthermore, "the product champion would also look out for beneficial modifications and attempt to promote these" (*Ibid.*), or in other words function as a selector.

In a UP working paper (Snyman and Phahlamohlaka, 2002), the EC as a group is characterized as "a composite social entrepreneur", with Jackie P. as the driving force of the project for the past ten years. This driving force is the product champion Douthwaite refers to. We have already seen that Jackie P. is an informal leader who does not lead from the front, but leads by giving ideas, through encouragement, by being critical, giving constructive criticism and by checking whether everyone is still on the right track. He uses a mix of firmness, humility and team spirit. In the UP working paper, Jackie P. is described as being "exceptionally driven and absolutely committed to improve the quality of life in his community. His ambition and zeal are combined with a caring personality" (pp. 12-13). Furthermore, his "no hard feelings" attitude towards volunteers keeps the atmosphere in the project at par and shows a great insight in volunteer work and group motivation. Besides having experienced the problems himself during his studies, Jackie had no specific knowledge at the time that made him especially suitable for the job. However, he quickly made a lot of contacts in the field of education and started to work at the department of education for the former Homeland. What he might have lacked in knowledge he made up in personality, motivation and resources (e.g. contacts). The selection functions of the product champion were handled by the EC as a whole and the board of SEIDET.

Conclusion: there was (at least one) stakeholder who was highly motivated, knowledgeable, communicative and 'low on the ego side' who championed the process, filled in the knowledge gaps and functioned as a selector. The sixth hypothesis is accepted.

# • *Hypothesis 7: Nothing with a(re)sale value is given away.*

Douthwaite states "do not give [...] anything with a resale value for free ... otherwise people might be tempted to adopt in order to get something for nothing. In addition, people generally value something more highly if they have paid for it... (2002, p. 230)

SEIDET certainly did not give anything away. In fact, it would not have been able to do so, even if it had wanted to. With no funds available at the start of the project, the initiators had to contribute from their own pockets, the teachers could not even receive transportation allowances (which SEIDET did intend to pay, as a rule), and the learners had to pay a voluntary tuition fee of R10 per month [\$3.56; exchange rate of 1 Feb 1992<sup>16</sup>] to keep the project running. Although the initial teaching location (an empty building) was free of charge, simple things like chalk and blackboard wipers had to be bought by the steering committee. Dalhousie University was the first to make a small donation, then the UP followed, and during the fundraising day, individuals from the community donated R 800 [appr. US\$ 280 at the going exchange rate on 9 June 1992].

While this strategy arose out of sheer penury, it had favourable effects on learning selection as well. First of all, as pointed out by Jackie P., it made participants realize that the project could get by with very limited financial resources, and helped them to realize that the *minds of its people* were (and still are) SEIDET's biggest investment and asset. Secondly, the fact that the teachers in the beginning were not sure of anything, not even of getting a transportation allowance, probably selected out all but the most motivated teachers. Thirdly, the tuition fee for students served to raise consciousness among them and their parents that they were being offered something of value, helping them to persevere with the learning. Similar reasons underlay the raising of the

<sup>&</sup>lt;sup>16</sup> <u>http://www.oanda.com/convert/fxhistory</u>

tuition fee at a later stage in the project. SEIDET was by then *perceived* to offer lesser quality tuition than more expensive competing options that had by then become available in the urban areas, simply because of its low fees.

In sum, every individual participating in the project was asked to contribute to the project, even the volunteers and the teachers, and this served to heighten their motivation and perceive the value offered by the project. Even the low and *voluntary* fee asked from the learners served that purpose. A voluntary fee is different from a free service, because coming forward to admit that you are not able to pay the fee is not easy to do, especially since the project is driven by and paid for by your own community members. The SEIDET experience thus demonstrates the value of giving nothing of value away. The seventh hypothesis is thus accepted.

# • Hypothesis 8: Early adopters (from within the group of stakeholders) understand the concept and are sufficiently motivated to modify and carry out sensible learning selection on the 'plausible promise'.

After all, as Douthwaite argues, learning selection does not necessarily occur [even when a plausible promise has actually been adopted by a few early adopters]. It only comes about if those key stakeholders are sufficiently motivated to modify the plausible promise, and they must also understand the "technology" *well enough to do so themselves*. (2002, p. 220)

Neither lack of motivation nor lack of knowledge were obstacles to successful learning selection in SEIDET. Motivation was high as the need for the project was high, while the concept of the innovation was simple and people could draw from their professional background. These two key factors for learning selection were present. In the (early) adoption phase, learning selection cycles can be seen with the establishment of the Manager's position at every branch and the establishment of the career guidance committee. But also within the core activities of SEIDET there are examples of learning selection cycles. Because of the low financial rewards for the teachers, only the most motivated survived; and because the teachers at SEIDET were highly motivated and felt more free to experiment with their methods of teaching than in their schools during the week, new forms of teaching ( and "learning to teach") emerged, as the discussion under "*Personal learning selection*" showed. Stakeholders were sufficiently motivated, had sufficient knowledge and did carry out learning selection. Hypothesis eight is accepted.

• *Hypothesis 9: Stakeholders gradually take over the ownership from the initiators.* Quoting Douthwaite: "At a certain point [..] Rogers's *early adopters* start to show an interest. This marks the point at which the key stakeholders begin to *take over ownership* [...] and *market selection* begins to work" (2002, p. 220). "The takeover also marks the beginning of the *expansion phase*, when the technology becomes mainstream. As this happens, the people adopting the technology change from hackers (innovators) and early adopters to people who want the technology to work *reliably and profitably*." (2002, p. 220)

The early adopters of the SEIDET concept are the communities at KwaMhlanga and Vaalbank. When the people in Vaalbank and KwaMhlanga heard about SEIDET, they wanted such a centre too and contacted SEIDET. But SEIDET did not set up these new branches. It would give advice, whereas the work had to be done by the local people for the centres to become sustainable. During the 10 years that SEIDET has been running, more and more responsibilities have been transferred from the Executive Committee to the branches. For example, the Managers of the Saturday program now are responsible for, and have deciding power over, the practical and financial arrangements of the Saturday program at their local branch. Before the establishment of the Managers, the Executive Committee performed this task. Another example of increasing local ownership is SEISPRO, the SEIDET Student Project which gives advice and help to (prospective) students who want to go to University or College. SEISPRO is a separate organizational entity with its own executive committee and budget. Before its establishment, these tasks and responsibilities lay with the SEIDET Executive Committee. The start of "market selection" in

SEIDET is also visible. It can be seen in the raising of the tuition fee, which took place in response to the competition with market partners. The idea of commercializing the ICT services also points in the direction of beginning market selection.

In short, early adopters did show interest, began to take over ownership and the first signs of market selection are visible. The only stage that is still lacking is the expansion phase, which SEIDET has not moved into, even though it now functions quite reliably. This may be due to the fact that the project as a whole is still more or less dependent on outside funding. Thus, it has not (yet) become mainstream at this stage. However, on the whole, the ninth hypothesis is accepted.

# • *Hypothesis 10: The pilot project is in an area where the need for it is high.*

Douthwaite recommends to ..."Work in a pilot site or sites where the need for the innovation is great, ... your co-developers [...] motivation levels will be sustained for longer if they live or operate in an environment where your innovation promises to provide great benefits. In addition, they are more likely to receive encouraging feedback from members of their community" (2002, p. 230).

The severe educational problems facing South Africa's black population in general, and Siyabuswa's black community in particular, were elaborated in SEIDET's Founding Problem Statement of 1992, discussed in Section 2 of this paper. This certainly made it clear that a great need for a project like SEIDET existed in Siyabuswa in the early 1990s, as it did in many other rural areas. But in addition to the felt need, the Siyabuswa community had also seen for themselves the possibility of overcoming the obstacles through perseverance: Jackie P. had successfully completed a university education overseas. The combination of great need and the knowledge that it could be done, proved a fertile breading ground for SEIDET. By itself, the presence of the enormous gap in educational opportunities between black and white might have led to apathy, since the problem might have been considered too large for a local community to try to tackle it. It was the presence of a local successful role model that spurred the community into action since it gave them the confidence to believe in success. The tenth hypothesis is therefore accepted.

# • *Hypothesis 11: The innovation is not released too soon to too many learning selection participants.*

Douthwaite states that "Product champions should restrict the number of co-developers so that they can work effectively. When people show enthusiasm for a prototype it is very tempting to release it as soon as possible, but this entails jumping from the start-up phase to the expansion phase, and missing out the adaptation phase. This should be resisted." (2002, pp. 231-232).

Over the years, the SEIDET project grew from one location to three branches, one of which is located in a purpose-built multifunctional facility erected by SEIDET. The SEIDET innovation was not released instantly. The second branch was opened only after two years of experience with the first campus. Even though the actual work of starting up the branch was done by the local people, it took the EC a lot of time to explain, get commitment and lead the process. Therefore, even though various communities throughout the region had approached SEIDET requesting it to establish branches in their areas as well, the EC was very careful not to attempt to expand the project too rapidly, mainly due to considerations of management, resources as well as the standards already achieved by the project.

Although the two branches could be seen as diffusion, this is only partially true. The two branches are not independent from the 'mother' organization, together they *are* SEIDET. On the other hand, the campuses are run fairly independently from each other and teachers and managers identify with 'their' branch as well as with SEIDET as a whole. This combination of belonging to the same organization (which improves the communication between the branches) and the independence of the branches (which generates diversity) might also be a good structure for other service projects aiming for learning selection. The eleventh hypothesis is accepted.

• Hypothesis 12: The innovation is not patented or protected in another way. On this issue, Douthwaite observes that ... "the process [of learning selection] is seriously damaged if one person or group tries to gain intellectual property rights over what is emerging" (2002, p. 232). Although this hypothesis is not really applicable to SEIDET, during discussions some SEIDET members told that others were free to use the SEIDET ideas as long as they did not compete within the region. The hypothesis is accepted.

# • *Hypothesis 13: The product champion lets go in time before expansion occurs and the market takes over.*

Douthwaite: "Product champions need to be personally involved and emotionally attached to their projects to do their work properly. [But] This makes it easy for them to go on flogging dead horses. [...] Equally, product champions can continue trying to nurture their babies long after they have grown up, entered the expansion phase and proper market selection has begun." (2002, p. 233).

In 1997, when the first mandate of the EC expired, the EC members felt they had not yet finished their job were re-elected to continue their building up of SEIDET. They were well aware of the danger in becoming, as Jackie put it, "African Leaders" who stay in power too long. In 2000 they devised a plan to ensure a smooth transition to their successors in 2002, and started to look for successors. The transition plan, or "induction" as it was called, was a process of combined meetings of the new and old EC, and learning by observing and learning by doing tasks for the new EC. The induction took more than a year, but in May 2002 Jackie P. and the other EC members signed off. Jackie P. felt that this moment was the perfect time to hand over. Even with a more flexible constitution, he would still have chosen to hand over then. However, looking at the learning selection cycles in SEIDET, there does seem to be a drop in new ideas after 2000 and the establishment of the LAN at the SEIDET centre. This might be due to the fact that from that moment on the EC was busy working towards the handing over. The process of handing over itself may also have changed the focus of the EC more towards the SEIDET project that was already there, instead of new ideas for the future.

As the expansion phase has not started yet and only some first steps towards market selection can be seen, the product champions let go in time. The thirteenth hypothesis is accepted.

• Hypothesis 14: The innovation becomes mainstream (or enters the expansion phase) when there is a very rapid growth of adopters. The pool of possible adopters becomes larger as the adoption of the innovation becomes easier, because the innovation becomes more reliable, cheaper and/or and profitable as a result of many learning selection cycles.

The two new SEIDET branches that were established cannot be seen as the beginning of the expansion phase. The establishment of the branches was still quite difficult, since learning selection still drove the development of the original project. Instead, the new branches must be seen as the co-developers that Douthwaite describes. And even now, although SEIDET is working quite reliably, it is still not yet profitable and easy enough to adopt for the innovation to become mainstream by moving into the expansion phase. It may be that SEIDET will move into an expansion phase eventually. But it is also possible that SEIDET will never replicate on a large scale. This could be because of the nature of the innovation, because of the unique constellation of community and personal factors that made the project succeed, or because SEIDET itself does not seek large scale adoption in the first place. The evidence about the fourteenth hypothesis is therefore inconclusive.

• Hypothesis 15: A move from 'learning by doing' to 'learning by modeling' occurs when adaptations are not carried out directly on the technology but are modeled, and learning occurs from virtual tests rather than from field experience.

Douthwaite defines learning by modeling as "*learning from virtual tests* [...] *rather than field experience*" (2002, p. 220). In view of the non-technical nature of SEIDET, it is hard to imagine how learning by modeling could be applied to this project. There are certainly no signs of learning by modeling in SEIDET at the moment, and we doubt if they can or will ever exist. Therefore, the final hypothesis is rejected.

# Conclusion

Tracing SEIDET's emergence and evolution from the perspective of Douthwaite's Learning Selection model pointed us towards a number of factors that have clearly been of key importance in the development of the organization, and in shaping it into the dynamic organization that it has now become. No less than twelve out of Douthwaite's fourteen key success factors, and all four success prerequisites were found to have been present in SEIDET. Together, these factors suggest that SEIDET 's establishment and subsequent development have adhered closely to a "bazaar"-like innovation model; and also that this model worked well in this case because SEIDET as an innovation has some important characteristics that were suited to this particular model (such as its simplicity, its potential for adaptation, the presence of a powerful product champion with "facilitative"-type leadership skills at the right place at the right time, and so on). The application of Douthwaite's Learning Selection model thus seems to yield substantial insight into the ways in which SEIDET's successes have been achieved.

But does it constitute a full explanation? We recall that our earlier analysis of four major Learning Selection Cycles in SEIDET in Section 5 led us to identify no less than 47 "key factors of success" from the research data themselves. Although on the face of it, a large degree of overlap can be seen between those 47 factors and the insights from the application of the Learning Selection model to SEIDET, the question still suggests itself whether the success factors from Douthwaite's theoretical model can indeed fully capture the richness of SEIDET's experiences. In the next section we try to formulate an answer to this question, by attempting to match the historical insights that we gained from SEIDET's practices (section 5) with the insights that we got from analyzing SEIDET by means of the Learning Selection theory (section 6). We try to tease out additional insights about SEIDET's success from any mismatches that we detect in the process.

# 7. Synthesis of the Findings

In the discussion about SEIDET's establishment and set up, and in the development of three important sub-projects, a total of 47 key success factors were identified. In this section we attempt to determine the extent to which these factors overlap with the key success factors from Douthwaite's Learning Selection model. In order to make the analysis more manageable, we structure the discussion by means of the eight broad factor-categories that were discussed at the end of Section 4. We examine to what extent the success factors listed under each of these categories have also been listed by Douthwaite as key driving forces of success in his Learning Selection model.

# 1. The idea, the initiators and start-up:

All the key success factors from SEIDET's set up, such as the long and thorough preparation, small-scale experimentation, the role of the product champion, and so on, can also be found in some form or another among Douthwaite's key factors. The only difference relates to the point about the importance of the initiatives coming from local participants, beneficiaries, or the

community (mentioned thrice). User-drivenness is not a "key success factor" in Douthwaite's model; rather it constitutes the core of his model itself.

# 2. The community:

Comparing the role that the community played in SEIDET and in Douthwaite's model, we can see some important differences. In SEIDET, the community takes a more prominent place than in Douthwaite's model, and the concept itself is different as well. For Douthwaite, the community is the *development community*, the collection of innovators that apply learning selection to an innovation. In SEIDET, the community is the *local community of all people who have a need for a particular innovation*. The existence of this social community was crucial, because it instigated the project by challenging Jackie P., and this in turn led to the desired effect because of the *social-cultural cohesion* within that community, of which he was a member. Community in the SEIDET case is thus a geographical, social as well as a cultural entity. Although Douthwaite also acknowledges that culture makes a difference, his remark is so wide open that it could not serve as a basis for a hypothesis in this research; there is certainly no natural direct link with the attributes and functioning of a local community like there was in the SEIDET case. We thus add "*The community as a local socio-cultural entity*" as an additional success factor found in SEIDET, not found in the Douthwaite model.

# 3. External linkages:

Douthwaite is not much concerned with linkages in his model. They can be seen to operate in some of his examples, but he does not postulate linkages as a key success factor. In contrast, in SEIDET linkages of all kinds proved to be crucial in the development of the project, in a variety of ways. The establishment of forward linkages with tertiary education institutions ensured a market for the "outputs" of the project (i.e., trained learners), and also acted as performance inducements by generating pressures to show results (when overseas visitors were due to visit) and enhancing participant's motivation. Forging forward and backward linkages both also provided access to various crucial project inputs. And establishing human resource linkages with other projects opened the way for wider transfer of ideas and lessons (even if these were not always exploited to their full potential). We therefore conclude that *the establishment and exploitation of external linkages* also constituted an extra key success factor in SEIDET, not seen in the Douthewaite model.

# 4. Leadership and atmosphere:

With respect to the leadership aspect, Douthwaite's model and SEIDET's experience seem to tally very closely. Very similar observations are made about the role and the needed personality of the product champion. The product champion must be someone with stamina, ambition and high motivation, someone who does not suffer from too strong a sense of personal attachment to his/her "innovation baby", and who is open to new contributions by others.

In addition, however, SEIDET's experience points towards additional factors not seen in Douthwaite's model. The whole project atmosphere, issues to do *with the management of volunteers* and ensuring continued active involvement by the local community (in the sense defined above) are also of importance. The importance of working with positive incentives and "go-with-the-flow", including a "no hard feelings attitude", quickly turning failures into possibilities for learning rather than assigning blame, and celebration of achievements together with the community, are highlighted much more prominently in the SEIDET case than in Douthwaite's model. We add "*maintaining a positive atmosphere / skills in volunteer management*" as an extra success factor.

# 5. Learning selection methods:

The methods employed during the learning phases in SEIDET (facilitation of learning-by-doing and stimulation of self-development, learning-by-interacting between similar but not identical sub-projects, avoidance of forking; adopting a gradual and bottom-up approach) closely resemble the learning selection principles that Douthwaite stipulates. However, in the SEIDET case, sometimes experts and non-experts were involved in learning cycles together (especially in the activities that involved staff from the UP). The experts could have easily upset the learning selection process by coming up with preconceived solutions ("shortcuts"), thereby bypassing the learning selection cycle. However, this did not happen because the experts, to their credit, somehow realized the importance of *guiding* and *helping* the other participants to discover their own solutions.

Another learning factor that was employed to advantage in SEIDET, which is also not discussed by Douthwaite, is that action-oriented research can induce (shared) learning as well. In sum, we add the *"guiding- and helping-attitudes by external experts"* and *"action-oriented research"* as additional factors that contributed to success in the SEIDET case.

# 6. Communication:

Good communication in all its forms and at all times was clearly a key success factor in SEIDET. Its experience showed that communication and the existence of well-functioning and *institutionalized* communication channels, in turn facilitated by a *conducive project structure*, were undoubtedly crucial to the project's success. In particular, SEIDET's branch structure offered possibilities for small variations in activities to develop (diversity), which could lead to new learning selection cycles and learning from one another. At the same time the branches were kept in sufficiently close touch so that isolated experimentation (of the sort that could lead to forking) could not occur. The branches retained a common culture and framework, so that they could actually keep learning from each other.

Douthwaite also emphasizes the importance of there being a communication channel between different innovators, so that experiences can be shared and learning from each other can occur, although he does not formulate it as a key success factor, and he also does not highlight the importance of institutionalization and organization structure. Therefore, the principles of *"unity in diversity"* and *learning through regularly organized exchange* can be considered as additional key success factors.

The case of local teachers in SEIDET being more successful than external experts points to the importance of yet other ways in which communication contributed to learning in SEIDET: In particular, the fact that it was *face-to-face* interaction played a big role in increasing the effectiveness of the teaching, since the communicators could see the reactions from their learners first hand, and respond to their problems and comments immediately. The feature of physical proximity is also very much part of evolutionary innovation models, including Douthwaite's. But that the *shared local culture* between the teachers and the learners also facilitated the interaction between them is not so strongly present in these theories, although it is clearly another instance in which "culture matters", according to Douthwaite (see also the discussion under "community"). The element of "a shared local culture facilitating communication" can therefore also be considered as an additional success factor found in SEIDET.

# 7. Commercialization:

Difficulties of balancing the needs of the non-profit "mother" organization with the new requirements of a "for-profit" spin-off are also discussed in Douthwaite's work (albeit not in the form of an explicit key success factor).

# 8. Everything of value should have its price:

The project learnt that underpricing its services was a bad way to compete, because it gave potential learners and their families wrong signals about its service quality. This factor, too, is

present in Douthwaite's model, as we have seen. He observed that nothing of value should be given away.

# Conclusion

We conclude that Douthwaite's Learning Selection model did cover many key explanatory aspects of SEIDET's success, but not all. SEIDET's success was also in no small measure due to the conducive role played by social-cultural factors; the crucial efforts made by *volunteers* and the constructive role of the management in handling them; an awareness of the importance of building all kinds of external linkages and utilizing the resources from these links judiciously (for the purpose of learning, not copying!); and the awareness of the need to cultivate continuous open communication and consultation, and building the organization in such a way as to accommodate this need; and the importance of a good social, non-competitive atmosphere in which individuals of different types can thrive and feel useful. Moreover, there were some key success factors in the SEIDET case that, although present in Douthwaite's writings, were not identified as key success factors in his Learning Selection model as such. These include the importance of face-to-face communication in the learning process, the importance of handling commercialization carefully, and the importance of good pricing policies.

# 8. SEIDET's success: Final conclusions

How can we explain SEIDET's success? Combining the insights from all the previous sections, we come up with the following answer:

SEIDET became successful because it engaged in extensive learning selection. Undergoing this process was *possible* because of the presence of Douthwaite's four learning selection "prerequisites": Its participants were free to join and they selected themselves; the participants (adopters) were able to modify the innovation; evaluation of modifications was possible; and there was an unbiased selection mechanism for the modifications. Having satisfied these essential necessary conditions for learning selection actually *happen* in practice. The importance of several of these factors has also been pointed out in modern evolutionary innovation theory (in this case, Douthwaite's learning selection model):

- 1. SEIDET's initial concept was formed by a small team of individual(s); *the initiators*. This small team of individuals generated a 'best bet' prototype of what the stakeholders wanted.
- 2. They demonstrated this 'best bet' prototype to the stakeholders and the stakeholders were convinced it constituted a 'plausible promise' of being of benefit to them.
- 3. The 'plausible promise' was simple, flexible and robust.
- 4. There was at least one stakeholder who was highly motivated, knowledgeable, communicative and 'low on the ego side', who championed the process, filled in the knowledge gaps and functioned as a selector.
- 5. Nothing with a (re)sale value was given away.
- 6. Early adopters (from within the stakeholders) understood the concept and were sufficiently motivated to modify and carry out sensible *learning selection* on the /'plausible promise'.
- 7. Stakeholders (teachers, parents, and the community at large) gradually took over the project's ownership from the initiators.
- 8. The pilot project was in an area where the need for the new service was very high.
- 9. *Start-up:* The innovation was not released too soon to too many learning selection participants. There was an extended period of brainstorming by the initiators, following by small-scale experimentation.

- 10. Innovation was not patented or protected in any other way.
- 11. The product champion let go in time before the expansion, and before the market took over.

But SEIDET's case history is far richer than this. A number of additional key driving forces emerged from the analysis of its history, which could not be readily linked with theoretical insights. In this connection we must mention:

- 12. The local community was able to successfully challenge the product champion to start the project because of its strong social and cultural bonds.
- 13. The project was transformed into a true community-driven project. The strength of the local culture, "Ubuntu", was harnessed for this purpose.
- 14. The establishment of forward and backward linkages ensured a "market", generated performance inducements and motivation to assimilate new skills and knowledge, and supplied crucial inputs.
- 15. Overlap in personnel, and well developed communication channels between personnel, across similar sub-projects was a useful vehicle for transferring ideas. Branches in the project were encouraged to experiment and generate diversity, while they were kept close enough to prevent forking.
- 16. Celebration of success provided a morale boost to the participants and established a sense of community among the participants.
- 17. The project's management realized what it meant that they were working with *volunteers*. A "no hard feelings" approach kept the atmosphere in the project from falling below par, by not trying to keep people in your organization that have lost interest. People were also encouraged to pursue their own ideas and engage in self-development.
- 18. External experts *guided* and *helped* the participants instead of coming up with preconceived solutions and thereby bypassing learning selection.
- 19. Research acted as a catalyst for change.

The SEIDET case holds important managerial lessons for those who wish to set up similar development projects, whether in South Africa or in other less developed regions of the world. First and foremost, the virtues of a facilitative, "bottom-up" leadership- and management style are evident for projects that lend themselves to, and thrive on, broad-based participation from different types of stakeholders. The SEIDET project would not have been able to blossom without these varied inputs, because the new concept that it embodied could only be designed successfully through extensive learning-by-doing in a whole network of participants with different views, knowledge and skills. By involving all these key stakeholders in an in-depth process of democratic consultation and adaptation right from the project's inception, the project management allowed this "laboratory" churning phase to happen. The result was that the project's "fitness" improved over time, and in the process the local community as a whole also achieved true ownership of their project and felt responsible for its wellbeing. This continued broad-based support and enthousiasm for the project ultimately were responsible for its continued survival through bad times, for its continuous improvement processes, and for the initiation and flourishing of several new sub-projects in the course of its existence. There are countless development projects with characteristics that would benefit from a similar approach; not merely education projects, but all manner of initiatives that involve the introduction of much needed new products or services that lend themselves to incremental adaptation by local stakeholders.

The other main lesson from our case, which also emerges from Douthwaite's (2002) projects and Raymond's Linux case, is that stakeholders will indeed commit themselves to putting substantial efforts into development projects that concern them. The predominant driving force seems to be motivation and enthousiasm, not financial reward. At the same time, working with volunteers poses special challenges for project leaders. Sanction-based rules and regulations as commonly used in commercially run organisations will have adverse effects on the project atmosphere, which can easily kill off worthwhile initatives. The SEIDET case showed how a

more positive approach was used to good effect. A "no hard feelings" approach towards participants who, for whatever reason, wanted to discontinue contributing to the project maintained the positive project atmosphere. New people with fresh ideas were welcomed, with the project's scope being adapted in response to the skills, interests and knowledge of the contributers, rather than the other way around.

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