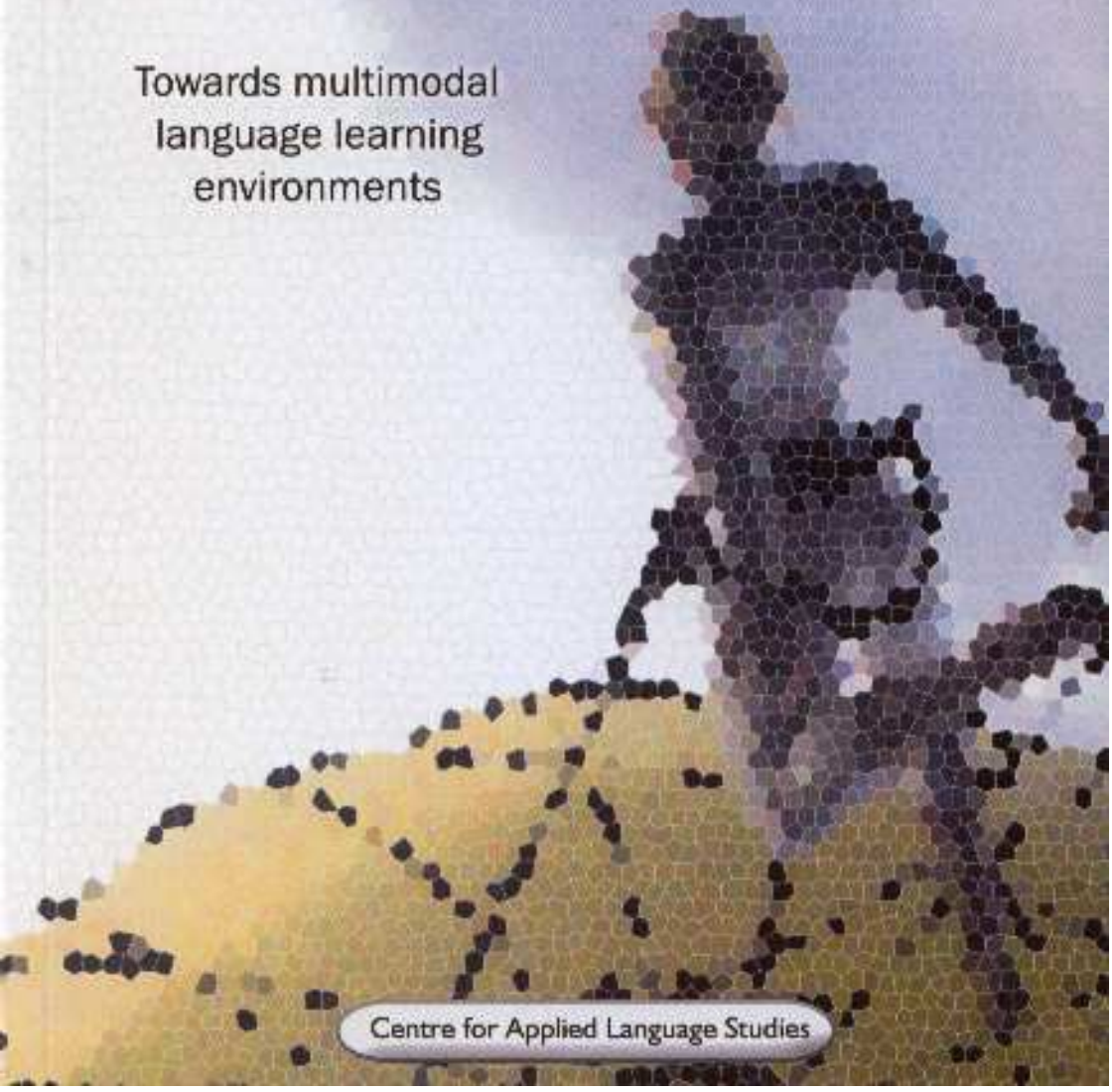
Peppi Taalas

Change in the making: strategic and pedagogical aspects of technology integration in language teaching

Towards multimodal language learning environments



Centre for Applied Language Studies

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Förmågan att idag tänka annorlunda än igår
skiljer den vise från den envise
- J. Steinbeck

Abstract

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Change in the making: Strategic and pedagogical aspects of technology integration in language teaching
Jyväskylä: Centre for Applied Language Studies, University of Jyväskylä

This study explores the way in which technology is integrated in language teaching in the vocational and higher education sectors. There are two parts in the study. Part I looks at change in a seven-year follow up study where English teachers' teaching practices and the technology use are surveyed to see where and what kind of change is taking place. Along with an extensive theoretical framework of educational change and learning technologies, change is examined in the light of three external interventions: immense technological advancement and the information strategies, the changing notion of literacy, and the restructuring of education in Europe. There are three sets of data (from 1994, 1997, and 2001) covering all Finnish and Swedish vocational schools in Finland. Part II of the study is an empirical examination of the 'rules' and 'realities' of change in real life context of language teaching. The aims of the part is to better understand the mechanisms of change as a systemic process.

The study has both strategic and pedagogic aims. The strategic aims are to view the impact of current information strategies in the area of language teaching, and to examine the suitability of the available research methods for the multilayered and dynamic contexts of organisational development. The pedagogical aims are to examine the concept of innovative technology use, to present a design model for technology integrated language teaching, and to provide useful information about the current technology-integrated language teaching practices.

The results in Part I quite clearly show that the kind of change described in the Finnish information strategies has not taken place, and that the support structures for technology-integration need to be revised. The teachers' technology use has increased in the seven-year time span, but the use is mostly administrative or quite traditional. Part II raises concerns about the lack of adequate research and evaluation approaches that would support sustainable re-culturing processes in teaching organisations.

Keywords: technology integrated language learning, technologies for learning, innovative use of computers, professional development, systemic change

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1 Introduction

This study is about change. There are two contexts within which change is explored and analysed. Both these contexts are in the domain of language teaching and learning, in Part I in the vocational education sector and in Part II in the higher education sector. The theoretical sections consist of a selection of approaches that have direct relevance for the central areas of the research setting and these sections create the ideological base for the exploration. The two contexts in the study have different purposes and outlines. The first one is an attempt to get an overall picture of what is happening 'out there' in the schools where change is assumed to be gradually happening and new cultures of teaching and learning emerging. The same educational sector and the same subject area have been surveyed three times during a seven-year time period to see how technology is being adopted into the language teaching practices.

It would be easy enough to leave the exploration at that. But to really understand the dynamics of change in the area of teaching and learning, a more empirical and in-context exploration is needed to understand and face the realities of teaching. This is what the second part of this study is about: an illustration of a systemic development process where a whole teaching organisation is working towards establishing new ways of teaching languages at the higher education level.

As the title of this study suggests the change that is underway is both a strategic and pedagogical challenge. Neither one can survive without the support of the other on the mission towards sustainable and constructive re-culturing of teaching and learning. It has also been a conscious choice to use the word teaching in the title because all 'teaching' should always have 'learning' in the focal point. This does not work both ways, learning can well take place without formal teaching.

The challenges for sustainable change are manifold. The technological advances should be localised to serve as tools and

resources for teaching and the new learning theories should be understood in ways that support learning in the given context. The emerging cultures need to be built on the existing ones with a careful consideration of the reasoning and 'evolutionary chains' behind the main principles of the current teaching practices. In all honesty, quite many of the current structures and practices are relics of the past and are embedded into the existing structures (study materials, examinations, assessment and evaluation criteria and so on). Even if the old and new will need to co-exist, a forthright debate is needed in order to acknowledge and agree on the critical points where re-thinking and serious adjustments are prerequisites for improvement and change.

1.1 From Emerging Theories and Resources to New Learning Environments and Teaching Practices

The changing notions of learning, knowledge and Information and Communication Technologies (ICTs) have given rise and potential for new ways in which teaching and learning can be organised. It is not directly the technology itself imposing a need for restructuring and re-culturing education, but the encouraging new possibilities it offers for enhancing learning and making the learning settings more multimodal. The pedagogical implementation of the various technologies should however always supersede the features of the applied technologies (see Lehtinen, 2003).

The current teaching practices are seriously challenged by these changing notions, all of which are interdependent of one another, and cannot be dealt separately. The changes that these notions impose on teaching and learning practices are illustrated in Figure 1 (p. 15).

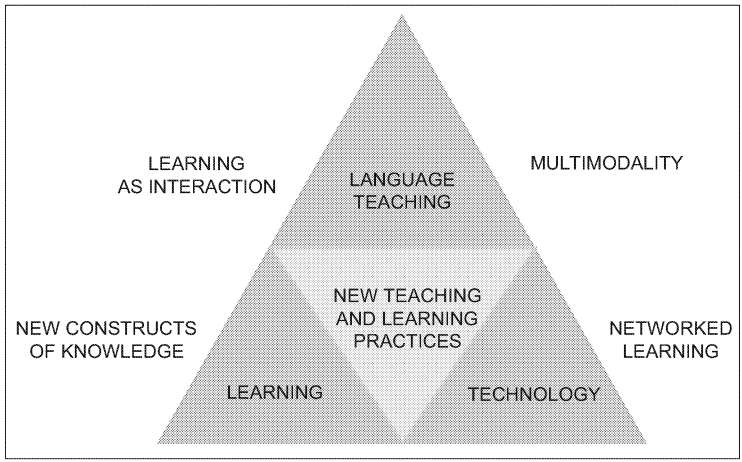


FIGURE 1. The imposed changes to the current teaching and learning practices.

According to the recent theories, learning is perceived to be social in nature, any successful learning setting thus allowing for multifaceted interaction (see for instance Salomon, 1993, Lave and Wenger, 1991). The networked forms of learning in turn support joint knowledge construction and shared expertise in a real life context (see Scardamalia and Bereiter, 1994, 1999). From the perspective that cognition is distributed, the tools, rules, values, and actors in a learning environment form a complex and interacting system. As Salomon (1993) has pointed out, it is important to consider how to design learning environments which support collaborative knowledge construction and include socially distributed cognitive resources. These ideas are tied in the Computer Supported Collaborative Learning (CSCL) approach, where the key point is in finding technology-supported collaborative ways of sharing knowledge and distributing expertise among the communities of learners (see for instance Koschmann, 1996, 2002).

The changing notion of knowledge is in the core of the emerging learning settings. Not only has the access to knowledge radically increased in the networked and multimodal world, but so has the authorship and ownership of knowledge changed. The Internet has

offered a free publishing media, the technology has made hypertextual document creation possible, and it is a pedagogical challenge to create activities that incorporate multiliterate aspects to information and joint creation of knowledge. Sfard (1998) has proposed to include the participation metaphor to the models of learning to signify the aspect of learning as becoming a participant in a community where knowledge is seen as an activity, practice and discourse. This model is supplemented with the knowledge construction metaphor (Hakkarainen et al., 2002), which refers to the cultural roots of knowledge and skills creation. Nonaka and Takeuchi (1995) have looked at knowledge creation from the organisational perspective and Engeström (1987) has created an activity theory where the idea of expansive learning and joint knowledge building are brought together.

In addition to the new ways in which the learning settings should accommodate for multiple ways of working with information, the sociocultural aspect of learning has opened up a new dimension to how the language learning setting should be designed. The communicative element has been claimed to be a part of formal language learning for the past two decades, but the social nature of that communication can have varied greatly from one classroom to another. In theory the sociocultural approach allows for designing language learning settings where language is used as a mediator of meaning and a means of participation. These kinds of learning settings will require new kinds of teaching practices, where form is a minor part of the message and where activities are multimodal and networked. This means that also the research approach and methods need to be reformulated and explored to understand the new context and the new ways of interaction (see Kuure et al. 2002, Raudaskoski, 2002 and Saarenkunnas et al., 2003, Saarenkunnas 2004).

As has been pointed out, the complex systems of learning, technology, context, content, and goals demand for new approaches for designing learning. The increasingly complex nature of the learning settings and the demand for new types of learning tasks

has made the ideas of Instructional Design (ID) interesting again. In the past days of instructional design the approach to learning setting was quite mechanical and rigid following the principles of programmed instruction. The new ways of looking at the design is to include new critical aspects (such as cognitive, social and emotional) to the learning setting (more on the developments in ID, see Häkkinen, 2002). In the chapters to come, the word 'design' is used to refer to the new ways of looking at the learning processes and to attempts at creating learning scenarios with a clear focus on learning (and not the media, the content or the learner as separate entities) and the features that support the learning process. This kind of thinking is aligned with, for instance, the ideas about e-learning hubs and media affordances presented by Kuk (2003). The fundamental principle in the designs thinking in this study is a shift from content-based activities to activity-based ones.

One of the focus points throughout the current study is a quest for emerging language teaching practices that incorporate the ideas presented in above. The way in which technology is used in education will have far reaching effects in the surrounding societies. Innovative uses of ICTs are seen as steps towards the future classroom, where the ICT element is thoroughly integrated into the school (and society) as a system and not as a separable unit (see for instance Kozma, 2003). The area of language teaching is not isolated from this development and will be faced with change demands that will inevitably need to be dealt with in the years to come.

1.2 Educational Change

It can be claimed that throughout ages education has been faced with waves of criticism from the surrounding society. It seems that the general public always has a clear and definite idea of how education should be developed and what it should and should not look like. In the American debate, education has been labelled as a source of, and a base for, societal inequality and even turmoil in

almost every turn (cf. Perelman, 1992, Sarason, 1996, Smith 1995). In 1983 the American National Commission on Excellence in Education wrote an open letter to the American people and published a report "Nation at Risk - The Imperative for Educational Reform" and warned of a "rising tide of mediocrity" in the schools. This caused a panic among politicians and educational planners, among parents, teachers and principals, and placed educational reform on top of the agenda for many years. Now 20 years later, a book called "A Nation Reformed: American Education 20 Years After a Nation at Risk" (Gordon, 2003) takes a look at the past events and asks whether the nation really ever was at risk and whether it still is. The recurring nature of this type of debate can be seen in the confused state in Germany triggered by the outcome of the International OECD/PISA study (2000). The study looked at young people's skills in reading, mathematics, and problem solving in the principal industrialised countries. The results were quite unflattering for Germany, which fell clearly under the OECD average and is now taking a serious look at its educational system.

A great deal of the current debate has to do with the societal transformation brought along by the technology revolution. Naturally, there are many other imposing challenges in the educational establishment, but unquestionably technology has both changed the way we work and think and the way in which we access the world around us. As these changes have effects on the skills required in the information society, educational establishment has had to react to these new requests from the world outside. This has unavoidable consequences as to how the approaches to teaching and learning should be reformulated and reformed. Yet, according to Wagner (1993) among others, too little attention has been paid to the rethinking of the purpose of school and schooling, the consequence of this being that the educational establishment has lost its sense of direction, and in its reaction to the external pressures is easily taken for a rollercoaster ride in the wake of new trends and demands in the surrounding society. Teachers are sent to further training, curricula are re-written and the winds of change blow in

through all doors and windows. It is no wonder that some educators have started to call the new efforts in this parade of reform programmes the "flavor of the month" and just wait for the hype to pass without taking any greater initiative in the process. The change efforts should always underpinned by theories or at least assumptions of what the core activities of teaching are and should be (see for instance Hargreaves, 1995).

For many years the prevailing attitude has favoured computerised schools and technology investments. The school reform and the technology initiatives have for a long time now been adjoined (see for instance Collins 1991). This development has nevertheless not fulfilled the expectations and promises of changing the way in which teachers go about doing the teaching (see for instance Cuban 2001, Kerr 1996, Grant 2000). The desired shift from teacher-directed transmission approaches toward student-centred approaches that would emphasise the social and cognitive construction of knowledge will not take place without other measures as well. Carey (1993) points out that the fact that the evaluation of the implementation outcomes has mostly been restricted to quantitative methods (the number of machines and hours of student use) has left room to overtly optimistic assumptions about the progress of educational computing.

Winnans and Brown (1992) and Cuban (2001) among others state that although the number of computers in society has risen dramatically, there has not been noticeable change in the number of teachers actually using microcomputers in teaching. Dupagne and Krendl (1992) furthermore have found the teachers' ambivalent attitude towards computers to be less favourable than the general public's. Cohen (1987) in turn argues that schools and the nature of teaching have remained substantially the same for seven hundred years, and there exists in the popular mind a very conservative conception of schools and what they are like. Hodas (1993) claims that this is one of the major reasons for the slow pace of technology implementation in schools. According to Hodas (1993), the schools themselves are conservative, hyper-hierarchical organisations, which

perceive the technologists' promise as a threat and a disruption of routine. The gradual pace of change has been acknowledged earlier, too. Milstein (1976) justifies the prolonged process of change by explaining that the educational policy making is a complex process partly because there are so many instances participating in it, but also because policy enforcing is a gradual, non-neutral, divergent process with different stages preceding implementation.

1.2.1 Theories of Change

A set of traditional change models are frequently present when talking about change in the educational domain. One of the models of change that is often quoted has been advanced by Rogers (1983). The basic model consists of five stages: (a) knowledge of innovation; (b) persuasion about the utility of the innovation; (c) a decision to adopt or reject the innovation; (d) the actual implementation; and (e) reinforcement for innovation's utilisation. He uses innovation and communication as the central terms meaning that communication is the process which has its aim in adopting an innovation in an organisation. Rogers (1983:5) clarifies the concept of diffusion as follows:

> "DIFFUSION is the process by which an innovation is communicated through certain channels over time among the members of a social system and COMMUNICATION is a process in which participants create and share information with one another in order to reach a mutual understanding"

Fullan (1982, 2001) presents another model of change that is often cited: (a) innovation (b) adaptation and (c) implementation and beyond (planning, doing and coping with change). Innovation as a set of materials and resources is the most visible aspect of change and, at least literally, easiest to employ. A greater difficulty is presented if the use of the materials means learning and employing a new teaching approach or style. Even more difficult is the situation if a change in beliefs has to occur. According to Fullan (1982), these

beliefs are often not explicit, discussed, or comprehended, but rather are buried at the level of non-stated assumptions. He emphasises that a change cannot happen unless teachers understand themselves and are understood by others. Notwithstanding the fact that teachers are on the receiving end of new policy and program directions, individual teachers can become more capable of assessing, and even influencing, whether the necessary prerequisites exist for coping with the change.

Fullan (1982) suggests three types of questions for teachers to be answered before they decide for or against the proposed change. First, is the change needed? Does it address an important educational goal that is not being achieved adequately with the present methods? Second, is the administration committed to the increase in need of resources? Third, are the other teachers enthusiastic about the change, i.e. the collegiality aspect? These questions have relevance in their message: teachers are influential parts of the change chain, and the links in the chain have to hold if any permanent reforms are to be accomplished. However, in the modern times and when it comes to technology, it seems almost impossible to imagine that teachers would still be able to say no to the proposed change. What they can do is influence the way in which the change is outlined and implemented, but for doing so they will need educated opinions and ideas. The collegiality aspect can also turn into a negative force if the "group think" intensifies itself against the proposed change (Fullan & Hargreaves, 1996).

These and other traditional change models can be examined through the central components that the theory of change is based on. Ellsworth (2000) has assembled the most influential change theories according to these central themes. His taxonomy can be seen in an abridged format in Table 1.

TABLE 1. Taxonomy of change models. (Adapted from Ellsworth, 2000)

Questions	Component of Change	Title of Flagship Publication	Principal Authors
What attributes can be built into the innovation or its implementation strategy to facilitate its acceptance by the intended adopter?	INNOVATION	Diffusion of innovations	Rogers, E.M.
What are the conditions that should exist or be created in the environment to facilitate adoption of innovation?	ENVIRONMENT	Conditions of Change	Ely, D.P.
What are the implications of change for people or organisations promoting or opposing it?	CHANGE AGENT	Meaning of Educational Change	Fullan, M. Stiegelbauer, S.M.
What are the essential stages of the change facilitation process?	CHANGE PROCESS	Change Agent's Guide	Havelock, R.G.
What stages do teachers go through as an innovation is adopted?	INTENDED ADOPTER	Concerns-Based Adoption Model (CBAM)	Hall, G.E. Hord, S.M. Newlowe, B.W.
What are the cultural, social, organisational, and psychological barriers to change?	RESISTANCE	Strategies for Planned Change	Zaltman, G. Duncan, R.B.
What are the immediate factors outside the immediate environment in which the innovation is being introduced that can affect its adoption?	SYSTEM	System Change in Education	Banathy, B.H. Reigeluth, C.M. Garfinkle, R. J. Carr-Chellman, A.A. Jenlink. P.M.

Other change models that originate from outside the educational sector are, for instance, the Fifth discipline by Senge (1990) and the Chasm by Moore (1990). Senge's model will be discussed further in Chapter 8.1. Moore's Crossing the Chasm is written for the high-tech community, and it focuses on the nature of technology adoption cycles in the corporate world. Emphasis is on the marketing models of innovative products in the different consumer behaviour segments (innovators, early adopters, early majority, late majority, and laggards). The logic of the cycle is in the underlying thesis that technology is absorbed into any community in stages that correspond to the psychological and social segments of this community. These stages and the group movements are definable and make a predictable continuum, which is called the high-tech marketing model. Strangely enough, this model is sometimes used when programmes for technology integration in education are being designed.

The model which, along with the ideas by Fullan, Banathy and Rogers, fits well into the ideology of the present study is the Concerns-Based Adoption model (Hall & Hord, 2001). The change principles in the model will be presented in more detail in Part II, where an actual development process will be reported.

1.2.2 Change and School Improvement

There is probably no reason to separate change and school improvement as such, but in literature a distinction between the two is often made. It seems that school improvement is seen as a more focused process of improving certain aspects of schooling, these improvements being a part of a larger reform or change process. The improvements are often interpreted to be measurable and concrete, which the more abstract concepts are not. It seems that timelines are often presented for improvement but not for change.

Hameyer (2002) explores the successful factors of school improvement in an international study called IMPACT

(Implementing Activity-Based Learning in Science). He outlines three premises for school improvement as follows:

- Schools can learn from what works elsewhere. Methods that have proven viable in other contexts can be viable in the school context as well.
- A quality improvement process is like knowledge-based problem solving in the school organisation.
- Communication is an integral part of the process and it should take place on two levels: on the level of reflection and on the level of construction.

These points do raise some controversy in literature. For instance, for point one, an equal conviction to the opposite can be found and a critique for the adaptation of corporate models to non-profit organisations (see for instance, Higher Education Report, 2001).

In the IMPACT project Hameyer has found the three stages (see Figure 2) to constitute the development process. He does not offer a time frame for the stages of sequencing, and just notes that these are overlapping. In the second part of this study this idea has been used when to design the time frame and the goals for the overall process.

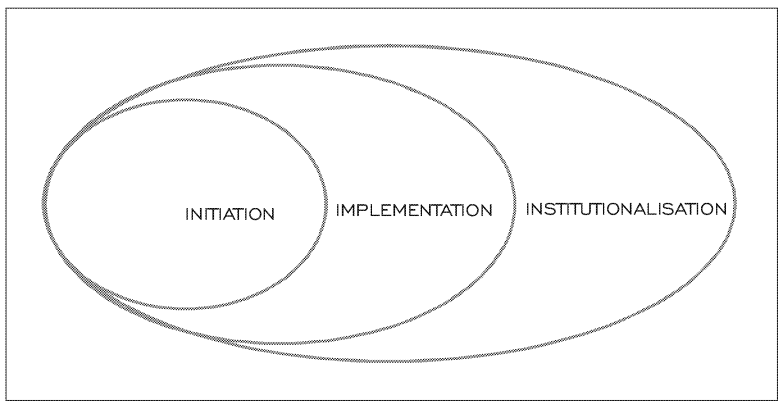


FIGURE 2. Stages of school improvement (Hameyer, 2002).

Passey and Ridgway (1994) present their observations on the integration process of new information technology (IT) with a minimum of seven detectable stages (see Figure 3):

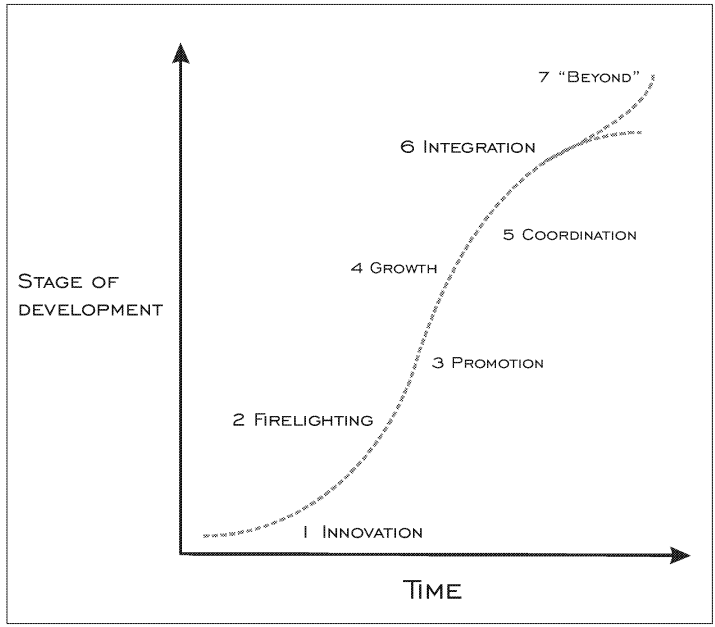


FIGURE 3. Strategies of school IT development.

1. Innovation as one finds out about educational computing and its uses.
2. Firelighting as one is trying to persuade those who have influence.
3. Promotion as school management actively support IT.
4. Growth as the teachers gain insight into the possibilities and pre-requisites.
5. Coordination as the need to monitor learners' total experiences becomes urgent.
6. Integration when most teachers use IT and a stable state is reached.
7. Extension as new educational uses for IT are explored and adapted.

Passey and Ridgway claim that the integration of technology into a whole school requires at least three years, which seems very optimistic in the light of the present situation. They have listed the conditions and prerequisites for the timeframe to be realised. These include consistent support for teachers and a staff development program of about 100 hours and cooperation within the various hierarchical instances in the school district.

At one point the idea in this study was to use this adoption model for analysing the seven years of data in Part I, where the teachers' technology practices are examined. It turned out that the data collected in this study does not offer all the details needed, neither is the overall situation in Finland as clear-cut as the use of the model would require. For instance, it is not possible to pinpoint the start of the process in concrete terms (it would be too imprecise to for instance use the year 1994 as the introduction of an innovation such as the WWW). It is difficult to estimate the content and the hours of further training the teachers have received. This model will thus remain an example of an adoption process in the schools.

1.2.3 Change Forces

There are many reasons outside and independent of the educational sector that put pressure on the schools to initiate reform processes especially in the area of ICT integration. This chapter takes a look at some of the influential change forces in society at the moment. The highlighted pressures are the massive efforts for the creation of an information society and an eEurope, the constantly changing practices of dealing with information and knowledge, and finally the new structures of education in Europe. Some of these forces and pressures also offer means and resources for the initiation of the various development processes. The national and European information strategy programmes are among these.

1.2.3.1 Information strategies in Europe

At the European level, the major turning point in the inclusion of information society and ICT in strategic planning was in May 1994 when the Bangemann group published the White Paper on "Europe and the global information society". The report announced that "throughout the world, information and telecommunications technologies are bringing about a new industrial revolution which already looks to be as important and radical as those which preceded it". In 1996 an action plan was published: "Learning in the Information Society – action plan for a European education initiative".[1] The action plan was expected to support and reinforce the impetus of various activities at national and local levels to connect schools to communication networks, train instructors and develop products which meet pedagogical needs. The action plan was mainly targeted at primary and secondary educational establishments, where the need for technology was being met least satisfactorily. Questions linked to vocational training were treated in separate publications which were more oriented to the labour market and the mobility of work force in Europe.

The aims of the initiative were:

- To accelerate schools' entry into the information society by giving them new means of access to the world;
- To encourage widespread application of multimedia pedagogical practices and forming of a critical mass of users, products and educational multimedia services; and
- To reinforce the European dimension of education and training with the tools of information society whilst enhancing cultural and linguistic diversity.

Year 2000 was the real start of the European e's. The eEurope initiative was introduced as an umbrella for the various e-activities

1 More information on these documents can be found on the eEurope website at: http://europa.eu.int/information_society/eeurope/2005/all_about/elearning/index_en.htm.

and programmes in various sectors of society: eGovernment, eBusiness, eHealth, eInclusion among others. In the area of education, the "eLearning: designing tomorrow's education" (2001) policy paper for 2001–2004 was published. This policy paper is divided into four action lines with rigorous objectives as can be seen below:

1. **To accelerate use of a high-quality infrastructure with the following aims**:
   to provide all schools with access to the Internet and multimedia resources by the end of 2001, and to equip all classrooms with a fast Internet connection by the end of 2002; to connect all schools to research networks by the end of 2002; to achieve a ratio of 5-15 pupils per multimedia computer by 2004; to ensure the availability of support services and educational resources on the Internet, together with on-line learning platforms for teachers, pupils and parents, by the end of 2002; to support the evolution of school curricula with the aim of integrating new learning methods based on information and communication technologies by the end of 2002.

2. **To step up the training drive with the following aims:**
   to promote universal digital literacy at all levels and to ensure the availability of appropriate training for teachers and trainers, including technology training as well as courses on the educational use of technology and management of change. Schools, universities and training centres are urged to become local knowledge acquisition centres which are versatile and accessible to everyone. It will need to be ensured, by the end of 2003, that all school-leavers have had the chance to become digitally literate; that all teachers have had appropriate training; that the teacher training programmes are adapted accordingly, and to introduce measures to encourage teachers to make real use of digital technology in their lessons by the end of 2002; every worker is offered the opportunity to become digitally literate through the lifelong learning system by the end of 2003.

3. **To put emphasis on creating appropriate content, services and learning environments with the following aims**:
   The environments need to be sufficiently advanced and relevant to education, in terms of both the market and the public sphere.

The availability of standards is particularly important, as is the establishing of conditions conducive to change and to adaptation of the ways in which education and training systems are organised.

4. **To strengthen cooperation and dialogue and improve links between measures and initiatives with the following aims:** the links need to be established at all levels – local, regional, national and European – and between all the players in the field: universities, schools, training centres, decision-makers and administrators responsible for selecting equipment, software, content or services (including the social partners). Partnerships between the public and private sectors will continue to be established, in order to encourage exchanges of experience, technology transfers and an improvement in the way in which businesses' skill needs are taken into account in conjunction with the measures advocated by the European Employment Strategy.

These action lines have been converted to concrete programmes and funding schemes. For instance, within the education, training and youth programmes (Socrates, Leonardo da Vinci and Youth) about 352 million euros were planned to be allocated for e-Learning initiatives in years 2002–2006.

Even if it is highly doubtful that the goals of the 2001 action plan have been even remotely achieved, a new eEurope 2005 Action Plan has already been published. An eEurope interim review was published in 2004 and in that report the European eLearning progress was assured to move along as planned. Exchange of experiences and good practice would need to be improved and new approaches to learning encouraged even more than before. The new and revised Action Plan 2005 is a supporting measure to the previous eEurope Action Plan and it has the following targets:

1. **Launch the e-Learning Programme** (2004–2006) to continue this work and support priority areas, including the deployment of virtual campuses. (The programme was proposed on December 2002, to be adopted in the Education Council of November 2003.)

2. **Analyse the European market for e-learning**, including the private sector, to identify obstacles and propose remedies.

3. **Virtual campuses for all students**. All universities should offer on-line access for students and researchers to maximise the quality and efficiency of learning processes and activities by the end of 2005. The e-Learning Initiative has already launched several pilot projects, which it will soon begin clustering together, and is publishing a study on virtual campus deployment.

4. **Broadband connections**. All schools and universities, as well as other institutions that play a key role in e-learning (museums, libraries, archives ...), should have broadband Internet access for educational and research purposes by the end of 2005.

5. **Grids for e-Learning**. the Commission was to launch, by the end of 2003, research and pilot projects in using advanced distributed computing systems ("GRIDs") and broadband networks to provide high quality learning facilities.

It is difficult to find language learning and teaching specific strategies in the early strategy documents. The actions for promoting skills for enhancing technology use in the classroom are directed at different school levels rather than at different subject teachers. In the 1995 "White Paper on Teaching and Learning: Towards learning society" language skills are seen as a part of the employability skills and as one of the corners of the free movement of work force in Europe: "Language learning also needs to be encouraged... The European Commission believes that it is necessary to make proficiency in at least two foreign languages at school a priority...," (p.18). Language teachers are expected to 'go with the flow' towards information society, as well as to intensify cultural and international dimensions in their classroom practice. The newer documents, however, have taken up the importance of a plurilingual Europe, and dedicated specific programmes for the development of language teaching practices. To emphasise the importance of language learning, year 2001 was celebrated as the official year of languages

in Europe. An action plan focusing completely on language learning was published in 2003 ("Promoting Language Learning and Linguistic Diversity: An Action Plan 2004–2006"). The main concern of the document is to ensure a linguistic diversity across Europe and maintain the "mother tongue plus two other European languages" ideology in the language teaching policies around Europe. The role of the ICTs is occasionally mentioned as a developmental tool for language teaching pedagogy and for creating networks of teachers within Europe.

Situation in the Member States

The Bangemann White Paper was the catalyst for many of the other information strategies throughout Europe. The need for a national information technology strategy plan was clearly acknowledged by all the European Union countries. From the very beginning the national strategies have been closely aligned with the ideas presented in these various European Union action plans as they concentrate on the future scenario of education and the development demands it imposes on the educational traditions and structures. Many of the existing information plans are linked with the EU's People First strategies, so that the steps towards information technology implementation are embodied in cultural strategies and the idea of lifelong learning.

The countries seem to have different approaches to carrying out the actual shaping of their national strategies. In some countries a national organisation is appointed to act as the agent for the planning and implementation of the national strategies, while in other countries the ministry of education designs the plan and the implementation strategy, urges schools and other educational institutions to react to the proposed plans and provides them with economic support. The support is basically directed at two levels: support for the purchase of computing and communications equipment; and/or support for teacher education, staff and materials development. The sums of money spent in this context are quite substantial.

The Finnish Information Strategies

Finland took major steps in documenting the action plan for the creation of a Finnish Information Society in 1994. The first strategy was published in 1995 (Education, Training and Research in the Information Society). It was an ambitious effort to establish the guiding principles and building blocks for Finnish information society. The objectives were striving and far-reaching. The main action lines were:

- To provide all citizens with basic information society skills both within and outside the formal educational system
- To focus on teachers' professional skills to be able to support the ideas of life long learning and learner autonomy
- To develop information products and services
- To improve the opportunities for research in the information society
- To build education and research networks

Finland made a pioneering contribution to the development of information strategies in the other countries and was sometimes called the information society laboratory in Europe. The number of Internet sites in Finland was just behind the numbers in USA and well ahead of the other Scandinavian countries. It was also promised that by the year 2000 there would be a computer per every eight student in all schools and that all the Finnish schools would be connected to the Internet. The Finnish Ministry of Education spent 24 million Finnish marks (over 4 million euros) in 1996 only on the development of teacher education and new learning environments. Heavy machinery was set up for further training of teachers. The goal was that every fifth teacher in the whole teaching cohort in Finland would participate in the Tieto Suomi ('Knowledge Finland') training courses between 1996–1999. It was a 5 credit unit training course consisting of the basics in new ICT pedagogies, open learning environments, distance learning and learning platforms. Many teacher-centred development projects were also initiated to help teachers integrate the newly acquired skills into their daily teaching practices.

In 1997 and 1998, interim evaluations were carried out to see how well the goals had been met. Some serious problems were noted in the following areas: only 10% of the teachers had gone through the intended training, the impact of technology investments had not been as strong as had been planned and the maintenance costs had taken up most of the resources allocated for the integration of the hardware into the teaching practices. Moreover, a serious problem was noticed in content production as there was an acute shortage of high quality electronic content. The research efforts were not sufficient and the dissemination of results did not reach the classrooms.

These challenges were taken onboard in the following information strategy (2000–2004), where it was stated that ICT and course development must go hand in hand, where cross-disciplinary research projects were encouraged and supported, and where evaluation of all processes was put in the core of all development. The year 2004 is the focus year, and the magnitude of the financial investment is estimated at 50 million euros. The goals were to ensure equal opportunities for all to utilise the information resources and educational services extensively. This was seen to be the heart of the efforts to make Finland one of the "leading knowledge and interaction societies" (Education, Training and Research in the Information Society, 1999:29). The required skills for all are seen to be media literacy and technology skills, and the means by which this can be realised is through the creation of virtual universities and polytechnics, through turning libraries and other public access points into mediatheques, and finally through guaranteeing an e-mail address to each citizen by the year 2004.

The most visible effort for teachers is again the intense training framework, this time called OPE.FI I, II, III (or TieVie 5 and 10 in the higher education sector). The goal is to have 30,000 teachers participating in the training and ensure that all graduating teachers have learnt the equivalent skills during their university studies. The budgetary plan is to allocate at least 5 million euro to this end each year. The new course structure is modular and project-based with

the objective of linking the training as closely as possible to the teacher's every day work. There are three levels of competence, level one starting at the very basic computing skills moving on to more sophisticated ICT and pedagogy related skills.

An evaluation report was published in 2002 on some aspects of the implementation of the information strategy (Koulutuksen ja tutkimuksen tietostrategia 2000–2004: Hankesuunnitelmat), and it seems that things are moving on as planned. The training scheme will be modified slightly to include more subject-specific themes and supplements. An update to the 2000–2004 strategy has been published (Information Society Programme for Education, Training and Research 2004–2006) and its main objective is to establish and sustain the accomplishments of the previous strategies. There are four goals in the newly launched strategy: 1) to develop all citizens' information society knowledge and skills, 2) to enable educational institutions to use information and communications technology (ICT) in a versatile way in their activities, 3) to establish ICT-based procedures in education, training and research and 4) to promote social innovation through the use of ICT. Evaluation of the progress is also mentioned as one of the focus areas, but no evaluation criteria or framework are mentioned in the publication.

The attempts at European-wide transparent measures of eLearning have forced the development to concentrate on quantity over quality. The way in which the Finnish Ministry of Education, for example, measures the development of the Finnish virtual university is by counting the number of teachers who have attended the national ICT training courses and the number of study credits that have been given for the various joint on-line courses. This type of evaluation of progress gives only a partial picture of the situation and also shifts the focus of development to superficial changes. Also, the opportunities and obstacles for attending further training should be examined. The situation in different schools is unquestionably different and equal opportunities for attending training cannot be assured for all teachers for economic, geographical or other reasons.

As a final note on the information strategies, it can be stated that education is in the absolute core of any information society. The visions and the concrete actions and results are still seeking out to find each other and new ways of reaching the visions in an ethically sound manner are yet to be discovered. As Ilkka Tuomi (2004), a member of the executive board of the Finnish Information Society Forum, points out, the discussion on information society and its future is only now beginning.

1.2.3.2 New Literacies

Literacy has always been in the focal point of educational objectives. Learning to read and write is seen as an integral part of social inclusion, a necessity in guiding one's own fate. The traditional literacy skills, however, are not sufficient for handling and coping with the ever growing masses of information (see for instance Koski, 1998) and for dealing with the social nature of information (see Brown & Duguid, 2000), so new forms of literacy are being introduced. These new forms incorporate the idea of an information society where the information takes on many structures and where the authorship and ownership of the information is not as clearly predefined as before.

In the realm of computing the term literacy was in the 1970's originally used about 'persons who could write computer programs' or even about persons 'who could compute' in the word's earlier meaning 'to calculate'. Nevison (1976) notes that when the term was first introduced in the 1970's, as Leuhman (cited in Douglas 1980) affirms, the term was gradually extended to include people who could 'do computing'. Soon after, the term 'functional computer literacy' (Longstreet & Sorant 1985) started to gain foothold in the field of educational computing and notions of the computer as a pedagogic conveyor or as a tool and a resource (Levin & Souviney 1983) were introduced.

Today, however, since literacy is not just about computers, its terminology and the different variations are considerably more

complex. The parameters within which the whole phenomenon is examined are wide and varied depending on who is making the claim and within which discipline. The available terminology is often overlapping, but usually the main differentiation comes from the context of use and from the definition of multimodality itself. Paul Gilster (1997) has introduced the term 'digital literacy', and he defines it as being about mastering ideas and not keystrokes. Warschauer (1999) in turn uses the term 'electronic literacy' and argues that the whole issue is about either interacting or being interacted, which means that an electronically literate person can be an active participant in the different interaction chains in contrast to just being handed information to, 'being interacted with', on the terms of the other participants. Other common terms are media literacy (the Finnish equivalent being medialukutaito), web literacy (verkkolukutaito in Finnish) and information literacy (tiedonlukutaito in Finnish).

In the European Commission publication Better eLearning for Europe (2003) the various terms for literacy have been defined as follows:

> **Technology literacy**: The ability to use new media to access and communicate information effectively
> **Information literacy**: The ability to gather, organise and evaluate information and to form valid opinions based on the results
> **Media creativity**: The capacity to produce and distribute content to various audiences
> **Global literacy:** Understanding the interdependence among people and nations and having the ability to interact and collaborate across cultures
> **Literacy with responsibility:** The ability to consider the social consequences of media from the standpoint of safety, privacy and other issues

In these definitions literacy is seen as relative rather than absolute. There are multiple levels and kinds of literacy and it is noteworthy that according to the classification, no single level of skill or

knowledge qualifies someone as literate. It is also interesting to note that the term 'digital literacy' used in some of the action plans for eLearning has not been defined here at all.

In their work on recommendations for the literacy skills in information society an expert group at the Finnish Ministry of Education has also defined literacy (see Figure 4). Their classification is based on a 'staircase' to illustrate that there is not just one form of literacy and that each generation creates its own interpretation of the literacy skills needed in the current times. It is difficult to contrast these steps to the European Union categorisation, and it is also problematic to see the internal relationships of these steps. It could be supposed that moral and ethical choices would create the base and be prerequisites for any educated literacy practices. The report does not explain the steps in any detail and many questions remain unanswered. It could almost be claimed that the objective of the report is mainly to defend the status of the traditional, printed, book in the changing times.

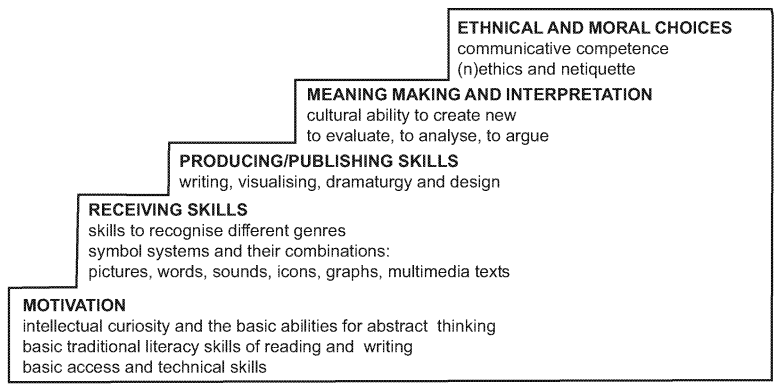


FIGURE 4. The steps of (media) literacy (Ministry of Education 2000, translation and graphical presentation Ahtikari & Eronen, 2004).

Snyder (2002) argues for the expansion of the current narrow definitions to include the complexities of literacy practices within a broader social order. The guiding idea is to combine the various modalities of the electronically mediated world to create meaning. This meaning lies in the semiotic systems that are read, written, viewed, spoken in the expanding social networks. As Snyder rightfully points out, the challenge for literacy educators is immense. The immensity comes not only from the fact that the whole territory of literacy is still largely unknown, but also from the fact that educators themselves are not fully literate themselves. Despite the abundance of research in the field, literacy practices in technology-supported, multimodal environments are still largely unknown and very little researched. In the area of languages Kuure (2002) has, among the few, explored the notion of accessibility in relation to literacy in different multimodal environments of work and study.

Yet another term, Multiliteracies, was introduced by a group of experts, the New London Group (2000), who were concerned about the disparities of educational outcomes and the radical need of rethinking "the fundamental premises of literacy pedagogy in order to influence practices that would give the students the skills and knowledge they need to achieve their aspirations" (Cope & Kalantzis, 2000:5). According to Kalantzis and Cope, education has reached a crisis point. What has been the 'basics' in education has become irrelevant as the earlier page-bound written texts no longer are the standard for literacy practice. The identities of people have become more social and multilayered, and the schools need to work towards creating productive interrelationships between the layers and work against a fragmentation of the realities.

The New London Group (2000:19–22) propose a new approach to literacy pedagogy and call it a pedagogy of Multiliteracies. The central term in the pedagogy is "Design" in that design is what the current workplace innovations and the school reform are about. (The term was chosen because it lacks negative connotations in learning.) The framework itself is based on a particular theory of discourse. Design involves three elements: Available Designs, Designing, and

The Redesigned. Available designs (the resources for design) base themselves on various semiotic systems (film, text, gesture and so on) and the Designing always includes meaning making affected by the linguistic and discoursal experiences of those involved in it. The Redesigned is the outcome of Designing and bound by the existing historically and culturally received patterns of meaning but incorporates new interpretations and meanings. This new, transformed meaning will eventually form a part of the new Available Designs.

As can be seen in the above definitions and frameworks, literacy can be claimed to consist of anything between an awareness raising activity to an empowering authoring of new interpretations by the learners. The awareness raising includes the formation of the understanding of one's cultural position (e.g. western, ethnic, social, local) and through that positioning one builds an understanding of one's responsibilities, limitations and opportunities as a user and creator of information. In more concrete and practical terms this would in the school context mean building a healthy relationship to the wealth of information in the different media by allocating lesson time for the exploration, evaluation and discussion of the various representations of the world as expressed through these different media. The available information needs to become knowledge in learners' minds and an insight of this knowledge can only be acquired through a conscious processing of the meaning and the message of it.

In language learning the aspect of multiliteracy is as critical as ever. Language as coding system, language as representation, language as practice, language as power, language as meaning all come together when people are learning to decode a new language and new cultures which the languages always are a part of. The mother tongue plays a very important role in this issue, but the multiliteracy aspects should not be tied to the mother tongue curriculum only; the world of meaning does not live by the boundaries of curricula. The various literacy skills should be seen

as transferable learning skills and thus embedded in the learning practices across all subject areas.

Among all the existing demands and the flurry of terminology and ideals, more concrete descriptions of actual teaching practices are needed. A practical approach to literacy in language teaching is outlined in Figure 5. The idea is that the literacy practices are always situational, but in a learning situation certain elements and processes are always present and should be supported. The notion of language in a language learning setting is expanded to include all the semiotic, iconic, and graphical representations that carry meaning. Thus, the language element is seen both in the lifeworld of the participants (in all interpretations) and the authors, and in the structures and processes whose meaning is situationally negotiated by the participants. This negotiation is a part of the pedagogical approach of the learning setting in the sense of allowing for language to have both multiple representations and individual interpretations.

This also means that the pedagogical design would need to allow for a space for the different communities to participate in the negotiation about goals and meanings for the tasks at hand. From the methodological point these communities will need tools for both constructing their new designs but also for sharing these designs. Knowledge and knowledge construction are placed between language and methods, but it should be noted that all these elements are embedded in, and intertwined with, all the corners of the framework. The idea of knowledge is that the interpretations are often based on values, beliefs and the individual learner's way of looking at life, and with accurate tools and processes for evaluating, constructing, re-constructing and sharing those interpretations, new insights, and realisations will develop.

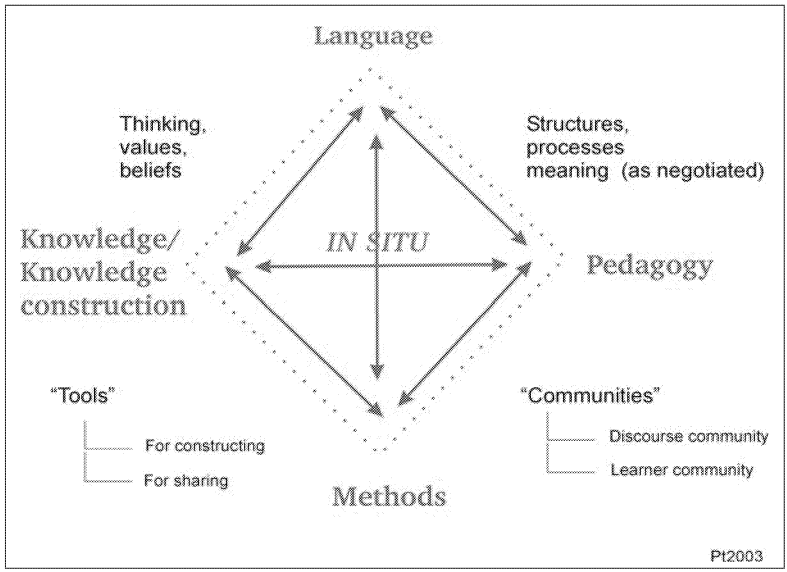


FIGURE 5. A practical framework for literacy practices in language teaching.

1.2.3.3 Restructuring of the Education in Europe

The final highlight in the external change forces in the Finnish educational sector is the Bologna process. The empirical part in this study is largely on vocational education, but the Bologna process has implications for it too.

The basic objectives of the restructuring process are a more unified and comparable cross-European educational system. The key points in the process are:

- Simplifying the mix of higher education qualifications and making the educational system more transparent with comparable degrees in the undergraduate and postgraduate studies. A standardised accreditation system (such as the ECTS) will also be needed

- Improving mobility within Europe and attracting students from around the world by encouraging free movement of students, teachers and researchers
- Ensuring high standards will require a quality assurance framework. Networks of universities and higher education institutions will need to be stronger for the dissemination of best practices and for designing evaluation systems
- Ensuring a continued follow-up of the progress by agreeing on a timeline for the work and assigning a follow-up group and a preparatory group.

Lifelong learning and a strengthening of the European dimensions of higher education and employability are also seen as an essential element of the European Higher Education Area.

In Finland the main arrangements linked to the Bologna Process are set out in the Development Plan of the Ministry of Education 'Education and Research 1999–2004' adopted in 1999. A new five-year development plan will be adopted at the end of 2004. From August 2005 on, the two-tier degree system will be adopted in all fields of study and Bachelor-level degrees will become obligatory for all students. The national university degree credit system will be replaced by an ECTS-based system from August 2005. The corresponding reform of polytechnic degrees is likely to be in accordance with the same schedule.

As regards quality assurance, Finland has been a member of the European Network for Quality Assurance in Higher Education (ENQA) since it was first established, and the Finnish Higher Education Evaluation Council (FINHEEC) is also acting as the secretariat for the European Network for Quality Assurance in Higher Education. According to Finnish legistlation, both universities and polytechnics are responsible for evaluating their own activities. The government has set goals for student mobility in both universities and polytechnics, and both sectors have been very active and successful in their international activities. Institutions of higher education are also encouraged to develop a larger selection of English-language study programmes. Both universities and

polytechnics are to offer a wide range of lifelong learning programmes.

Besides its measures associated with the Bologna Process, the government is planning to take steps to facilitate a quick transition from secondary to higher education by making appropriate changes in the student admission system. An important development in relation to student mobility and university networking has been progress in the area of flexible study rights. Based on a recent agreement, students at Finnish universities may now apply for temporary entitlement to study at another Finnish university and have this period taken into account in their degree.

For language teachers the re-structured and streamlined overall study schemes can mean an even harder struggle for slots for language courses in the various curricula. It will also be an opportunity to explore new ways of organising language courses within the different disciplines and to think of new possibilities of integrating language learning in the subject specific studies in more flexible and profound ways.

2 The Research Design and the Overall Purpose of the Study

The empirical section of this study is divided into two parts. Part I is a seven- year survey study on technology use among teachers of English. Part II is a systemic study, a window into the real life context of teaching work and the assumed change in teaching culture.

This is an explorative study which is supported by descriptive statistical data. The aim of the study is to outline the context and mechanisms within which technology-integration takes place. This is not a theory-validation study as the focus is on the actual practices of teachers in the changing times, first examined at a distance in Part I and then close-up in Part II. The aim is, however, to present study results, which will have value to other contexts as well, and to ensure some level of transferability of the findings.

Overall Research Objectives in Parts I and II

The objectives in the study have both theoretical (strategic/policy) and practical dimensions. The objectives are:

- To view the impact of the current information strategies and implementation policies on the schools in the area of language teaching and thus produce useful information about the current situation in information technology implementation in schools;
- To examine the ways in which technology can be integrated into language teaching in a holistic way and to present a design model for technology integration; and
- To present an example of a professional development process where systems thinking is the fundamental basis for action.

The research methods used in the study have been summarised in Figure 6 below. More detailed discussion on the methods will take place at the beginning of each of the two parts in the study.

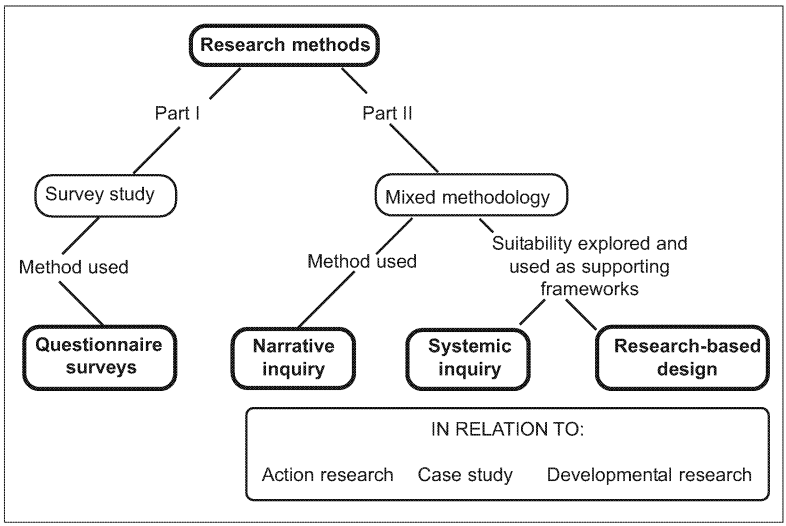


FIGURE 6. The research methods explored and used in the study.

The state of affairs in the schools

Before moving on, it is useful to take a look at how this area has been approached in other studies and to see how much we know of the ICT situation in schools so far. There are different reports and studies available, which give some disparate pieces of research and some statistical information on numbers of computers, numbers of further training courses and so on. But what is actually done with the available computers in the classrooms remains largely a mystery. To quote Howard Mehlinger, "no one knows for certain what kind of technology exists in schools, how it is used, how much it is used, whether what exists is actually available to teachers, and whether what exists is broken, worn-out, or still in unopened boxes" (2000).

In the past large surveys of educational computer use have been carried out by the International Association for the Evaluation of

Educational Achievement (The IEA Study of Computers in Education: Implementation of an Innovation in 21 Education Systems 1993) and ISTE/Sites study series. The IEA study was carried out in two stages with data collection from two points in time, in 1989 and 1992. The purpose of the study was to describe and analyse the use of computers in education around the world. The countries represented in the study were Austria, Belgium (French and Flemish), Canada, China, France, Germany, Greece, Hungary, India, Israel, Italy, Japan, Luxembourg, Netherlands, New Zealand, Poland, Portugal, Slovenia, Switzerland and United States. The countries portrayed very different stages of technological development as well as educational reform, and the results gave a broad picture of the situation around the world. The immensity of the study population, however, limited the qualitative nature of the research to a descriptive approach.

The IEA study was followed by the three-module Sites study, which has and will have a more concentrated approach. The Sites I module (1997–1999) was a comparative international study carried out to help countries (26 in all) estimate their position relative to other countries in the use of ICT in education. The Sites II module (1999–2002) was a series of qualitative studies that identify and describe innovative pedagogical practices in ICT use. The data from this Sites module has been used in the OECD report Education at a glance. The Sites III module (2002–2006) will be a follow-up survey of principals and technicians. The innovation framework of the Sites II module will be presented later in this study when the pedagogical practices of the teachers will be explored (see Chapter 5.4.3).

On EU level, various surveys have produced statistical data of the situation in the member states, and the reports from the many development projects give more detailed information. The information is not available in any database format but in separate documents, most of which are randomly accessible for the common public. The Eurobarometer Flash reports are the most updated technological databanks on the current situation and the changes that are under way.

Fresh out from the printers is a comparison study IT i skolan (ICT in the School, 2003) carried out by the Swedish KK foundation (KK-stiftelsen). It uses the OECD (the Pisa and Sites II data), and the Eurobarometer to outline the technological situation in the various European countries and reports also on the pedagogical and attitudinal aspects of ICT use. An interesting finding in the report is that Finnish and Swedish teachers are more critical towards using the Internet in teaching. One of the explanations given for this is that Finnish and Swedish teachers are more web-literate and have a critical approach to the masses of unsorted and bad quality information on the web. The other explanation is that teachers use the Internet in a monotonous way, as a replacement for the other materials and have not yet discovered the whole potential of the medium.

In the past, the Finnish National Board of Education funded some surveys. These were a survey of the spread of educational programs in the Finnish comprehensive schools, where teachers have been asked to state the names of the educational program titles they have used (Huovinen & Lakkala 1992), and another survey of educational computer use in the Finnish commercial colleges, where teachers were asked to state the amount of hours they had spent using computer assisted instruction (Tietokoneavusteisten opetusvälineiden käyttö kauppaoppilaitoksessa 1993). The main results were quantitative in nature while some assumptions and solutions to the low integration of computers were presented. The computer or educational computing was examined as separate entities in schools, and not as a part of classroom interaction and practice. Currently the Board of Education is funding various study projects, such as the OpinNet and AiHe projects, in which technological approaches are developed for adult education and vocational training. These have not been quantitative projects; the aim has been to produce and pilot models that would develop teaching practices in the adult education sector.

Some individual school districts have started with annual surveys on teachers' ICT skills and uses on the various school levels.

At least the Turku and Lappeenranta regions have established structural development and data gathering schemes for their internal use. The questions in their surveys range from the use of tool programmes to the use of the Internet and the WWW. The results of these surveys function as indicators of teachers' pedagogical (and technical) ICT skill levels and also of teachers' needs and interest for further training.

The report "The Challenges of ICT in Finnish Education" (Sinko & Lehtinen, 1999) has been a major work in the area in Finland. It is a collection of on-site reports describing and analysing the current practices, challenges and advancements of technology integration on different levels of education and in different subjects. This report has also influenced the action lines in the current information strategy in Finland. Also, the studies carried out by individual teachers in their efforts to confront the challenges of ICT integration are of great value to the development of common understanding of the actions needed (see for instance Mällinen 2001 and Tammelin 2004).

Part I:

Seven Years of Change

3 The Research Questions and the Timeline

This part of the research presents a longitudinal study on the use of computers in English language teaching in vocational schools and commercial colleges in Finland. Part I of the study will concentrate on the following questions:

- How, when and where are teachers using technology in their teaching?
- How has the use developed in the period of seven years?
- Can some innovative/emerging technology integrated practices be distinguished?
- How are teachers provided for in their work in terms of further training and support?
- How have the strategic and other policy efforts affected the level of technology integration into language teaching over a period of intense change and ICT development?

The data in this part of the study is unique in nature: there are no other longitudinal surveys covering this time period where major developments took place both from the standpoints of the national information strategies, restructuring of the vocational education sector and immense technological advancement. The results of this study provide useful information on how the internal and external change forces have affected the teaching practices and the 'technological atmosphere' in the schools in Finland (in the vocational sector). The timeline for the study is presented in Figure 7. There are three data collection points on this timeline (1994, 1997 and 2001). Each one of these points is preceded and succeeded with apparent interventions which have inevitable effects on teachers' work across all school sectors.

In 1994 there were hardly any networked computers in the schools, the Internet was mostly used within the academic sector only, and the WWW was an unknown concept for most people. The

Mosaic browser (along with Cello and Netscape) was introduced in 1993 (to be followed by the Internet Explorer 2.0 in 1996). Email was still used by very few teachers outside the universities. The sound and graphics facilities of available computers were very limited. The EU membership and the international and national information strategies boosted up the networking and equipping of schools. In 1996 an extensive training programme for improving the teachers' ICT skills was initiated. In 1999 Finland launched a sequel to the information strategy, and the use of the WWW was a common practice. Around the same time, virtual teaching and eLearning became buzz words in the world of learning technologies.

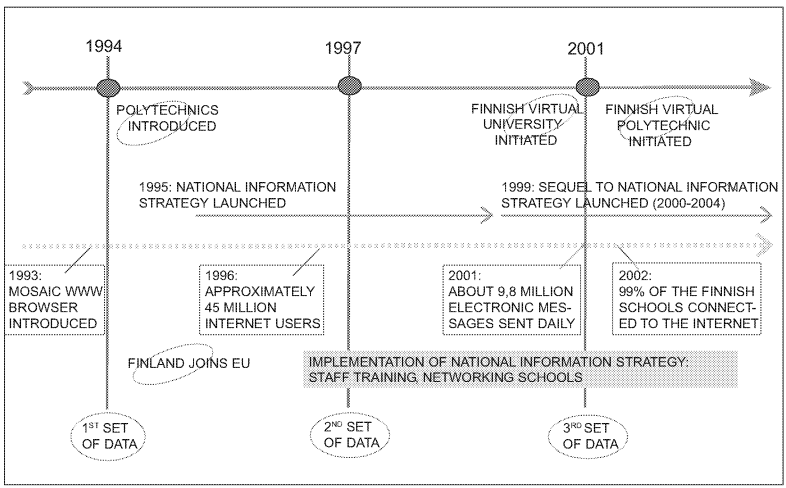


FIGURE 7. The timeline for the data collection[2].

How has all this affected the way teachers go about doing their daily work, teaching? The answers to this question will be the essence of the pages to come.

2 Information on the development of the Internet is from http://www.factmonster.com/ipka/A0193167.html. Information on the Finnish Internet penetration comes from the Nordic Information Society Statistics 2002. Nordic Council of Ministers, Statistics Denmark, Statistics Finland, Statistics Iceland, Statistics Norway, Statistics Sweden 2002 (Statistics Finland). http://tilastokeskus.fi/tk/yr/tietoyhteiskunta/nordic_iss_02.pdf.

4 Technologies For Learning

In this chapter a background for learning technologies will be presented and discussed. The purpose of the chapter is to establish the theoretical whereabouts of the present study in the technology realm and survey the technological approaches and solutions that will be referred to in the passages to come. The terminology in the field is quite complex and confusing in places, which is why the central terminology is explained and explored at the beginning of this chapter. In this exploration the focus is mainly on the teaching practices and not on the policy issues.

4.1 Educational Technology

Even though the theoretical focus of computer education has shifted from *learning about computers* to *learning with computers* and even to *learning through computers* (Crook, 1994), it seems that the areas of actual use and practice have remained very much unchanged (see for instance Cuban 1990, 2001). The area of educational technology itself seems flexible with spacious and almost all-inclusive definitions and approaches. To pin down a definition that will hold, it is possible to turn to one of the oldest organisations in the field. The Association for Educational Communications and Technology (AECT), founded in 1923, offered the following definition in 1977:

> ***Educational technology*** is a complex, integrated process involving people, procedures, ideas, devices, and organization, for analyzing problems and devising, implementing, evaluating, and managing solutions to those problems, involved in all aspects of human learning. In educational technology, the solutions to problems take the form of all the *Learning Resources* that are designed and/or selected and/or utilized to bring about learning, these resources are identified as Messages, People, Materials, Devices, Techniques, and Settings. The processes for analyzing problems, and devising,

> implementing and evaluating solutions are identified by the *Educational Development Functions* of Research-Theory, Design, Production, Evaluation-Selection, Logistics, Utilization, and Utilization-Dissemination. The processes of directing or coordinating one or more of these functions are identified by the *Educational Management Functions* of Organization Management and Personnel Management. Educational technology is a profession made up of an organized effort to implement the theory, intellectual technique, and practical application of educational technology. (AECT 1977)

This definition seems all-inclusive on technology use in education and various processes involved in it, and functions as an umbrella term for many of the other terms used in the literature. One such term which is often used interchangeably or parallel is the term "*technology in education*", which, according to the AECT definition,

> "*is the application of technology to any of those processes involved in operating the institutions which house the educational enterprise. It includes the application of technology to food, health, finance, scheduling, grade reporting, and other processes, which support education within institutions. Technology in education is not the same as educational technology.*"

Other adjacent terms are "*instructional technology*" and "*educational computing*". According to Tickton (1970),

> "*instructional technology is a way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication and employing a combination of human and non-human resources to bring about more effective instruction.*"

The AECT in turn has adopted quite a similar definition proposed by Seels and Richey (1994), which reads as follows:

> "*Instructional technology is the theory and practice of design, development, utilization, management and evaluation of processes and resources for learning.*"

The more current definitions do not necessarily keep these two apart or maintain the earlier hierarchy: *"instructional technology combines educational technology with learning strategies, developmental principles and pedagogical ideas"* (Tomei, 2002:7).

In Finland the concept of educational technology (koulutusteknologia) is often based on the loose definition by Michael Eraut (1989): *"Educational technology is the development, application, and evaluation of systems, techniques, and aids to improve the process of human learning"*. The general trend, however, is towards talking about ICTs in learning where the focus can vary according to the context of use (see for instance Sinko and Lehtinen 1999).

All in all, it seems correct to conclude that educational technology is a policy-oriented multi-level approach, or a theory even, whereas educational computing and instructional technology (opetusteknologia) are more slotted in the area of designing technology-integrated settings where the various learning processes and needs are in the primary focus.

It is also clear from the definitions that we are dealing with a multivariate context where no single approach or model can suffice for all development, learning, teaching and re-structuring needs. It can be stated, however, that the integration of technology into educational practices can create conditions that allow for flexible approaches without offering one solution meant to fit all needs and purposes. Kent and McNergney (1999) suggest a model (see Figure 8) to help refine and enrich the existing teaching models by varying certain elements and to help create completely new approaches to teaching and learning. Their idea is that technology can be used to influence the tasks and objectives, the sequence of these activities, teacher's reactions to students in the form of guidance and feedback, and finally the social space for learning.

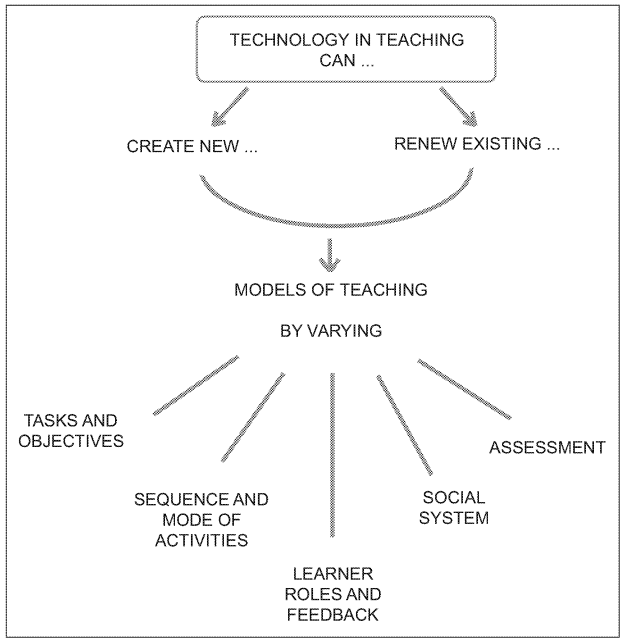


FIGURE 8. Technology in Teaching.

In addition to modelling the flexibility and challenges of technology integration, this model also conveys the message that the integration is not about replacing the old ways and approaches with new digital thinking. The core idea is that the strength of learning technologies is in finding meaningful combinations of the old and new practices and perhaps in finding new dimensions and levels of classroom existence.

In the area of language teaching, this type of thinking has not penetrated the field in a prominent way. The approach to the integration is often still about finding new ways of covering the old territory without challenging the underlying traditions of language learning. Not much help has come for the software designers. Language learning packages are still quite conventional, and available CD-ROMs for language teaching are mostly replicas of the old ideas clothed in sound, colour, and moving images. But even

if the actual software use has remained very much the same during the past decades, the electronic world has opened itself to language learning and teaching as well. This development has had the effect on the field of Computer-Assisted Language-Learning (CALL), which gradually has started to expand.

4.2 Computer-Assisted-Language-Learning (CALL)

A common refrain especially in the earlier days was often that computers have no place in foreign language teaching because computer use will isolate students and deny them communicative interaction essential for foreign language learning. The counter-weighting claim was that the computer could create new task-related learning situations which inspire learners' communication with one another. Johnson (1991) argued that it is not the computer use that creates the social effects but the structure in which the computer is used. Johnson (1991) claimed subsequently: "technology can serve as a means to bring the learners together to negotiate a learning task, to negotiate meaning, to think and to interact".

The ideas presented by Johnson were lost in the earlier phases of CALL. That was when the approach was very much materials-oriented and the computer was used as a tireless exercise giver. The modalities of language were limited to vocabulary and grammar but that limitation was surpassed by the realisation that the students were more (externally) motivated to work on the computer than with paper and pencil. Even if it was stated early on that it is a passing phase, the types of exercises and solutions offered in the literature did not go beyond the traditional boundaries of language teaching (see for instance Cameron, 1989). The core areas of CALL in the 1980s to almost mid 1990s seemed to concentrate on the following: text exercises (gap-fills for reading and vocabulary exercises and short writing tasks), grammar drills, and authoring tools for teachers. Learner training was mentioned in some of the books (see for instance Hardisty and Windeatt, 1989) meaning some sort of

awareness raising at the beginning of a computer activity.

With time the focus of interest in language learning shifted from what students learned to how they learned it. This process-orientation involved examining the development of learning strategies, and the learning objectives were directed towards developing the learner's communicative competence. The idea behind this teaching orientation was to support and promote the development of these strategies through realistic interaction between learners in a meaningful, contextualised language. According to Oxford (1990), these new strategies also incorporated an idea of a new teacher role: the spectre role changed to a new role as a facilitator, guide, helper, coordinator and co-communicator. This new role coincided with the developments within the instructional technology field where the notion of the teacher as the information distributor was replaced by the idea that the teacher facilitates learning, in other words the teacher guides students to guide their own learning (Carey 1993). Unfortunately the new approach to the teacher role did not seem to materialise in the way in which computers were used in the (language) classroom (Becker 2001, Taalas 1996).

The state of affairs in the classrooms did not however reflect some of the ideas and models presented in some of the guidebooks on CALL. One example is the Finnish handbook (written in Swedish) by Rolf Palmberg (1991). He presented a model of computer-assisted language learning (see Figure 9) where the computer was a built-in component of project work. In his model the computer session was preceded by other activities and the assignments involved all the four language skills as well as social and computational skills. The situation was learner-centred and task-oriented and the role of the teacher was that of a facilitator both in language learning and computer use. In today's world the model is still valid and in some respects even pioneering. The whole set-up is holistic, and the learning setting includes task-designs that are not on a one-off basis but more project-oriented encompassing collaborative as well as individual sequences.

One may question the computer's place in the middle, or the appropriateness of the learning and metacognitive skills being placed under computer skills. Palmberg has developed the model further and some of these issues have been re-considered even if the starting point quite often is at the computer (2003). The most valuable aspect in this model is the emphasis on instructional (and task-) design, which nowadays is one of the key areas of CALL pedagogy (see Felix 2003).

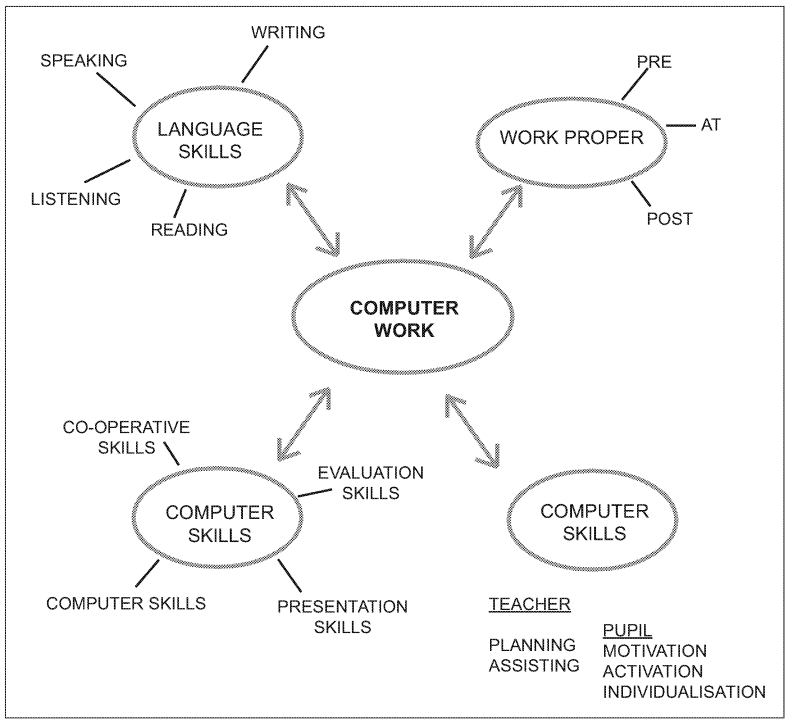


FIGURE 9. Palmberg's (1991) model for CALL work.

4.2.1 History of CALL

The term CALL itself originates from the behaviouristic era of computing. Its predecessor was the term CALI (Computer-Assisted Language Instruction), which never gained much hold as a fixed term in the field. Levy's (1997) updated definition of CALL is "the search for and study of applications of the computer in language teaching and learning". Before this definition the term TELL (Technology Enhanced Language Learning) was introduced in the 1990s to separate the more recent developments from the past 'drill and kill' approach. As the World Wide Web became a more and more prominent part of language learning, the term WELL (Web-Enhanced Language Learning) was taken into use. A term to some extent parallel to WELL is networked-based language learning (NBLT), which is described as "language teaching that involves the use of computers connected to one another in either local or global networks" (Kern and Warschauer, 2000). Blended learning and resources-based language learning are also terms seen in the literature (see for instance Roberts, 1998). The common practice and the most transparent way of talking about technology-integrated language learning term-wise, at least in Europe, seems to be to use the combination CALL/WELL or blended learning. (Further discussion on the terminology can be found especially in Levy, 1997 and Chapelle, 2000 and 2001.)

The evolution of CALL can be looked at from the terminology viewpoint as well as from the learning theoretical viewpoint. Below the evolution of terminology can be seen in the three phases of CALL that are distinguished by Warschauer (1996). The phases illustrate the increasing number of different ways in which the computer has been used in language learning and teaching:

Behaviouristic. The core idea of this phase is to provide the learner with series of exercises where the stimulus-response model is the underlying pedagogical approach combined with instant feedback (see Skinner). The computer serves as a tutor, serving mainly as a

vehicle for delivering instructional materials to the learner. It is difficult to find lesson plans in the pure form of the phase since there really is not anything to plan, apart from the physical aspects of computer locations and software titles. The following example is from this era, but as can be seen does include other than behaviouristic elements as well.

> A typical ideal of a lesson description in this phase can be illustrated by an example from Jones and Fortescue (1987): A teacher of the first class in the morning has decided to give his elementary class students some practice on prepositions. He is using a multiple-choice program, and has chosen the language items himself, using a simple procedure, which took him about twenty minutes. The learners sit round the computers in groups of three or four, discussing the correct answers. The computer gives them correct answers and calculates the final score. The teacher goes from group to group, sorting out problems, encouraging learners to speak in the target language, and giving them individual attention it is often difficult to find time for in a 'normal' class lesson.

Communicative. The computer is used for skill practice, but in a non-drill format and with a greater degree of student choice, control and interaction. This phase also includes (a) using the computer to stimulate discussion, writing or critical thinking and (b) using the computer as a tool.

> An example lesson plan (Frodo's Supplies: Childerhouse, 2004):
> 1. Divide the class into pairs.
> 2. Using the brainstorm as reference, sort (write/draw) objects, into countable and uncountable nouns: Countable (a/an + singular noun/some + plural noun) Uncountable (some +singular nouns)
> 3. Each student now draws a backpack on A4 white paper, one student from each pair adds what he/she thinks are the 10 most important items needed for the journey. He/she must not show his/her partner. The second partner leaves his/her backpack empty but takes the packing list (vocabulary brainstorm).
> 4. The student with the packing list should ask his/her partner 'Frodo needs some money, has he got any?
> 5. The student with the backpack should answer 'yes, he's got some' or 'no, he hasn't got any'

6. If the answer is yes, the student with the empty backpack draws this item onto his backpack. If the response is no, he/she does not draw anything.
7. When finished, partners compare their backpacks verbally, and could then write sentences; Frodo has some/a/an…..he doesn't have any/a/an……
8. The game can be continued with partners swapping roles.
9. Share backpacks whole class, asking each pair to describe what they have.
10. A debate could then ensue as to what really are the 10 most important items and why.

Integrative. This phase is rooted in two important technological developments: multimedia/hypermedia and the Internet. The main advantage of multimedia packages is that they enable reading, writing, speaking and listening to be combined in a single activity, with the learner exercising a high degree of control over the path that s/he follows through the learning materials. The Internet offers both a hypermedia-based repository of materials along with asynchronous and synchronous communication channels between learners and teachers.

Another way of looking at the evolution is to label the phases with approaches from the evolution of the learning theories. Warschauer and Kern (2000) have shifted the focus from the previous scheme by Warschauer (1996) and examine the shifts from these theoretical approaches as follows:

The structural approach incorporates mainly the early CALL vocabulary and grammar drill and practice programmes in the computer-as-a-tutor manner. The benefit of the approach is considered to be in the instant feedback and the clearly defined essential content the learner repeats until the essentials are 'mastered' (= the pre-determined number of correct responses given).

The cognitive approach is in line with the constructivist view of learning and aims at putting the learner in control of the nature and needs of his/her own learning. In the footsteps of Seymour Papert

(1980) and his logo programming language, the MIT laboratory developed an intermediate/advanced French language learning programme *A la recontre de Philippe*, where the learner works in an environment of a simulation type exposing the learner to different spoken and written French situations. A Finnish version of this approach is the *Stockholm kors och tvärs* simulation (Brainware, 1991), where the learner is faced with a problematic situation in Stockholm and has to solve it in the given timeframe to make it to the rock concert in the evening. The language content is built in as a natural part of the problem solving process and many alternate solutions to the problem are possible.

The sociocognitive approaches "shift the dynamic from learners' interaction *with* computers to interaction with other humans *via* the computer" (Kern & Warschauer, 2000:11). The theoretical idea that lies beneath is the conviction that learning takes place in meaningful interaction and technology offers many possibilities for learning settings where the learners have access to different kinds of information and interact with other human beings.

Throughout these phases and approaches it can be seen that even if the settings and objectives get more sophisticated, the teacher role is still quite traditional in many cases. If the teacher is in the background during the activities, he still has a firm grip on the materials the students are working on. The two example lesson plans deal with younger students so some sort of pre-planning of the work stages and control over the actions is understandable. But the issue of various roles is one of the cornerstones when more flexible, learning-oriented settings are being developed.

TABLE 2. Computers in language learning: possible roles. 'Mechanical' vs. 'Meaningful' practice.

Characteristics	"Mechanical" Practice	"Meaningful" Practice
control:	Mostly computer	mostly learner
focus of attention:	language or language skills	use of the language
primary interaction:	between learner and computer	between learner and other people

'MECHANICAL' PRACTICE

Role of the Computer	Description	Examples
Test-Giver	the computer exercises maximum control; the learner responds to questions	Drill exercises which require a correct answer before advancing,ComputerAdaptive Tests (CAT), research software
Tutor	the computer provides both information and exercises; the learner has some freedom to	TOEFL Practice Software, Food forThought (learning American idioms, Lingua-choose activities Center)
Practice Partner	similar to the "tutor" role but the focus is typically on skills	Grammar Review Software (LinguaCenter), HyperACE Aural Comprehension Exercises development and practice (Athelstan), Hollywood (listening comprehension, LinguaCenter),

'MEANINGFUL' PRACTICE

Role of the Computer	Description	Examples
Tool	the computer provides a means of meaningful communication	word processing a composition, email exchange with a keypal, creating or contributing to a Web site
Environment	the computer provides a context for meaningful communication	Grand Canyon (simulation, LinguaCenter), Who Killed Sam Rupert? (VirtualMurder), Sokoban
Resource	the computer provides the content for meaningful communication	Multimedia Encyclopedia CD (Grolier), Grammar Safari on the World Wide Web (LinguaCenter)

Mills (2001) looks at the evolution of CALL by examining the role of the computer in the learning setting. He proposes a scheme for distinguishing mechanical and meaningful practices (see Table 2). He divides the practice into these two categories by looking at: (a) who has the control of the learning situation, (b) where the focus of learning proper lies, and (c) where the interaction takes place. The mechanical practice is delimited into settings where the computer is a tool for testing, tutoring or doing exercises. The meaningful practice takes place in a more open learning environment where the computer does not define the way in which the learning sequence takes place, but rather offers resources, springboards and communicative tools for various activities around the computer. The resource and programme examples are mostly for EFL teaching, but equivalent resources are available for teaching other languages. It is important to note that the categories do not exclude one another but offer a practical reflection tool and a planning aid for a teacher who wants to integrate the computer into the language teaching practices in a comprehensive way. The only thing to remember is to combine this type of language resources with the non-language learning tools (for reflection, for evaluation, for dealing with real-life language materials) in order to better be able to provide support for a sustainable learning process in general.

CALL/WELL today

Even if some of the recent CALL materials have not evolved very much from the earlier days of CALL, development and progress is underway. The works of Mark Warschauer & Richard Kern (2000), Ken Beatty (2003), Carol Chapelle (2001), and Uschi Felix (2003) are concrete proofs of this. Kern and Warschauer make new openings in the area of research methodologies within the area. Beatty's definition of the areas of CALL/WELL is fresh and far-reaching including collaboration and networked learning from the educational science (for example from the Computer Supported Collaborative Learning, CSCL, perspective). Carol Chapelle, among other things, prompts for a closer examination of the findings within

the language testing domain and calls for new openings in the development of feedback and assessment mechanisms for CALL. Uschi Felix closes some very important links of on-line language learning. She has edited a volume where she brings together various aspects and challenges of CALL/WELL, including the areas of feedback, pedagogical thought and tools thinking in language learning. The next natural steps are a more cross-disciplinary co-operation between various instances and more research-oriented initiatives in the field. These new openings and ideas are reassuring. As we are well aware, the wealth of available learning resources does not carry value as such, it is the pedagogical challenge to integrate these resources in various learning settings in a meaningful way. In the following passage an overview of these learning tools and supporting resources is given.

4.2.2 Learning Tools / Applications – Classifications and Methodologies[3]

Learning software or software that can be used for learning is a wide area where tastes and types vary. Even though software designers have reacted to the demand for educational programmes, a gap in the software supply persists. The lack of good educational software was earlier indisputably one reason for the low level of integration of computers into the classrooms, but in today's networked world the availability of electronic tools and resources is limitless. However, the word 'methodologies' in the title demonstrates the argument that even if a piece of software can be incorporated into the teaching practices in many different ways, there almost always is an underlying assumption of intended use embedded in the design and content of the piece. Integrating these digital bits and pieces meaningfully into teaching practices is the pedagogical and methodological challenge that the teachers are faced with. For

3 Web addresses for all the resources mentioned in this chapter can be found in the WWW links list in the bibliography.

instance, the Kent and McNergney (1999) illustration presented earlier in this chapter (Figure 8) is a good ideological starting point for combining the old practices with the new possibilities and dimensions.

In the following a classification of various learning tools and applications will be presented. The basis for the categories has been taken from the works by Alessi and Trollop (2001) and Beatty (2003). This classification and the presentation of the learning tools will also help the reading of the data analysis section in Chapter 5 and some of the other parts where concrete software/resource titles are given as illustrative examples. The categorisations are neither straightforward nor exhaustive, and some of the resources presented here can have a multitude of other applications and potential uses than the ones mentioned here. The applications and resources have been chosen just as examples of a 'genre'. The selection is neither based on assumptions of popularity nor on any particular manufacturer or service provider.

Tutorials

Tutorials in this context are computer-based demonstrations of an incident or a chain of incidents. The Intelligent Tutoring Systems of the past were a popular way of walking students through complicated phenomena at their own pace in compact packages. Such areas as performance evaluation or individual learner paths are not part of the tutorials approach. The core practices are presentation and guidance. There are examples of this type of application in, for instance, the area of sciences and computer programming. The problems, even if complex, are often precise and definable and the user can easily be demonstrated the effects and consequences of different choices and actions.

Drills

The basic idea is to tell the learner when the answer is correct or incorrect, and in this way reinforce learning, to re-present the exercise and then move on to more difficult exercises, which build on the

elements previously learned. This approach has had an immense influence on the design of instructional technology and computer software. In this context the computer is only a tireless repetition machine, which is capable of individualized content and pace. Gagné (1968) included an emphasis on intellectual skills such as problem solving, reading and writing to the basic behaviourist theory. He introduced a technology hierarchical task analysis for sequencing the intellectual skills based on lower level skills already possessed by the learner.

Present drill-and-practice programmes are sophisticated and advanced alterations of the old 'stimulus-response-feedback loop' kind of programmes. The more refined versions of these programmes may have a somewhat non-linear structure, and the difficulty level of the exercises can be adjusted according to student performance. Despite the surface structure, the deep structure is nevertheless quite behaviouristic (see for instance Taalas, 2000). Figure 10 shows the interface of one drill-and-practice programme of the semi-traditional type for language learning[4]. The idea in the programme is to present the examples and move on to the exercises that are based on the given examples. By pressing the < Puhu > (= speak) button, the learners can listen to the sentences before or after they have completed them. The structure is based on a pure drill and practice sequence: there is no interaction (beside the input-output chain) between the learner and the programme, and the learner has to follow the pre-designed passage of the events in the programme.

4 This particular software title was the most used one in 1994 among the teachers of English in the vocational sector (see Taalas 1996).

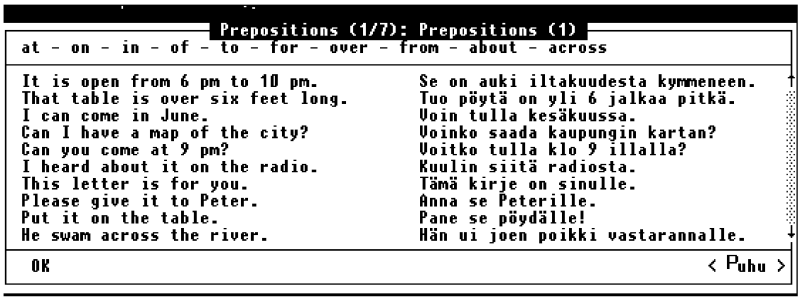


FIGURE 10. Preposition exercise in Alfa Grammar.

Simulations

The basic idea of a simulation is "learning in the real world" (Alessi et al. 2001:213). The simulation design is as close to the real world events also in the sense that the learner's actions have direct effect on the chain of events in the programme or resource. A simulation does not necessarily just replicate a real life phenomenon; for the sake of better learning support it simplifies it by omitting or adding features or details. Some simulations are very close to educational games in the interface design and story telling. The earlier mentioned *A la recontre de Philippe* and *Stockholm kors och tvärs* are examples of simulations for language learning.

GEOLOGY EXPLORER (see Figure 11) is a web-based simulation aimed to teach the students the basic concepts and principles of Physical Geology. The simulation is a collaborative game where the students work on mission and are offered the surroundings and tools within the Explorer pages. The pages include supporting tools both for the teachers and for the learners, and examples of lesson plans are also available on the website. Below is an example of a student mission:

> The first mission involves identification of the mineral and rock resources of Oit. Your general goal is to identify as many minerals and rocks as you can. You score 25 points for these. In addition, you will get specific goals that score 100 points.

We hope you accept this mission. It may be difficult at times, but there will always be a helping hand. We know you will be an excellent addition to our crew. We on Earth await your findings.

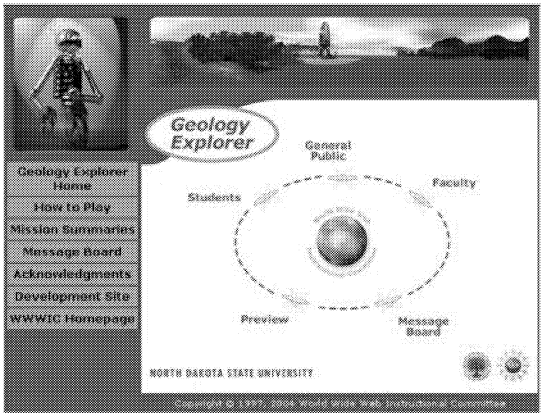


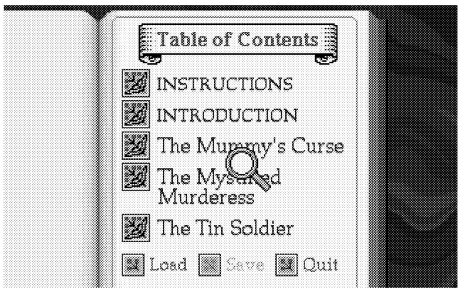
FIGURE 11. The opening page of Geology Explorer simulation.

The International Communication and Negotiation Simulations (ICONS) Project has a more complex setting when it comes to the content, difficulty level, and working processes. In an ICONS simulation, the students are given a role (i.e. a country they represent), and by working in teams, the students do research in order to develop policies on issues of international importance, such as nuclear proliferation, human rights, trade, narcotics trafficking and environmental degradation. Negotiations occur both within teams, as students try to reach consensus on their negotiation strategies, and across teams, as they seek support for their own proposals and evaluate solutions offered by others. The ICONS staff at the University of Maryland designs the content, assigns the roles, structures the chain of negotiations and acts as the chair for the online conferences. A wealth of background material is offered in the ICONS reference library.

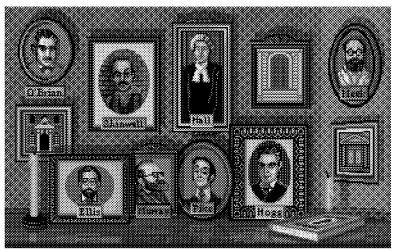
Educational Games

CD-ROM programme interfaces with moving images, sound and 256+ colours make a difference compared to the text-based

educational packages of the 1980s and early 1990s. Figure 12 displays extracts from the screens of Sherlock Holmes, Consulting Detective (1991), a non-linear, hypermedia type of a programme with sound and video stills on CD-ROM. This programme is a good example of a piece of software that can be used interdisciplinarily in many different contexts.



The opening screen.



The Cast of characters.

The map of London with all the game options and tools.

FIGURE 12. Sherlock Holmes programme interface.

The programme includes historical details about ancient mummies and archaeological excavations in Egypt; it requires a careful studying of newspapers and observation of countless clues, and encourages deduction skills. The programme has animated video sequences with actors from the Sherlock Holmes series on TV. Even more popular titles in this genre are the Carmen Sandiego packages where the learner travels through continents, countries or history trying to catch bandits and advance in the detective ranks.

One type of resource that best falls under the category of simulations is the web-based repositories. These are professionally created resources for learning on certain topics. *The Valley of the Shadow: Two Communities in the American Civil War* is an example of a repository (see Figure 13). It contains thousands of documents from the Civil war era, including letters and diaries, newspapers and maps, military and personal records. The new Valley website also includes enhanced navigation tools, full timelines for the Civil War era, and increased searching capabilities.

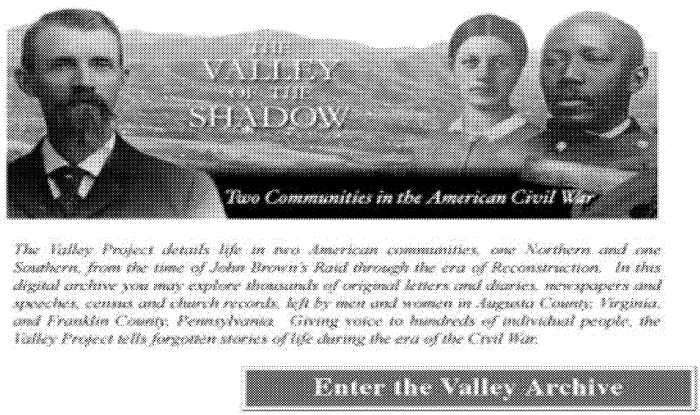


FIGURE 13. The opening page of the Valley of the Shadow repository.

Apart from the resources mentioned above there are maintained link lists on electronic newspapers, Internet radio stations, movie databases, etc. All these have value as information resources in the language classroom.

Applications for open-ended learning environments

Various applications and open learning settings can combine, and need to combine, a variety of available tools and resources for learner and content support. The advantage of many of these tools is that they are suitable for both individual and collaborative work phases. A distinction between the concepts of 'tools' and 'resources' manifests itself only in the manner in which they are integrated into the learning setting. A tool refers to a learning aid that is taken into use as an active device in the learning process (for instance, an electronic portfolio as a tool for assessment throughout a course). A resource is a more static supporting element which is referred to and used but not with a clear and pre-determined function in the course structure (for instance, an electronic portfolio that is used for setting examples and getting a reference frame for parts of the course evaluation). Of course, the concepts are sometimes interchangeable and the distinction cannot really be made between the two.

ELECTRONIC PORTFOLIOS. The terms 'computer-based portfolio' and 'electronic portfolio' or 'digital portfolio' are used to describe portfolios saved in electronic format. Electronic portfolios contain the same types of information as paper-based portfolios, but the information is collected, stored, and managed electronically. (See for instance Kankaanranta 2002).

WEB LOGS. Kristen Kennedy (2003), a senior editor of tech Learning, calls web logs an emergent genre which is making a space for students to publish online. Educators can use weblogs as sources of information on important topics and as modes of online classroom interaction.

Concept/mind maps are visual tools for presenting ideas, and analysing and sorting information. In a learning setting, these are valuable tools for sharing, for instance group work findings with the other learners. (See for instance Jonassen 2000).

THE ZOOMERANG SITE is an online tool of another type of (see Figure 14.). It is an online resource for individuals or groups to post questionnaires and explore a particular topic by collecting and analysing data.

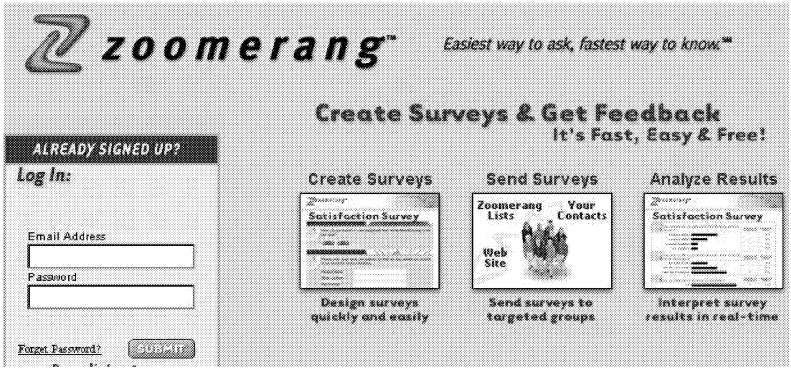


FIGURE 14. Zoomering web resource for data gathering and alanysis.

WIMBA is a voice-based system that is an alternative to Bulletin Boards, where the option to reply to a comment with a microphone and/or a text message is available. The packaged software has been specially designed for language learning and higher education, and it enables voice communication anytime anywhere participants have access to their courses. A few universities have incorporated Wimba into their language teaching tools as an updated language laboratory resource.

Authoring Tools

One of the past trends in CALL was the idea of teachers authoring exercises for their students. Teachers were offered many kinds of authoring packages (such as WinCalis, Toolbook and HyperCard). One of today's top five authoring tools is the HotPotatoes suite for the creation of web based exercises. (See for instance Jonassen 2000).

Self-assessment tools in language learning

Within the domain of language learning, the obvious resource for a self-assessment-based diagnostic tool is the Dialang assessment system. It offers validated tests of different language skills in 14 languages, together with a range of feedback and expert advice on how to improve one's skills. There are other online test/assessment resources available, but these are either test and go types of resources or robust testing systems available for a charge. (Read more about Dialang and its background in Common European Framework of Reference for Languages: Learning, Teaching, Assessment, 2002)

Telecollaboration

TANDEM LEARNING – Tandem learning involves a partnership of two native speakers, learners of each other's language who learn from each other and help one another to learn. It is underpinned by the principle of autonomy, which establishes that each partner is responsible for their own language learning. Tandem learning is built on the principle of reciprocity where both parties should benefit equally from the exchange. This type of novice-novice interaction requires teacher presence at least in the form of instruction and structure for the exchange. (See more on tandem learning in Appel, 2003).

INTERNATIONAL EMAIL CLASSROOM CONNECTIONS (IECC) is one of the oldest telecollaboration projects (founded in 1992). It is a free service to help teachers link with partners in other cultures and countries for email classroom pen pal and other project exchanges.

Web-based simulations

WEBQUEST is an inquiry-oriented activity in which learners interact with resources on the Internet. These quests are structured virtual field trips on different themes with groups of learners from different countries.

GRAMMAR SAFARI. "The grammar safari" could be called a simplified webquest for languages. It is a collection suggested language learning related activities for 'hunting' and 'collecting' examples of specific words in documents on the WWW. The idea is to send the students on a quest for answers on particular questions around language learning, language use and the linguistic system.

4.2.3 THE NEW LANGUAGE LEARNING DESIGNS

Because and inspite of the wealth of resources and tools the design of the learning setting becomes even more critical and important. We still seem to be missing a holistic idea of developing the settings but concentrate instead on using individual and isolated materials. The overall design, the assessment practices and the actual activities/ exercises need to match with the learning objectives, the learner's needs and the learning content. In the wave of all these new possibilities, new approaches to designing language learning scenarios are urgently needed. These scenarios will need to encompass new notions of learning, of the learner and of the learning objectives (as discussed in the Introduction). In the following, one suggestion in this new direction is offered (adapted in parts from Conacher et al., 2004).

If we accept the premises that language teaching today should seek to promote learner autonomy and learner awareness (see Benson and Voller 1998) and that learning, or knowledge construction, takes place in interaction with other learners, traditional face-to-face teaching falls short of providing an optimal learning environment for this kind of learning. It's often fixed, linear structure leaves little room for the necessary 'side-steps' that make possible an extension to the core of teaching where various individual and group learning processes can evolve and thrive. In a traditional learning setting (for example, a teacher teaching a group of students in a classroom within a 45-minute time slot), a student or a group of students can very seldom guide the teaching structure to include the kinds of elements and approaches that best accommodate their own needs at that particular moment.

The general CALL approach may often not include the notions of autonomy and self-directed learning, notions that have been central realisations in the current developments of technology-integrated/enhanced language learning. The milestone definition of learner autonomy was developed by Little (1990:7):

> A capacity for detachment, critical reflection, decision-making and independent action. The various freedoms that autonomy implies are always conditional and constrained, never absolute.

This implies that individual learners need room and space to accommodate fully their individual style, approach and rhythm in relation to the learning tasks at hand. Holec (1981, 1988), in his emphasis on 'self-directed learning' (SDL), proposes a transfer of decision-making from teacher to learner to enable this accommodation to take place. Furthermore, in line with the interpretation of humans as social beings, which is advocated by Little and others, Lave & Wenger (1991) and Resnick (1991) argue that a successful learning process is social in nature.

What then could be the kind of learning scenario where these needs can be taken into consideration and addressed? Of course, this will vary from one learning context to another, but in global terms, this may well constitute a combination of face-to-face teaching and a variety of student-directed activities, through email, chat rooms, websites, etc. Even in a less structured form, however, this type of combination has the advantage that it allows conventional teaching to branch out in many different directions according to the learners' interests and learning styles, without this branching out implying the use of a haphazard flurry of materials and activities. As ever in language teaching, clear goals and pedagogic thought are very much called for. Hutchinson and Waters (1897) propose a move beyond a learner-centred approach to a 'learning-centred' one, whereby the aim lies in 'maximising the potential of the learning situation'. Thus, we can argue that on a broader scale, placing the learner and learning at the centre of the learning process allows a common thread to be established within the learning environment,

whereby teaching sequences, most commonly in the form of a course or a series of courses, also incorporate a variety of modes of teaching and learning (see Figure 15).

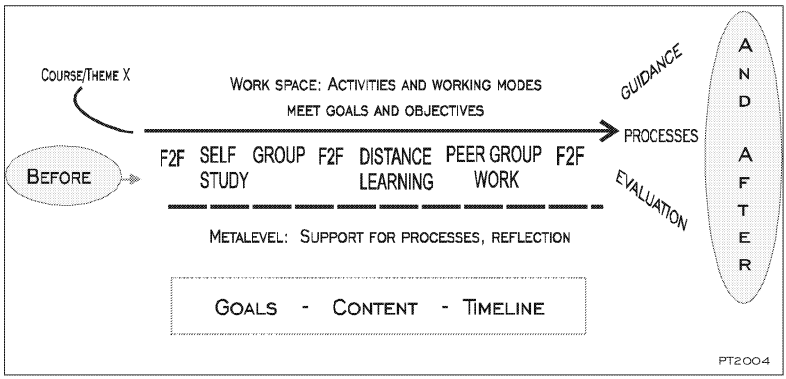


FIGURE 15. Learning process as the focal point of teaching.

Figure 15 is a graphic representation of a learning continuum, which interprets Course/Theme X as an ongoing process whereby the learners are engaged fully in the learning content within a diversified set of working and communication tools and modes. This particular design presupposes the use of a learning platform as an extension to the face-to-face situations, although this could be substituted with a looser framework (separate websites, weblogs and the like). The real challenge for the teacher lies in the development of an ongoing understanding of the processes that take place, whether on an individual or group basis and how these processes can best be maintained and supported throughout the sequence. For the learner, too, there is, of course, the challenge of understanding that inevitably with this new 'freedom' there comes a new responsibility for one's own action. From the outset, the teaching and learning goals need to be tied in with the skills development, which again is tied to the activities and tasks the learners are engaged in. This particular aspect is especially important in language learning since the skills can, and need to be practised in many different ways during the course.

The working modes in the model change depending on which phase of work is being undertaken, and the learners engage in peer and group work to share some of the ideas they have formulated in the earlier phases. Some of these formulations and thinking processes are certainly private, but negotiation of meaning does take place among the different groups of learners (see for instance Rogoff, 1990), and the rhythm and working mode changes as the course progresses, with various tasks being carried out partly individually and partly in groups. Peer groups can be employed for evaluation purposes or as a real audience for the work that the learners have carried out.

Face-to-face sessions remain a valuable element in the continuum. The work done while being physically in one place should have a social and reflective function concentrating on things that cannot or should not be carried out at a distance. Face-to-face meetings can also serve as an on-demand support element by dealing with issues that seem common in all groups at one specific time thus helping the learners carry on with their work more effectively. But very importantly, face-to-face meetings are needed to maintain the 'suspense' in the course by giving it concrete check-points, benefiting from the work the learners have done outside the classroom and by giving the learners (who are otherwise often working alone or in small groups) a social space and sense of community they clearly appreciate and need.

With the help of the different modes of communication it is also possible to invite external groups or individuals to participate in sections of the course. With email the learners can, for example, contact outside experts for help and advice. The virtual section of the classroom, that is, the learning platform itself, can easily be opened up to outside members, so broadening, for instance, the linguistic base in the home group or engaging with other interested parties to share the expertise of the group. These different communication modes can also have clear, built-in language-learning aims in which learners are faced with different, largely authentic and purposeful communication situations where they need to be able to use the language as a tool for finding the appropriate

form of usage in order to reach a common understanding among the participants.

The content and processes within this course are woven into a chain of activities and learning tasks, which are designed to guide the learners towards the key areas of the core content whilst at the same time allowing for divergence in both approach and interpretation. These tasks should include an element of problem solving which encourages the learners to seek for unpredictable solutions and answers that in turn encourage interaction among the participants. It must be understood, nevertheless, that not all tasks can be open-ended and seek for diversity of answers. Especially in language learning, some of the tasks still need to be quite traditional in order to build those linguistic skills which can form a ladder to higher-level activities and language usage. The most basic drilling applications can be used as self study material to make sure the essential language structures are sufficiently mastered. The most creative tasks, then, should support the learners' individual style and freedom to play around, and improvise, with language and communication.

Coping with this freedom and variety requires much from both teacher and learner, and there are expectations of both that may be difficult to meet. The metalevel space in the figure is devised to help cope with this challenge. It is an integral part of the working space but with a different focus and function. While the actual working 'area' (which includes both the face-to-face teaching and any other official meeting points of the specific course) is mainly about the content itself, the metalevel space is a supporting arena for that work to be carried out successfully in its different stages and modes. This arena lies mostly within the electronic learning platform since it is a flexible, on-demand type of tool where issues are raised whenever there is a need. These issues can, and should, of course, be discussed further in the face-to-face situations.

The kind of topics that are discussed on the metalevel can be both non-content- and content-related, but the main purpose of this space is to bring up, as the name implies, metalevel questions and

issues. Since the learners are to be the creators of their own learning processes and there are inevitable gaps in their abilities to do so, the metalevel work is intended to support building and understanding these abilities and skills by drawing attention to issues that are mostly to do with meta-cognitive skills. In addition to these skills, this is where learners' awareness can be directed towards the key issues in learning a language or understanding themselves as language learners. Furthermore, within this area the learners can voice their concerns and doubts about this type of learning, and it is important that they have the opportunity to exchange viewpoints with their co-learners and teachers in a way in which they would not usually be able to do. The metalevel area expands also to cover discussions around evaluation. (See Kuure et al. 2001.)

In a new learning setting, it is clear that a conventional, largely outcome-oriented evaluation cannot be adopted to assess these types of processes. New forms of more process-oriented evaluation are required, if not to replace, at least to complement the existing evaluation practices. An electronic learning platform can also lend itself to the creation of, for instance, learning diaries, weblogs or electronic portfolios. Learners can and should be involved in planning and carrying out evaluation, which is closely linked to the aims and objectives they have set for their own learning at the beginning of a course/thematic sequence. This type of a design imposes pressures for new ways of guiding the learning process and finding ways of making it more transparent throughout the learning sequence. The idea of scripting (see Dillenbourg 2002) is very useful for understanding the collaborative processes and the design of them. New designs for language learning will be discussed further in the upcoming sections of this study.

4.3 A Closer Look at Technology Integration

An essential aspect of the examination or evaluation of technology use in teaching is the different levels or degrees of use. It is too vague

an approach just to ask teachers whether or not they use computers in their teaching, or how many hours per week/month/year they use computers with their students. It is far more essential to try and outline the way in which teachers use computers or technology in general, and for what purpose. As will be illustrated in the chapter on innovative and emerging pedagogies (Chapter 5.4.3), there are paradigms and taxonomies that can assist in illustrating the intensity or depth of integration on classroom and institutional levels. In this chapter various approaches to and taxonomies for the establishment of the level or type of integration are discussed. These have not been directly used in the data analysis in the forthcoming chapters, but they have definitely served as pointers when the outline for the analysis the teachers' approaches to technology use will be constructed in Part I.

The crudest, but yet widely used figurative illustration of the degree or type of technology integration is the add-in versus add-on model (see Figure 16). In the add-on approach, the computer is used only as something extra, a dispensable supplement to the teaching setting, and is accessible only when the time frame or the teacher favours the use. The materials that the learners work on are often electronic versions of the study book exercises or isolated word-processing tasks. The activities may also include quick information searches on the Internet (on a given topic), the main point being that the activity most likely replaces an activity that has in the past been carried out in a more traditional way and does not expand or bring any extra value to the learning sequence.

In the add-in approach the computer/technology is present in all learning situations and can be used whenever the learning sequence prompts for its use. The decision is based on an unaffected need to use the computer for the fetching, storing and sorting of information, report writing, or for more traditional use like a vocabulary drill program. This kind of situation allows the students as well as the teacher to act upon their own initiative and come to terms with the equipment and its, as well as their own, potential. The integration approach does not exclude any existing ways of use

nor does it prevent any new from arising. This model can also be applied to a learning organisation on the whole. In the add-on mode of technology integration, the general feeling is that the surrounding mental or physical infrastructure does not need to be altered or re-visited by the implementation and use of learning technologies. In the add-in mode, technology is considered such an integrated part of the organisation that it will have inevitable effects, for instance on the existing course structures and professional development needs.

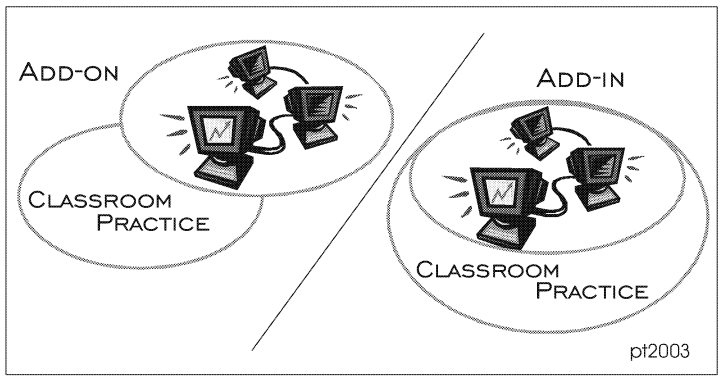


FIGURE 16. Add-On and Add-In perspectives in the classroom contect.

4.3.1 From Integrated Learning Systems to Tool-based Systems

Another perspective into the way in which computer-based activities are a part of the learning continuum can be found in the model presented by Marakis (as cited in Cummins and Sayers, 1990, who in their article interestingly enough are predicting how education would look like in 2001). Marakis has studied the computer-learner interaction in relation to cognitive/mental thinking. The way in which computers are traditionally used in education involves very little cognitive thinking as can be noted in Figure 17. This model has doubtfully been separated completely from the context of use. For

instance, the use of database programs without a linkage to the learning context is not likely to result in any or much advanced mental activity. It can, however, be assumed that Bloom's taxonomy of cognitive development is mirrored in this model. (More on Bloom's taxonomy later in this chapter.)

Marakis notes only that the computer use most often includes two or more of the activities simultaneously. It must be assumed further that the model refers to such use where the learners use the computer in a goal-oriented situation where they can guide and participate in the interaction between the computer and themselves. The trend in the earlier way of thinking can be seen in the figure: a shift from the sole use of drill and practice programs to semi-open or open learning environments where learning is supported with technology in agreement with the learner's needs and the goals of the learning sequence.

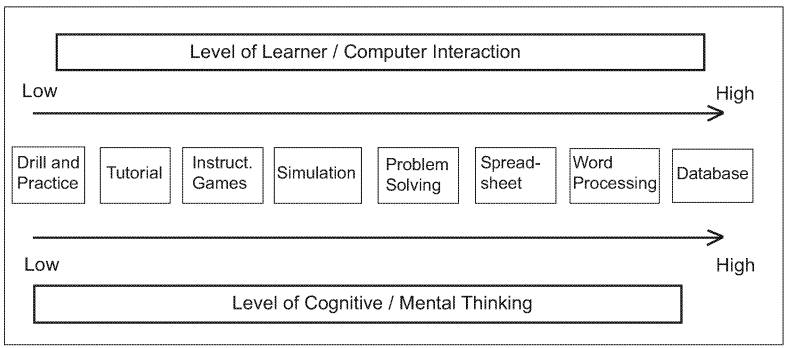


FIGURE 17. Marakis' model of computer use in schools.

This model is more than two decades old and serves as a good historical example of the past trend of hierarchically placing the tool programs above the other more educationally tuned software packages. This view comes clearly across for instance in the work of Stoddart and Niedeheuser (1993a), who present two technology-supported learning environments based on the instructivist and constructivist theories: the Integrated Learning Systems (ILS), which

are usually associated with drill-and-practice and tutorial programs and the open-ended application type of programs which are called Tool-Based Systems (TBS). According to the authors, the main difference between these systems is the way in which knowledge is transmitted between the teacher and the learner.

In an ILS the 'knowledge' is in the computer and it is the student's task to memorise the information and to be able to provide it to the computer at request. In the language teaching context this includes exercises on for instance combining sentences, parts of speech, punctuation, spelling and vocabulary in the form of multiple choice or cloze exercises. The ILS programs are conveniently adapted and suited to the classroom practices as they often include the software, the workbooks (if the program is not designed to be used adjunct to the current textbook), and the teacher's manual. In the ILS type of transaction the computer is the transmitter of knowledge and questioner as it guides and controls the student's learning with instant feedback and pre-designed routes of activity.

The Tool-Based Systems reflect the constructivist orientation with the learner in control and the computer as a tool for inquiry. Students are given access to many open-ended applications that can help them construct their understanding. The teachers are responsible for planning activities in a manner that challenges the students. In developing language skills for instance, the students and the language teacher decide upon a project. In the project students can use a computer to access databases, library catalogues and on-line encyclopedias. They can further edit and write the report using a word processor and/or a presentation program. In this model the learner is an active seeker of information who revises, up-dates and re-shapes his/her understanding through the on-going process of gathering new information.

The Tool-based approach takes us closer to today's views of open learning environments, the only significant difference being that the current focus is strongly shifting towards what is being done and not on with what sort of software or equipment. The emphasis is refocused from the tools thinking towards models for networked

learning and the pedagogical challenges that arise from designing learning settings that involve different kinds of learning processes (see for instance Saarenkunnas et al. 2000). However, neither of these approaches is by any means outdated today, the technological facilities and environments and approaches to learning have just become more advanced and varied. For instance, it could be argued that many of the so-called e-learning systems and packages today are yesterday's integrated learning systems.

4.3.2 Integration from the Language Learning Perspective

From the language teaching point of view the degree of integration can be examined by looking at the way in which technology is used in relation, on the one hand to the language learning processes and, on the other hand, to language per se: language as system vs. language as function (Taalas 2003). Figure 18 illustrates three degrees of integration assessed by the context, purpose and goals of computer use. On the less extensive or 'reaching' level of integration the computers are used as replacements of the paper-based materials and exercises. The view of the language learner needs is predominantly on the structural aspects. The context of learning is often traditional and the learning interaction is between the learner and the electronic activity/material. The approach has its roots in the traditional CALL-based models where learners work with grammar and vocabulary exercises either on stand-alone CD-ROMs or on the Internet (cf. the add-on model).

On the midway level computers are used for communication with either other learners or with various information sources. The ideal on this level is to use as authentic language material as possible. The learning interaction is more varied, but the learning setting is often quite traditional. The interaction takes place within a predetermined space and is outlined in the lesson plan. However, the outcome of the sequence is predicted and it does not have an impact on the turn of the upcoming events on the course by for instance re-focusing or re-directing them.

On the most integrated level, technology is used for various language or non-language related activities. From the pedagogical point of view the use is not detached, neither in value nor in the way of use, from the other media or materials used (face-to-face teaching being one of the media). The approach to language learning encompasses the idea that learning should involve both individual and collaborative processes as well as variation of learning and teaching modes. The core idea is to expand the learning setting to allow for more flexible and also individualised ways of working with language. The pedagogical challenge for the teacher is to design a course, or a course sequence, where the media is chosen by its suitability (not availability or trendiness), where individual learning paths fit into the overall course frame, and where the general objectives and evaluation criteria are negotiated or at least discussed with, and explained, to the students.

The difference between these various levels is not as clear-cut as it seems in the figure; the levels can be intertwined and overlapping. But there are distinct tendencies and characteristics in the teacher's pedagogical goals and ideas that establish the level of integration. Perhaps the most obvious difference is in the task-design: the way in which an electronic activity is spanned over a wider theme or a phenomenon, and the focus is not on the media used but on the goals of the learning sequence. The figure does not favour any level over another, but just makes the point of adjusting the expectations to the manner in which the integration has been planned. In many cases the levels are combined in a longer sequence of activities, and the objective of the activities varies also in terms of learner roles and learning targets.

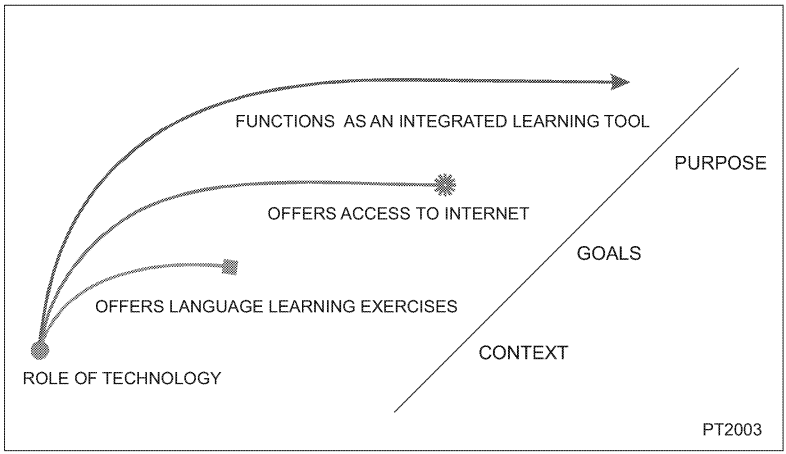


FIGURE 18. Degrees of integration from language learning perspective.

It might be useful to combine this idea of technology integration degree or role to the learner role approach presented by Pachler and Daly (2004), where the learning activities are examined in the context of learner autonomy and computer assisted language learning. In their compiled model they present three views of learners/learning activities:

- The intentional learner – an individual-cognitive view: the learners become aware of their own actions through confronting their personal constructs and systems and through that awareness can monitor and plan their learning activities better
- The learner as a communicator – social-interactionist view: learning takes place in interaction, through communication and collaboration with others
- The learner as experimenter/researcher: experimental-participatory view: the learner gradually develop knowledge of the learning matter through experimentation in a safe environment with new ideas around artefacts that are external or shareable

Similarly to the ideas presented in Figure 18, Pachler and Daly also suggest that the key is in combining these views and finding the best tools for the processes that support the individual learners with

their various learning histories, learning orientations, learning motivations and professional identities.

4.3.3 From single Models of Integration Towards Taxonomies

In between the single models and taxonomies there are schemes for more concrete descriptors and classifications of teachers' behaviours and their impact on students. It could be said that these are not taxonomies for technology integration but rather taxonomies for technology practices. One such example has been presented by Glen Bledsoe (2001) as seen in Table 3. The starting point in the proposal is the idea that the teacher's actions and decisions have direct impact on the way in which students learn. The teacher's actions are explained in a metadescription of each level and the starting point of these descriptions is an evolutionary scale of some sort of the teacher moving from being a technology novice to a technology expert.

A clear problem with this type of classification is the over-simplification of teaching and learning. It is true that much of the 'teaching' in a classroom is controlled by the teacher, but learning and its processes are a domain that requires serious attention on its own. It would be more constructive to look at teaching practices as interpretations of pedagogical thinking on the part of teachers in their attempts to guide learning in various learning contexts and with very different groups of learners. Whether technology is one of the media used in these situations derives from interpretations that are largely situated in specific contexts. Teachers should not be ranked according to the way in which they can handle various technologies and authoring tools. It is the pedagogical thinking and the task/activity design that make learning possible, not the medium such as technology or a certain piece of software itself. It would seem that a more solid taxonomy of *learning* should be the basis of this type of classification of actual technology-integrated teaching practices.

TABLE 3. Taxonomy of technology practices. (Abridged from the original version which can be found at ttp://www.willamette.org/owp/pages/tech/taxonomy.html)

Level of technology use	Teacher behaviours	Description	Impact on students
6	Teacher determines students' needs and creates software to assess and catalyze learning. ended tool. Createas soft-ware witha high level of interactivity.	Teacher is fundamentally changed. Sees and models technology as an open-software. They see technology as an open-ended tool, which can be serve many purposes.	Students are deeply involved with the development and use of
5	Teacher uses commercial, shareware, freeware software in unexpected and creative ways to enhance learning. between softwares. Becomes a technology leader.	Teacher sees beyond the intended use of canned software, makes unusual connections involved in that process.	Students are seeing the imaginative use of technology modelled and are directly
4	Teacher uses a wide range of software to enhance student learning, for assessment and record-keeping. finds software to support that learning.	Teacher acquires strategies to learn new software. Teacher puts learning first,	Activities directly meet students' educational and possibly personal and creative needs.
3	Teacher uses a set toolbox of applications to create spread-sheets, databases, web pages, slide shows. Teacher may use some form of software for record keeping. level.	Teacher's confidence and understanding begins to improve but is still limited and lacks an understanding a wider application. May resist moving above this to the students.	Students experience technology as artefacts of the teacher's invovlement. Students ar are fir to the software and not the software
2	Teacher performs minimal number of software functions (e.g. email, word process, web browse) step-by-step. down.	Teacher doesn't explore, doesn't use technology in any other ways than those memorized or written	Students are not a part of the teacher's computer practices.
1	Teacher provides educational "games" for students, usually via CD-ROM. Teacher either avoids technology or has no idea that it can be used in any other capacity. Either way, no real teacher involvement in the use of computers in the class-room occurs.	The software baby-sits students. May not address student learning needs.	Students who are used to arcade style games may be reluctant to engage in reflective computer uses such as writing.

Bloom's well-known taxonomy of educational objectives is one widely used taxonomy for analysing technology-integrated learning without being technology focused. It was created as early as the 1950s, and naturally has not got its roots in learning technology but in the area of enhancing planning for learning in general. It examines the levels of learning through the way in which the learner is cognitively engaged in learning activity. The complete taxonomy identifies three domains of learning (cognitive, affective, psychomotor), each of which is organised into a hierarchical set of levels. The significance of the taxonomy has not faded completely during the years even if its hierarchical and one-dimensional approach has been criticised as being too static and too skills-oriented. The taxonomy is still popular as a planning tool for classroom practices, curriculum design, and nowadays especially for designing and analysing on-line course activities.

Bloom's taxonomy has been the source of ideas and inspiration for many taxonomies ever since. One such taxonomy is the one that Lawrence Tomei (2002) introduces in his book on how to overcome the barriers to effective instructional technology. Tomei spends a great deal of time exploring the trilogy of taxonomies[5] and uses it as the foundation for his proposed taxonomy. The manifestations in the works by Bloom and his colleagues are present even though Tomei's taxonomy is a more policy-oriented than learning-oriented way of looking at the learning objectives. He treats technology as one medium that has to be mastered and for him literacy is the prerequisite for being able to do so.

He is concerned with what he calls "the technology façade", which arises when technology in itself is understood as the means to an end. The wider context of teaching and learning processes are overlooked, causing the pedagogical impact of technology in the classroom to fall short. To avoid this, he proposes three action points

5 These are the ones discussed above, ie. Bloom's taxonomy of cognitive development (1956), Krathwohl's taxonomy of social interaction (1964) and Kibler, Barker and Miles' taxonomy of physical development (1970).

for schools: (1) a more inclusive approach to technology should be adopted, (2) technology should be seen as an ongoing process demanding time, attention and dedication from an entire infrastructure with adequate resourcing; and finally (3) instructional technology should be considered as another instructional strategy. A necessary infrastructure needs to be in place to support technology use as a viable instructional strategy. Furthermore, the limitations and the advantages of learning technologies must be appreciated and accepted by teachers, staff, administrators, parents and students.

Tomei argues further that a widely accepted taxonomy is needed in order to make the benefits of technology for learning understandable, and for viewing the technology and the spectrum of potential that actually generate learning. He also acknowledges the fact that taxonomies tend to construct categorisations that are artificial, but these are minor problems compared to the benefits gained. In addition to producing an aid for the planning and evaluation of instruction, taxonomies are useful for the identification of relationships between groups and categorisations in ordered systems.

Tomei's taxonomy is built on six interconnected levels, which Tomei claims to be intended for planning and "creating technology-related learning objectives and technology-based student learning" (2002:70). It is, however, difficult to detect any serious consideration of learning processes and concern for a meaningful integration of the medium into learning. The taxonomy has quite a mechanical approach to technology-integrated learning, and the pedagogical ideology seems lost in the illustration of the somewhat quantitative learning activities. But nevertheless, it is always good to realise that for some scholars learning technology is still just another tool without any linkage to the actual classroom practices, to learner development, and to the way in which learning is assumed to happen, even if the text around the guiding principles states something completely different.

In what follows, Tomei's taxonomy is briefly presented. The structure of the classification includes six levels of technology

integration, an example of an activity and an example of a learning objective on each level. The hierarchy of the levels is not always clear, but it can be assumed that there is a progression of complexity starting from level one through the most advanced level six.

- Level one – Technology for Literacy:
  Minimum level of competence expected of teachers and students with respect to computers, educational programmes, office packages, and the Internet. An intellectual activity on this level would for instance include applying computer terminology in oral and written communication. A typical learning objective on this level could be:

  - Given a series of three keyboard activities, students will create a word processing document for each exercise without syntax or grammatical errors.

- Level two – Technology for Communication:
  The ability to employ technology for interaction. An intellectual activity would include using technology tools for sharing information among students and teachers. A typical learning objective could be:

  - Students will use the course provided chat room at least weekly during the grading period to discuss the assigned readings with fellow classmates.

- Level three – Technology for Decision Making:
  The ability to use technology in new and concrete situations, including those of the two previous levels. An intellectual activity would include applying electronic tools for research, information analysis, and problem solving. A typical learning objective could be:

  - After recording the quantitative results of a 2-week observation period, students will capture the resulting weather data in electronic format and use the "what-if" features of spreadsheets to forecast the next day's weather.

- Level four – Technology for Instruction:
  Learner outcomes center around identifying instructional materials, analyzing their component parts, integrating these components, and understanding the organizational principles involved in their application. Teachers are expected to have a firm grasp of their academic discipline. An intellectual activity on this level would involve teaching, differentiating, and discriminating using technology. A typical learning objective could be:

  * Students will locate four Internet sites concerning the Holocaust and select the site that best reflects their feelings and emotions about the Nazis' "final solution".

- Level five – Technology for Integration:
  Acts on the component parts of content material and reassembles them for better learner understanding. An intellectual activity would for example involve assimilating technology into a personal learning style. A typical learning objective could be:

  * Using a teacher-made workbook created from online resources, the students will explore the possible theories of dinosaur extinction, select their favourite theory, and prepare a grammatically correct essay defending one of the theories.

- Level six – Technology in Society:
  Includes awareness of various social issues of technology, multiculturalism, the digital divide, censorship on the Internet and the legal and ethical behaviours when using technology. An intellectual activity would involve arguing and assessing the historical evolution of technology and predicting its probable future roles in society. A typical learning objective could be:

  * Students will be provided with copies of recent publications, journals and newspapers. They will locate an article that reflects the legal/ethical use of technology and prepare a grammatically correct, 3-page report defending or criticising the premise of the work.

From the policy level we will now go back to Bloom and learning. The shortcomings of the original Bloom's taxonomy mentioned earlier were revisited by Kratwohl[6] and Anderson[7]. As a result the Bloom's Revised Taxonomy of Educational Objectives was introduced (Anderson et al., 2001). The main modification of the original taxonomy is the addition of a knowledge dimension, which is designed to illustrate the products of the thinking in respect to various forms of knowledge (factual, conceptual, procedural and metacognitive). Also, the names of the six categories have been changed from nouns to verbs to emphasise the idea of active learning practices (see Table 4 below).

TABLE 4. Bloom's original and revised taxonomies.

Original taxonomy	Revised taxonomy
Knowledge	Remembering
Comprehension	Understanding
Application	Applying
Analysis	Analysing
Synthesis	Evaluating
Evaluation	Creating

All these levels have sub-categories in both versions, but it is not motivated to explore and present these further within the scope of this research. What is motivated and necessary is to try and link this taxonomy with technology and the actual learning practices. Jonassen et al. (2003) have proposed various ways in which to involve the learners in a mixture of cognitive processes where the individual and collaborative aspects alternate as central working modes. Bailey (2002) has outlined a template where these ideas meet possible technological resources keeping Bloom's revised taxonomy as the

6 One of the three authors of the initial taxonomy.
7 A former student of Benjamin Bloom.

ideological foundation (see Table 5 below). The resources mentioned in the table have been presented in Chapter 4.2.2.

TABLE 5. Taxonomy of technology-fostered cognitive objectives. © Mark Bailey

Cognitive Process	Individual	Collaborative
1. Allow the storage or display Information	PDF -documents PowerPoint presentations	File sharing
2. Foster exploration of materials and ideas	Webquests Virtual Field Trips	Tapped In Zoomerang
3. Enable the application of understanding	Electronic Portfolios	Mighty M&M
4. Organize materials or ideas to foster analysis	Inspiration IStatView	Concept maps
5. Support evaluation and problem-solving	Repositories Simulations	NetMeeting Palaver Tree
6. Facilitate constructing or designing	HyperStudio GoLive	

The lowest level in this taxonomy is the storage of information or the passive viewing of information. In practice this can mean collecting and compiling information and saving it for further use. On this level an activity is seen as a mechanical activity, thus not involving any learning processes per se. The second level of the taxonomy represents an active exploration of materials and ideas. At this level the learner is engaged in a conscious quest for information that has its purpose in the learning task at hand. At the third level, the concept or 'understanding' (interpretation) is applied to a new situation with the help of electronic reflection tools. The organising on level four entails re-organising and analysing the materials in order to understand the relationships between the ideas and pieces of information at hand.

The fifth level of the taxonomy is about using ICTs for evaluating the information and their understanding of it. This is more like a problem-solving stage and that is why the proposed tools include simulations, communication of the ideas to others, and use of digital

repositories. The highest taxonomic level is about designing and constructing the integrated entities into project work format. Many of the earlier stages at the lower levels are brought together in the design of projects. This process involves hierarchical arrangements of information and communication of the interpretations to others. Cope and Kalantzs' process of multiliteracies presented in the Introduction section about modifying the existing designs into one's own re-designs correlates well with the continuum of the activities and goals in this taxonomy.

In the following chapters these models will function as a background framework when the teachers' technology practices and plans will be examined and when a development process that has learning in the central focus of action will be designed and explored.

5 Inside the Data

5.1 The schools and the Teachers in the Study

This chapter will present the background to all the three data sets. The three data gathering rounds covered all Finnish and Swedish vocational schools and commercial colleges listed in the Finnish and Swedish study guides published by the National Board of Education. The schools where the official language as well as the language of instruction is Swedish are referred to as Swedish schools. Consequently, the teachers from these schools are referred to as Swedish teachers. The Swedish schools have been included in the study simply because there is no reason not to include them, and yet they are often isolated and dealt with in their own separate surveys. The specialised vocational schools are excluded from the study, as they do not necessarily have languages in their curriculum.

Vocational schools and commercial colleges were originally chosen over the comprehensive schools for the following reasons and the questions arising from them:

1. The hardware quantities in these schools are much higher than in comprehensive schools. Does this mean that the facilities are evenly allocated across the curriculum?
2. Due to the professional approach to education, computers have an important role in the production process, so a considerable amount of time is spent on preparing the students for the use of technology. A real life link to working life is one of the core issues in the curriculum. Does this mean that employability or transferable skills are every teacher's responsibility? Or does it mean that the language teachers can leave the issue of transferable skills to be dealt with by other subjects?
3. The teachers have for the most part received the same teacher training as the language teachers in the comprehensive schools but do not have similar curricular obligations or teaching materials available in the same proportion as their colleagues in comprehensive schools. One of the aspirations has thus been to explore if this 'independence' from materials and school leaving examinations show in language teachers' approach to language teaching?

The data collection procedure in all three occasions was similar: initial posting of questionnaires, a reminder approximately two weeks after the first deadline and a second reminder to the remaining 'silent' schools. In 2001, in contrast to the two previous data gathering rounds, the teachers who had not replied to neither of the reminders were also contacted by email, fax and possibly by telephone. This was especially the case with the Swedish teachers who had an alarmingly low reply rate.

Table 6 is a summary of the numbers of replies in all three data rounds. There is a radical change in the numbers between years 1994 and 1997 both in the number of teachers and of schools participating in the study. A division between school type, gender and language of instruction is made to give the reader an idea of the study population in Table 7. These have been used as distinctive factors

and variables for analysing the data from 1994 and this analysis can be found in an earlier publication (Taalas, 1996).

TABLE 6. Summary of the three data sets.

	1994	1997	2001
Number of Teachers	201	119	111
Number of Schools	122	83	84

TABLE 7. The teachers in the subgroups.

	1994 (n=201)	1997 (n=119)	2001 (n=111)
School Type			
Vocational	107	65	80
Commercial	93	39	16
Polytechnic	-	12	11
Missing cases	1	3	4
Gender			
Female	163	99	100
Male	35	14	7
Missing cases	3	6	4
Instructional language of the school			
Finnish	186	108	106
Swedish	15	10	5
Missing cases	0	1	0

5.2 Geographic Distribution

Since the purpose of the study has been to survey the situation in the whole of Finland, it has been important to ensure adequate coverage of the teaching cohort. Figure 19 demonstrates the geographic distribution of the responses. The dots on the map do not correspond to the actual number of replies or the number of schools, but displays the coverage of the data on the map of Finland. As can be seen in the figure, the distribution has remained

wide-ranging even if the number of responses is smaller in the two later data sets. The only slight change is in the coverage of the Swedish speaking west coast and the Åland Islands in the data set from 2001.

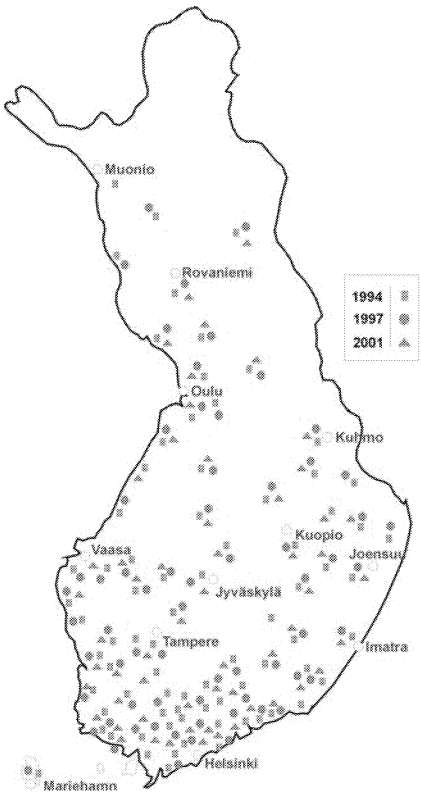


FIGURE 19. Geographic distribution of responses.

A more accurate joint record of the schools or the teachers who have been informants in the study has been impossible to maintain throughout the seven-year time span (this information exists separately for each data set). Between the years 1994 and 2001 there has been a strong restructuring of the vocational education sector along with a trend towards a modernisation of the traditional

vocational school names. Many of the former vocational schools are now being called vocational institutes (Ammatti-instituutti, Yrkesinstitut), vocational training centres (Ammatillinen koulutuskeskus), learning centres (Oppimiskeskus) or even more fashionably, "Vocana", "Novida", "Mercuria" or "Optima". This has obviously affected the categorisation of the data. In the 1994 data, a division was made between vocational and commercial schools to see if there was a 'cultural' difference in the way in which language teachers perceived their role in educating resourceful professionals. In the 1997 and 2001 data this division had no real significance since many of the study programmes already functioned under the same administrative roof with similar action lines and more focused curricular goals.

The updated addresses of the schools have for each year been taken from the Finnish Koulutusopas and its Swedish equivalent Utbildning (1993, 1997). For the 2001 data the addresses were taken from the electronic versions of the guides on the Board of Education website. For instance, according to the Finnish study guide (Koulutusopas 1993), there were 104 Finnish vocational schools and 62 Finnish commercial colleges in Finland. Correspondingly, there were 8 Swedish vocational schools and 8 Swedish commercial colleges according to the Swedish study guide (Utbildning 1993). For 1997 the ongoing vocational education reform process[8] resulted in quite a different mailing list for the second data-gathering round and the actual numbers of the schools were lost in the transition.

In 2001 the situation had not settled down. The shifts and changes in the vocational education field had juggled the number and types of schools around as much as ever. To illustrate this change: during a six-year time period (1994–2000) the number of the polytechnics varied from 22 (in 1994) to 29 (in 2000) peaking at

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8 The division of vocational education into secondary and tertiary levels in the form of non-university higher education sector, i.e. the polytechnics and vocational degree programmes and the re-defining of the existing vocational study programmes, see for instance Ammatillinen koulutus Suomessa, a publication from 1997.

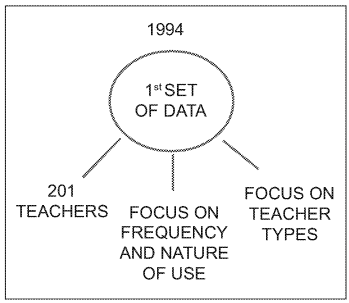
32 polytechnics in 1998. (Amkota database). This reorganisation process had its effect at all levels and types of vocational schooling. Other survey studies within the vocational sector have had similar difficulties in keeping up-to-date records of the numbers and names of the schools (Nikki, 1998:35). This is the reason for the vagueness in the numbers of the schools below.

There are no reliable lists or databases of the number of the English teachers in the vocational school sector. This is partly because at least some of the teachers in the non-vocational subjects are often part time teachers working in more than one institution. The re-structuring of the Board of Education has also had its effect on the information resources available through their databases; the vocational sector used be an autonomous unit (Ammattikasvatus-hallitus) with its own information databases.

The survey questionnaire was throughout the seven-year period sent to the generic recipient "English teachers" in all the schools listed in the study guides. It could happen that the same teacher would receive the questionnaire at more than one school and would consequently send back one set of replies but state that the responses were applicable to, say three schools at the same time. In these cases the set of questionnaires has been treated as one reply, with a mark after each school stating that a response has been received. In the following chapters all three data sets are briefly presented before they are combined for a more detailed investigation of the nature and directions of the change that has taken place during these seven years. A special focus is then placed on sustainability and innovativeness in the teachers' ideal visions of technology-integrated language learning. It is important to point out that each set of data has been treated as a document of its own time; the interpretations have been made with the prevailing conditions in mind. The results and the analyses of the individual data sets will not be presented in full detail in the text for the sake of readability.

5.3 An Overview of the Three Data Sets

5.3.1 The Data in 1994



The number of the teachers who responded to the questionnaire in 1994 was 201. The actual number of teachers exceeded this figure since some teachers filled out the questionnaire together with a colleague. The numbers of teachers in the three subgroups was presented in Table 7. A total of 107 of the teachers (53.7%) worked in vocational schools and 93 teachers (46.3%) in commercial colleges. 163 (82.3%) teachers were female and 35 (17.7%) male. 186 (92.5%) were from Finnish schools and 15 (7.5%) were from Swedish ones. The male teachers and Swedish teachers are few in number in the population, but nevertheless represent the actual situation accurately.

Out of the 184 schools 121 (66%) participated in the study: 67 Finnish vocational schools (66%), 8 Swedish vocational schools (100%), 42 Finnish commercial colleges (68%), and 5 Swedish commercial colleges (63%). In the light of the 1994 situation the degree of participation could be considered satisfactory, as at least some teachers seemed reluctant to approach the topic. Technology had infiltrated education in a manner that appeared permanent while language teachers were still recovering from the audio-lingual wave and the unfulfilled promise of language laboratories and high hopes of learning outcomes produced with the help of automated drilling programmes with instant feedback.

The main objectives in the 1994 survey were to find out how teachers were using technology (i.e. computers) in their work both when preparing for lessons and when working with students. On the one hand, the survey shed light on the infrastructure (access to computers and availability of tool programmes and language

learning software) and on teachers' attitudes towards using technology, on the other. The aim was also to categorise the teachers in line of the other teacher-technology studies at that time. For instance, in the IEA study Janssen Reinen and Plomp (1993) defined four groups of teachers using computers as follows: low integrators, mean integrators, high integrators, and non-users. Since this aspect has not been topical in the present study, more detailed information and implications of this categorisation can be found in Taalas (1996).

5.3.2 The 1994 data gathering round

The 1994 data were collected by means of Finnish and Swedish questionnaires that were sent to the teachers in the spring of 1994. Because of the central research objectives the questions focused on the following areas (the asterisk marks the sections that will be analysed in more detail in Chapter 5.4):

USE OF COMPUTERS*
Educational use
Private and administrative use

AVAILABILITY AND USE OF PROGRAMMES*
Tool programmes
Electronic mail and electronic dictionaries
Educational packages

ACCESS TO COMPUTERS
Computers in the school (computer segregation)
Computers in the classroom (computer integration)

ADVANTAGES OF USE
DISADVANTAGES OF USE
BARRIERS OF USE
SCENARIOS OF USE*
TEACHERS' GENERAL ATTITUDE*

STAFF DEVELOPMENT/FURTHER TRAINING*
Computer courses: number and nature

BACKGROUND DATA
Years as English teacher and future plans

Use of computers. The amount of computer use for private and administrative purposes as well as for educational purposes was mapped using a 4-point time scale (not at all – occasionally – weekly – daily).

Availability and use of programmes. The teachers were asked to mark the programmes that they had used themselves, programmes they had used in the classroom and programmes that, according to their knowledge, were available in the school. The programmes listed ranged from tool programmes, electronic dictionaries, and electronic mail to modifiable educational packages. The teachers were also asked to mark down any unlisted programmes they used or had previously used. The use of various programmes for instructional purposes was then compared to the private use to see if the teacher, after having used a specific programme, would have discovered possibilities to use the programme with the students. The teacher's awareness of the existing software, as well as hardware, in the school could be interpreted as an implication of interest towards actually using the resources. A list of the software titles mentioned in the responses can be found in the Appendix 1.

Advantages of computer use. The second questions concentrated on the advantages of educational computing: *What kind of advantages does educational computing have in your opinion?*

Disadvantages of computer use. *What possible disadvantages does educational computing have?*

Barriers of computer use. *What are the reasons for your not using computers as much as you might wish?*

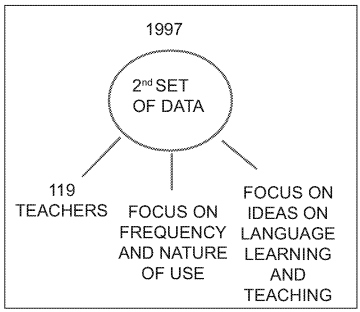
Scenarios of use. The previous section attempted at mapping the actual use of computers. The following question takes the idea further by getting at the imagined scenarios of use: *Let us suppose*

that you have the hardware, software and any other prerequisites to use computers in your classroom practices. How would you then use the computer in your teaching? This question will be dealt with separately in chapter 5.4.3.

Teachers' general attitude. Since the overall attitude was not measured directly, the attitudes could only be estimated and assumed. Some statements, though, could clearly be interpreted to reflect either negative or positive attitudes and if such statements did not occur, the general attitude was marked neutral. Statements like "I don't have time to fiddle with computers" or "because I want to keep the language alive, I discard the whole idea of computers in language teaching" were considered to imply negative positions, whereas such statements as "computers can make a real change for the good in language teaching" or "we need positive thinking and adventurous minds to make it" are considered positive. These attitudes will be presented in more detail in Chapter 5.4.4.

Staff development and background data. The questions gathered such information as the number of the years as English teacher, the years at the current institution, amount of English lessons per week, future prospects as far as the position is concerned, number of computer courses attended, content of these computer courses, overall number of computers in the school, potential number of computers in the English classroom. These questions and their answers were used to create teacher types. The amount and content of the computer courses were also considered to be very relevant for shaping the classroom practice of an individual teacher. The dedication for the cause or the lack of it was assumed to have some sort of linkage to the work situation of the teacher. More on these aspects can be found in Taalas (1996).

5.3.3 The data in 1997



In 1997 the number of the replies was considerably lower than in 1994. This cannot, however, be interpreted as a lower reply percentage but rather as an indication of an on-going re-structuring process. The number of the teachers divided into the three subgroups is presented in Table 7. A total of 65 of the teachers (54.6%) worked in vocational schools and 39 teachers (32.8%) in commercial colleges and 12 teachers (10.1%) in polytechnics (three teachers, 2.5%, did not want to reveal their school). As many as 99 (87.6%) of the teachers were female and 14 (12.4%) male, and 109 (91.5%) were from Finnish and 10 (8.5%) from Swedish schools. The male teachers and Swedish teachers were getting even fewer in number but these numbers probably reflect the situation rather accurately.

The main objective in the 1997 data gathering was to see if any change had taken place during the three years. Another major aim was to update the previous data to take into account the vast technological changes that had taken place during this time and also to see if the strategic initiatives in the educational field had influenced the teachers' work in any way. The language learning and technology emphasis in the questionnaire was expected to give support in understanding the teachers' behaviour and opinions. All the new questions will be presented below.

5.3.4 The 1997 Data Gathering Round

The Finnish and Swedish questionnaires were sent out to schools in the fall of 1997. The addresses of the schools were updated but otherwise the mailing list was similar to the list used in 1994. The contact information had changed for 44 schools out of the 184, and a

reply was received from 83 schools. It is impossible to calculate a valid reply percentage in this case since the merged schools and their shared teaching resources were not quantifiable without a focused investigation into this aspect.

The 1997 questionnaires were quite profoundly modified on the basis of the experiences from 1994 and the changes in the environment. The objective of the modifications was to keep the questionnaire as short as possible (four pages maximum) by adding the new questions in places where questions that did not give any relevant information in 1994 were left out. For the longitudinal nature of the surveys it would have been optimal to keep the questionnaires as identical as possible for the sake of comparability of the data. But between the years the situation had changed so much that new questions had to be added and old questions had to go.

It had been an oversight in 1994 not to ask whether the teachers had a computer at home. This question was added to the background section of the questionnaire. The rapid technological developments had made the section of educational packages almost obsolete. The questions concerning educational packages were thus revised to include multimedia CD-ROMs, the Internet and WWW. The number of the computers that teachers had at their disposal did not result in valid data in 1994 so it was left out.

In 1994 the questions on the availability of computers in the school and access to them resulted in such a wealth of non-comparable information in all sorts of formats that they were left out. The formulation of the question seemed unsuccessful and the expectation of the teachers' technological understanding unreasonable. The further training aspect that was part of this same section was kept as a stand-alone question in 1997 and embedded in the section on Finnish Information strategies. The question of how long a teacher had been employed at the same institution was thought to give an indication on the teacher's dedication and interest in developing his/her teaching. No evidence of this sort could be found in 1994, so this question too was left out.

Since there were so many questions that were left unanswered

both literally and contentwise (which is partly due to the data gathering method) in 1994, a tick box was added to all open-ended questions for at least quick and easy answering (see Figure 20). In this way the teachers were expected to give at least some signal of their computer use and thus increase the value of the returned questionnaire.

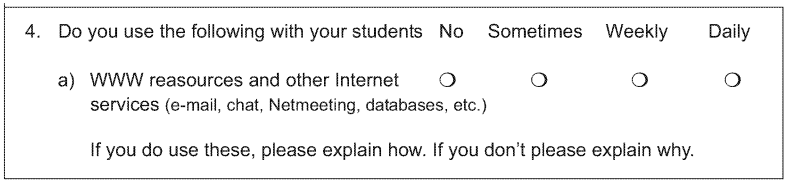


FIGURE 20. An example of a semi open-ended question on use of programmes with tick-boxes.

Another difference from the 1994 questionnaire was the situation in 1997 where the effects of both the Finnish information strategy and Finland's EU membership were becoming more visible and concrete in their contributions to education. A new section was added to the questionnaire to reflect this progression. The idea behind the new questions was to see whether these changes in society had an effect on the teachers' work in a situation where extensive in-service teacher training programmes were initiated and an upsurge of new national and international educational projects was taking place. One of the questions that falls into this section was the question of where the teachers feel they get most support for their development efforts.

Yet one more and completely new section was added concerning the nature of language learning and teaching, on language competence and on the use of technology in language learning. These questions were presented in the form of somewhat provocative statements, and the teachers were asked to choose "I agree" / "I disagree", comment on their opinion and explain what sort of thoughts the statements gave rise to (see Figure 21). The idea of these statements was to grasp the 'language pedagogical atmosphere' the teacher worked in and to see what kinds of viewpoints the statements would generate.

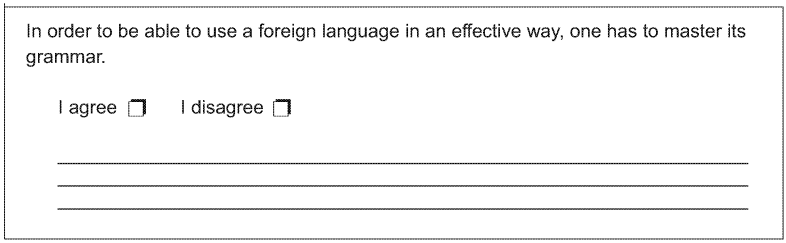


FIGURE 21. An example of the claims with tick-boxes.

The section in the questionnaire were (the asterisk marks the sections that will be analysed in more detail in Chapter 5.4)

USE OF COMPUTERS*
Educational use
Private and administrative use
Computer at home (in 1997 and 2001)

USE OF PROGRAMMES – WHAT/HOW/REASONS FOR NON-USE*
Internet and WWW
Tool programmes
Multimedia language learning packages
Other multimedia packages (resource and reference tools)
Traditional (language) learning packages

IDEAL USE (previously "Scenarios of use")*

INFORMATION STRATEGIES
Participation in projects
Effects on everyday teaching
Effects on further training

SUPPORT* (with 2001 data only)
Material and mental, coming from whom

VIEWS ON LANGUAGE LEARNING AND TECHNOLOGY USE (in 1997 only)
"Good" language learning
Learning with technology
Language competence

The first two sections are the same as in 1994, except for those concerned with computer software and technology.

Use of computers. The amount of computer use for private and administrative purposes as well as for educational purposes was mapped using a 4-point time scale (not at all – occasionally – weekly – daily).

Computer at home. The teachers were asked whether they had or did not have a computer at home, and also whether they were planning to buy one.

Use of "programmes" – frequency, nature, reasons for non-use. The programmes section was re-structured completely to accommodate for the recent developments in technology and computer programmes. These were divided into five groups: The Internet and WWW, tool programmes, multimedia language learning packages, other multimedia software, and traditional language learning packages. The teachers were asked to tick the regularity of use and explain the type of use or reasons for non-use as can be seen in Figure 20. A list of software titles the teachers mentioned in their responses can be found in the appendix.

Ideal use. As in the questionnaire in 1994, the previous section outlined the actual use of computers. To go on from there the same imaginary 'ideal use' question was administered in 1997: *Let us suppose that you have the hardware, software and any other prerequisites to use computers in your classroom practices. How would you then use the computer in your teaching?* This question will be dealt with in more detail in Chapter 5.4.3.

Teachers' general attitude. The teacher's general attitude was coded in 1997 as well. The coding system was the same as in 1994 and it was not measured in a systematic way, so it is just an interpretation and an impression. The scale in use was positive-neutral-negative.

The interpretations will be presented in more detail in Chapter 5.4.4.

Information strategies. Three questions about the kinds of projects that the teachers or their schools were involved in, the effects of these projects on the teachers' work and the effects on their further training activities and opportunities. The teachers were asked if they felt that these projects had an effect on their work. 43 teachers (36.1% of responses) felt that they had a positive effect whereas almost an equal number of 44 teachers (37%) felt that they did not have an effect at all. 29 teachers (24.4%) passed the question without a response.

The further training question was looked at in more detail to see if the teachers had had more opportunities to participate in training specifically aimed at language teachers. The poor availability of courses for language teachers had been a problem according to the 1994 responses but it seems that even if the number of available courses may have been increased, only a fraction of the teachers had actually taken a course for language teachers (eight teachers, 7.6%; the corresponding figures in 1994 had been 128 teachers, 63.7%). This question will be examined further when the data from all the three sets will be pooled in Chapter 5.4.

Support. The support question was ideologically a part of the information society section with the idea that, since there are so many projects and further training initiatives, the teachers might find it easier to get both material and mental support for their development efforts. This question was included in the 2001 questionnaire as well, and a comparative summary of the replies in these two separate data sets can be found in Table 9.

Views on language learning, learning and on technology in teaching. Altogether nine to some extent provocative claims were given to the teachers to either agree or disagree and comment on. The claims (referred to as Q) can be thematically clustered as follows:

1. Views on language learning
   - Q3: **In order to be able to use a foreign language in an effective way, one has to master its grammar.** (The point being in the teacher's views on language as a tool vs. language as linguistic details.)
   - Q6: **One can learn a language without learning the grammar and vocabulary by heart.** (The point being in trying to pinpoint the teacher's views on what language competence is about.)
   - Q8: **Good language competence cannot be obtained without formal language teaching.** (The point being in the views on the importance of formal teaching in the language learning process.)

2. Views on learning
   - Q1: **Bigger units or entities are learned by exercising smaller units first.** (The point being in seeing if the teachers emphasise segmented pieces of information rather than having a more holistic approach to language.)
   - Q4: **In a classroom situation the teacher has to be the absolute expert of the target language.** (The point being in looking at the teacher roles and whether the teachers see themselves as language experts or language learning experts.)
   - Q7: **In an ideal learning situation the students choose such working methods and learning tasks that suit them best.** (The point being in the idea of a learning environment comprising of multiple ways of doing things and a to some extent learner-directed freedom of choice.)

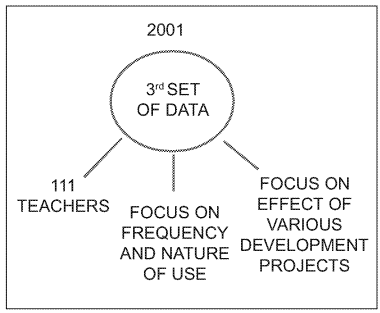
3. Views on technology integrated learning
   - Q2: **Students prefer learning languages with a teacher to learning with computers.** (The idea is to feel around the attitudes to computers and their place in language learning.)
   - Q5: **Technology's potential for language learning has no limits.** (The idea is to see if the teachers perceive technology as an opportunity.)
   - Q9: **Technology can also be misused in language teaching.** (The idea is to see if the teachers' views are mostly about technology threats.)

TABLE 8. The teachers' responses to the semi-provocative claims on language learning and technology-integrated language learning.

THE CLAIMS	I agree	I disagree	Missing
Q1: Bigger units are learned by exercising smaller units first	69,7 (n=83)	11,8 (n=14)	18,5 (n=22)
Q2: Students prefer learning languages with a teacher to learning with a computer	20,2 (n=24)	60,5 (n=72)	19,3 (n=23)
Q3: In order to be able to use a foreign language in an effective way, one has to master its grammar	67,2 (n=80)	21,8 (n=26)	10,9 (n=13)
Q4: In a classroom situation the teacher has to be the absolute expert of the target language	33,6 (n=40)	59,7 (n=71)	6,7 (n=8)
Q5: Technology's potential in language learning has no limits	47,1 (n=56)	45,4 (n=54)	7,6 (n=9)
Q6: One can learn a language without learning the grammar and vocabulary by heart	64,7 (n=77)	24,4 (n=29)	10,9 (n=13)
Q7: In an ideal learning situation the students choose working methods and tasks that suit them best	67,2 (n=80)	15,1 (n=18)	17,6 (n=21)
Q8: Good language competence cannot be obtained without formal language teaching	31,9 (n=38)	48,7 (n=58)	19,3 (n=23)
Q9: Technology can also be misused in language teaching	85,7 (n=102)	7,6 (n=9)	6,7 (n=8)

A break-down of the teachers' responses to the statements can be seen Table 8. These responses have also been chi-square tested against the teachers' responses in the other sections. The only statistically significant dependency between these views and the actual practice was found, not very surprisingly, between "Use of computers with students" and Q2: "Students prefer learning languages with a teacher to learning with computers" (x^2=13.8, p=0.003). An almost significant result and a positive correlation was found between "Own computer use" and Q5: "Technology's potential for language learning has no limits" (x^2= 7.4, p=0.059). Even if the responses are quite interesting, they will not be dealt within the scope of this study, where the focus of inquiry and interpretation is directed at a larger representation of technology-integrated language learning.

5.3.5 The Data in 2001



The 2001 data gathering was a close replica of the 1997 one. The address book had undergone only slight changes and the number of the schools remained almost the same. In the 2001 data, 80 of the teachers (72.1%) worked in vocational schools, 16 teachers (14.4%) in commercial colleges and 10 teachers (9%) in polytechnics. Four teachers (3.6%) did not want to reveal their institution and one teacher (.9%) worked in all three. Exactly 100 teachers (90.1%) were female and seven teachers (6.3%) were male. Four teachers (3.6%) were coded as neither because of missing contact information. A total of 106 teachers (95.5%) were from Finnish schools and five teachers (4.5%) were from Swedish ones. Male teachers and teachers from Swedish schools seem to have become almost extinct in this cohort. Since the number of Swedish teachers had decreased radically between the years and this change does not reflect the actual numbers, a special effort was made to get more replies from this group. Five more teachers were contacted by telephone/e-mail but despite their very positive intentions, no more responses were received by the deadline. It can only be assumed that the reasons have to do with a lack of time, and a lack of interest in the topic. Furthermore, many of the teachers who were contacted personally said that there was an overload of questionnaires flooding in at that point in time.

The data gathering in 2001 was to complement the earlier data and give more information about the situation in schools when it comes to the advancements on the technology front and the increased opportunities for further training and networking in various projects. The role of strategic initiatives was toned down slightly from the 1997 questions and directed more towards the assumption that teachers were more aware of what types of projects they could join in and the kinds of projects they would be interested in.

In summary, no new sections were added to the 2001 questionnaire, but some of the questions were modified. The claims section in the 1997 questionnaire was removed, since its significance or added value could not be established in the earlier data analysis. More details of these modifications can be read in the following passage.

5.3.6 The 2001 Data Gathering Round

As was said above, the 2001 questionnaire was modified from the 1997 version. The Finnish, Swedish and English[9] questionnaire were sent to the schools in the spring of 2001.

The sections in the questionnaire were (the asterisk marks the sections that will be analysed in more detail in Chapter 5.4):

USE OF COMPUTERS*
Educational use
Private and administrative use
Computer at home (in 1997 and 2001)

USE OF PROGRAMMES – WHAT/HOW/REASONS FOR NON-USE*
Internet and WWW
Learning platforms, LMS's (in 2001 only)
Tool programmes
Multimedia language learning packages
Other multimedia packages (resource and reference tools)
Traditional (language) learning packages

IDEAL USE
Type of integration
Ease of integration
INFORMATIONSTRATEGY/VIRTUALSCHOOL

PROJECTS*
Participation in projects

FURTHER TRAINING SUPPORT* (with 1997 data only)
Material and mental, coming from whom

9 This option was available at request the previous years as well, but was only now actually used by two teachers.

The two first sections are the same as in 1994 and in 1997, except for the up-dated computer software and technology questions. The only addition between the years 1997 and 2001 was the learning platforms or Learning Management Systems (LMS's).

Use of computers. The amount of computer use for private and administrative purposes as well as for educational purposes was mapped using a 4-point time scale (not at all – occasionally – weekly – daily).

Computer at home. The 1997 question was used again in its original form: the teachers were asked whether they had or did not have a computer at home, and also whether they were planning to buy one.

Use of "programmes" – frequency, nature, reasons for non-use. As in 1997, the question was divided into groups, five groups in 1997 and six groups in 2001: the Internet and WWW, tool programmes, learning platforms/learning management systems, multimedia language learning packages, other multimedia software, and traditional language learning packages. The same kind of tick-box as in 1997 (Figure 17) was used this time, too. A list of the software titles the teacher mention in their responses can be found in the appendix.

Ideal use – type AND ease of integration. As in the questionnaires in 1994 and 1997, the previous section outlined the actual use of computers. The same "ideal use" question was applied in 2001. (This will be dealt with later along with the 1994 and 1997 responses). This time there was a follow-up question asking whether the teachers felt that it was easier than before to start to integrate technology into their teaching (because of for instance better facilities, improved computer skills, better software). As many as 70.3% of the teachers (n=78) said that it was easier than before, whereas 19.1% of the teachers (n=19) claimed the opposite. Some teachers mentioned that

it is easier in the sense of getting help, but the availability of the facilities has not improved. Some even felt that the development of the facilities has not kept pace with the rapidly growing demands of the different technologies and ever-increasing use.

Information strategies. As in 1997, these questions were about the kinds of projects the teachers or their schools were involved in, the effects these projects had on the teachers' work and the effects on their further training activities and opportunities. In 2001 the teachers' awareness was assumed to have increased in respect to information strategy initiatives and availability of project opportunities in between the data gathering points. The further training question was included in the 2001 questionnaire as well. It was a part of the information strategy section again even if the question was not linked to these the way it was in 1997. Comparisons to the previous years are presented in Chapter 5.4.

Support. In 2001 this question was ideologically a part of the information society section on the basis of the idea that, since there are so many projects and further training initiatives that the teachers may find it easier to get both material and mental support for their development efforts. Moreover, in the area of school improvement and professional development it is crucial that the individual teachers and other personnel feel that they have the support and cooperation of their immediate associates (see for instance Luukkainen, 2003). In this context, however, it would be unwise to make any far-reaching conclusions of the situation in the schools on the basis of one question only. In the chi-square significance tests the answers understandably did not produce any meaningful results. It is nevertheless exciting to see how the teachers regard the issue. For instance, only a tiny proportion of the teachers felt that they did not get any support, which can be interpreted as a good sign in terms of the working atmosphere. Another 'good sign' is the collegiality aspect: the colleagues are the source for support that is most often mentioned.

Comparison of the 1997 and 2001 responses indicates that the situation has not changed much between the years (see Table 9). The only notable difference is the increase in the support the teachers felt was coming from their students. But it has simply to do with the phrasing of the questions (in 1997 only parents were mentioned as examples and in 2001 the phrasing had been revised to "students or their parents"). In 2001 this revision was made because of the earlier wording had been considered as an oversight and because of the teachers' had commented on it. Otherwise the numbers are almost identical (especially when the numbers for "cannot say" and empty replies are subtracted from the sum totals). The teachers did not specify the nature of the support in any way even if the question was about both material and mental aspects.

TABLE 9. Sources for material and mental support for development efforts.

SOURCE FOR SUPPORT	Times mentioned		Total	
	1997	2001	1997	2001
School administration / School	54	49		
Head of department	-	4		
Principal	1	2		
			55	55
Colleagues	65	57		
Computing teacher	6	4		
			71	61
Board of Education	9	11		
B of E training courses	7	3		
Training courses	1	2		
			17	16
Students	-	16		
Students' parents	1	1		
			1	17
City / municipal	4	4	4	4
Home / own children / friends	2	3		
Oneself	5	1		
International teachers network	6	-		
Magazines and journals	1	2		
Internet	1	-		
Fairs	1	-		
No support	7	5		
Cannot say	18	2		
			45	11
No reply			-	8
Sum total			**193**	**174**

Projects. In 2001 the new theme encompasses the idea that strategic thinking had become more common and practiced and that the teachers' opportunities for working in various national and international projects had increased. This type of school development had been taken on by various school departments, and supporting structures visibly available for teachers. The section has two questions (the information strategy section had the question on existing projects that the school or the teacher was involved in): Question number 10: *What sort of technology projects interest you at the moment?* Table 10 shows all the replies of the types of projects that the teachers indicated in their responses. Question number 11: *Are you currently planning or starting up any projects which attempt to utilise learning technology in some way? If yes, please explain in more detail.* For this question 32 teachers (28.8%) said yes, 45 teachers (40.5%) said no, and 34 teachers (30.6%) skipped the question completely. A chi-square analysis was used to evaluate these responses to see if there was any correlation between the responses in the other sections. No significant associations were found between any of the other variables in the questionnaire. It seems that the projects that the teachers mostly need focus more on pedagogic development and an increased understanding of technology-integrated teaching and learning. It can be asked whether these are rather further training needs than projects in the intended sense of the word.

TABLE 10. Types of projects teachers mention as interesting.

TYPES OF 'PROJECTS'	Times mentioned	Total
To do with Internet/WWW/Learning platforms		
International teaching cooperation	5	
Material banks	3	
Integration of Internet technology closer to teaching	2	
Net-based language teaching projects	11	
Development of learning environments	2	
Development of electronic teaching materials	6	
Upgrading Telsi Pro (a learning platform)	1	
		30
Multimedia projects		
Digital language lab projects – modernization, practices, closer integration to teaching	10	
Integration of PowerPoint	1	**11**
To do with CALL		
Better utilisation of learning software	5	
Better integration of the Ask me learning package	2	
Electronic dictionaries to all computers and more used in teaching	1	
		9
Other		
Everything new and exciting	3	
Better facilities	5	
Improved use of the available technology	3	
Integrated courses with vocational subjects	1	
Updating one's skills	1	
Teaching and pedagogical development	1	
Development of user-friendly materials	1	
		15
Total		**65**
None	6	
No reply	48	54

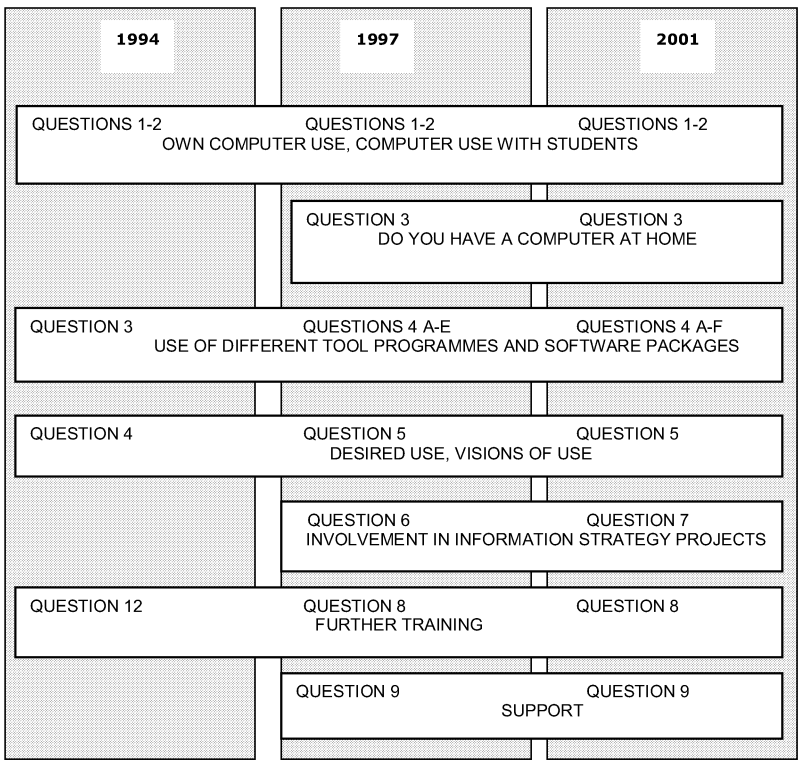
5.4 In Search of Signs of Change: The Data Sets Combined

Even if the questionnaires in the three separate data gathering rounds were not identical, there were established themes that remained in the core of the data gathering. The changes in the environment had brought with them a need for new themes and questions. The relevance of the set was evaluated and confirmed each year. The

following Table 11 gives an overview of the comparability of the data sets. All these sections will be explored in detail below.

The actual use of technology has remained as the main theme in the three data sets. An extensive analysis of the reported use has been possible, and it will be presented next. The restrictions of a questionnaire survey must however be kept in mind throughout. There will inevitably be conclusions that could only be confirmed for certain by a complementary data gathering methods such as interviews. This type of data is not available, so a cautious approach to the questionnaire based data is taken all through the analysis. The results are descriptive and sometimes even assuming, and not necessarily conclusive.

TABLE 11. The comparability of the questions in 1994, 1997 and 2001.



5.4.1 The Operational Environment and Reported Use

As was mentioned above, the numbers of accessible computers or availability of other technical resources were directly asked only in 1994, and the result was a blur of contradictory and indecipherable data. The operational environment can only be inferred from the replies (mostly from the reasons for no use), but this would not benefit the current analysis to any great extent. In 2001 this question was revisited in a sense by means of the question about the ease of integration of technology into teaching. The replies show that even if the teachers have major problems with getting a fair share of the resources and facilities, the situation seems to be somewhat improving. The general subjects are allocated at least some slots in computer rooms, and some language teachers have even been able to get computers into their own classrooms. Still, many teachers point to the access to computers as one of the biggest hinders to computer use with students. The faculty rooms seem to be almost adequately equipped in most cases allowing for lesson preparation, e-mail access and intranet use of the administrative systems.

As has been said earlier, the teachers were asked about their computer use both for administrative and for teaching purposes. The most radical change can be seen in their own use of computers for email, lesson preparation, and the use of administrative systems (student records, lesson schedules etc.). Figure 22 shows how the rather even distribution of responses in 1994 has in the seven year time span evolved into a very different picture: in 2001 not a single teacher reports that s/he does not use computers at all. When in 1997 there were still a few teachers who did not use computers at all, in 2001 it was a small group who reported occasional use. The response rate was high for this question; the numbers of missing information were 2 for 1994, 0 for 1997, and 0 for 2001. It is evident that computers have become everyday tools for the teachers in their work, that is in their administrative work.

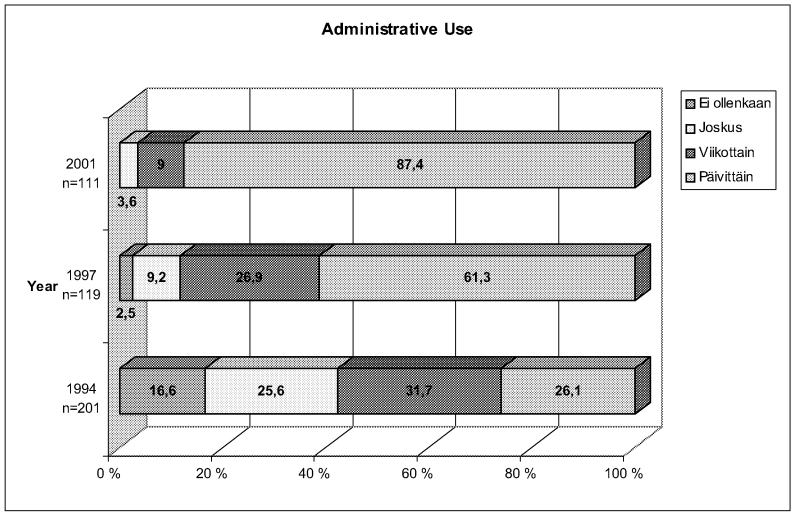


FIGURE 22. The teachers' administrative use of computers.

Administrative use has a strong positive correlation with computer use in teaching (p=0.000). A frequent administrative use of computers indicates a rather frequent use of computers with students and vice versa. This confirms the hypothesis behind the question about administrative use, even if the dependency of these two variables seemed weak in the 1994 data (p=0.607), but it actually became significant in the later data sets. In the other chi square correlation tests, a strong correlation (p=0.000) was found between the years of data gathering and administrative use, but for instance there was no correlation between the teacher having a computer at home and the administrative use of computers (p=0.398). It can be assumed that the teachers have received sufficient training in the use of office tools and school-specific applications. The question about further training at least to some extent confirms this. (Further training will be discussed in more detail later in this chapter.)

The change is not as radical for the teachers' use of computers with students, but a clear increase can be seen there too (see Figure 23). The numbers for regular users in the 1994 data make for less

than ten percent of the study population. There is a clear trend in the last two data sets of an increased regular use. The critical points on the scale used in the question are presumably first between the cut point of the teacher using or not using computers. After that follows the critical point in defining the regularity of use between *sometimes – weekly/daily*. If one reads the alternatives very literally, in all honesty, a daily use of computers in face-to-face language learning was very unlikely under the circumstances where these teachers worked. The teachers who ticked daily use were probably constant users of various technologies and the use of them was 'ideologically' present in all teaching. But this may have been the case with the teachers ticking weekly use as well; they were just more accurate in their response. The occasional users who ticked *sometimes* can be assumed to have been just any teachers varying in their intensity of use from using technology very rarely to almost regularly in their teaching. The actual cutting points are difficult to establish with certainty, but it is evident that the instructional use of technology increased considerably in the seven year time span. The share of the 40,7 percentage of the non-using teachers in 1994 shrank to 11,2 percent in 2001. The critical mass of users settled in the realm of irregular to regular use, whereas the assumed true 'heavy-users' still remained a small minority. The corresponding numbers for the percentages in numbers are: in 1994 one teacher reports daily use, in 1997 seven teachers ticked that alternative, and ten teachers did so in 2001. The corresponding numbers for weekly use were 17 teachers in 1994, 36 teachers in 1997, and 34 teachers in 2001. The numbers for occasional users were 51 in 1994, 56 in 1997, and 51 in 2001. The most heavily decreasing group of users were the non-users, and their corresponding numbers were 81 in 1994, 20 in 1997, and 12 in 2001. To summarise: a decrease can be clearly noted in the no-use area and an almost parallel increase in the *weekly-daily* area. To tick *sometimes* still remains the safest choice.

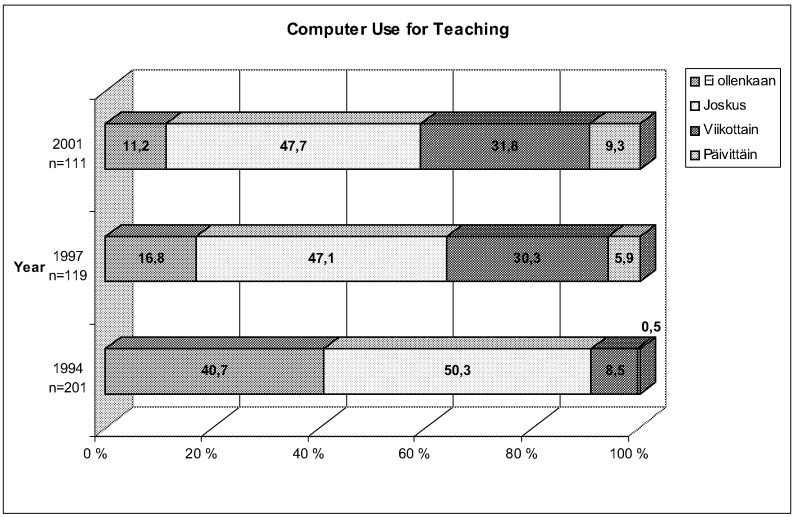


FIGURE 23. The teachers' use of computers with students.

The chi square correlation tests show an expected significant correlation between the year of data gathering and use of computers with students (p=0.000). But the correlation with further training courses was even less significant than that with administrative use (p=0.418). In the other tests (apart from use of various programmes and applications) no significant correlations were found. One interesting near significant dependency was found between the use of computers with students and the schools participating in various information strategy projects (p=0.063). The background variables (school, gender, instructional language) did not correlate with the educational or administrative use of computers in a significant way except for the dependency between administrative use and school type (p=0.008). But the validity of this correlation is doubtful because of the difficulties to define the school types in the last two data sets.

What do the teachers then do when using computers with their students? The applications and purpose of use was outlined with a series of questions in all the three data sets. As was explained earlier, the questions on the applications were updated according to the

technological advancements. The overall illustration of the frequency of the educational use of applications can be seen in Table 12.

The nature of the use has also been looked at through two lenses directed on the objectives of the use: (a) from the point of language learning and (b) from the point of restructured learning setting. This analysis has been possible in the last two data sets only, because in 1994 the teachers were not directly asked to describe the activities. However, in 1997 and 2001, the responses also consisted of too incomplete data for any statistical analyses; many respondents had only ticked a box for the frequency of use without explaining it any further.

A look back at the taxonomies and the types of integration presented in Chapter 4.4 reveals some 'promising' tendencies: the use of closed learning packages (CALL-traditional) had declined, whereas the use of tool programmes had expanded. In 2001 more than half of the technology using teachers report regular (weekly or daily) use of tool programmes (and slightly over 15% of the teachers report an equally regular use of traditional CALL packages). Most of this use was using word processing for professional purposes (exercises in business correspondence, different kinds of writing tasks, project work, etc.). A slight increase in the use of presentation tools (from 4.2 percent in 1997 to 7.2 in 2001) can be noted, but the clear forerunners in the tool programme category were the word processing tools. The increased use of the various open ended tool programmes can be taken to be a strong indicator of a shift taking place in the way in which the learning settings are constructed: the computer is not a replacement of the materials earlier used, but a tool for completing and working on the various learning tasks.

One of the undoubtedly and indisputably biggest technological advancements in this time period was the launch of the World Wide Web and the whole idea of hypertextuality and non-linear presentation of information. In the OECD study Education at a glance (2001: Table D7.3), the indicator for Internet access in the Finnish secondary schools for instructional purposes was 97%, ranking third highest in the study. In 2002 in the Eurobarometer Flash surveys

TABLE 12. Frequency of educational use of the various tools and applications.

	1994				1997				2001			
	Not at all	Some times	Weekly	Daily	Not at all	Some times	Weekly	Daily	Not at all	Some times	Weekly	Daily
CALL – traditional	63,7 % (n=128)	36,3 % (n=73)			44,3% (n=51)	40,0 (n=46)	6,1% (n=7)	9,6% (n=11)	53,7% (n=58)	29,6% (n=32)	12,0% (n=13)	4,6% (n=5)
CALL – multimedia	89,8 (n=167)	6,5 (n=12)	1,1 (n=2)	2,7 (n=5)	60,7 (n=71)	23,1 (n=27)	14,5 (n=17)	1,7 (n=2)	43,5 (n=47)	31,5 (n=34)	14,8 (n=16)	10,2 (N=11)
Tool programmes	63,7% (n=123)	21,8% (n=42)	8,8% (n=17)	5,7% (n=11)	28,1% (n=32)	28,1% (n=32)	16,7% (n=19)	27,2% (n=31)	15,0% (n=16)	31,8% (n=34)	18,7% (n=20)	34,6% (n=37)
Internet / WWW	95,7% (n=176)	3,3% (n=6)		1,0% (n=2)	32,5% (n=38)	49,6% (N=58)	12,8% (n=15)	5,1% (n=6)	12,1% (n=13)	56,1% (60)	18,7% (n=20)	13,1% (n=14)
Learning platforms									85,5% (n=94)	12,7% (n=14)	0,9% (n=1)	0,9% (n=1)

(119/2002), 42% of the Finnish teachers stated that the Internet had already changed the way they teach (of these teachers, less than 10% were language teachers). In language teaching the sudden access to various authentic materials (online magazines, newspapers, radio stations, and so on) has been of enormous importance. Along with an admission to a vast language materials depository, new means of communication have also become available. It has been central to emphasise both the resource and communicative aspects of the Internet and the WWW in language teaching, since the real potential of the resource is in the combination of the two. In this combination it is possible to allow for more individualised materials and different kinds of working modes. In Figure 24, the overall use of the Internet and the WWW is first presented before moving on to the nature of the use. As this figure demonstrates, the increase of the use had been overwhelmingly fast.

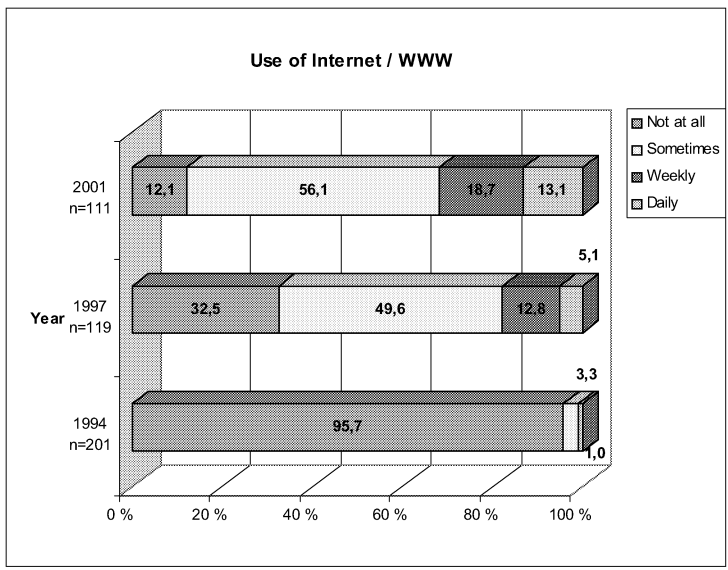


FIGURE 24. The teachers' reported use of the Internet/WWW.

In 1994 the Internet and its resources were rather uncommonly available in schools especially for teaching purposes as can be seen in the data. The question of whether the school has email facilities, the number of missing cases or "Cannot say" responses was 162 (80.2% of the responses). As many as 167 (83.1%) of the teachers had not used email. The pace of the development was astounding: in 1994, 176 teachers (95.7%) had not used the Internet with their students; in 1997 38 teachers (32.5%) said that they did not use the Internet in teaching; and in 2001, 13 teachers (12.1%) responded that they had not used the Internet with their students.

A look back at Chapter 4.4 on technology integration implies one more positive tendency which is the fact that the Internet/WWW use has become more integrated and focused. Internet pages were not replacing paper-based materials and were not just used as "background reading for an essay" on an one-off basis. The teachers frequently used not only language learning sites, but also the kinds of 'general' information resources that were mentioned in Chapter 4.2.2. In the communication domain along with 'older' e-mail exchange projects, Netmeeting conferences, simulations, Webquests were gaining in popularity and becoming more common (in other words, they were mentioned in some of the responses). Figure 25 illustrates this tendency by showing the growing number of teachers who used the Internet resources also for communication. This figure is highly descriptive, since the data is only partial and the division between the two types is based on interpretation only. The reported Internet used has been categorised as either being more resource - or communicative-based depending on the objectives of use the teachers described in their replies.

Another difference between the 1997 and 2001 responses is that the teachers have been more verbal in their descriptions of use. This could be interpreted as an indication of an increasingly confident and goal-oriented use of on-line resources and tools.

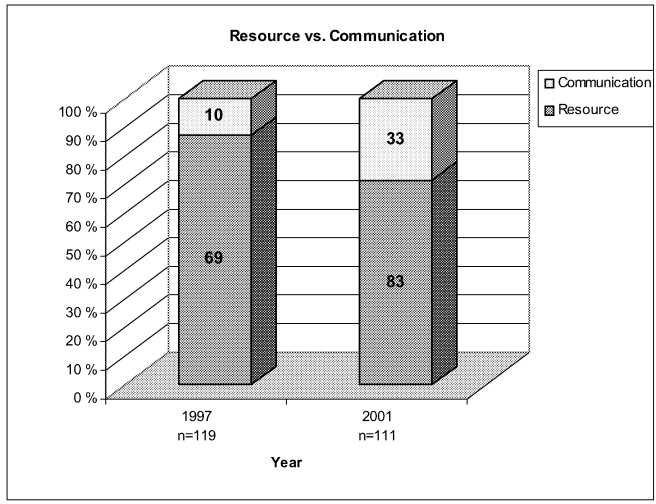


FIGURE 25. Communication vs. resource use.

5.4.2 Further Training

Further training, professional development, and staff training are regarded as keys to successful change. The question on the type of training the teachers have attended has been included in one form or another in all of the three questionnaires. The opportunities for further training in the vocational sector have always been relatively good, but the availability of suitable, pedagogically oriented ICT courses has not been encouraging until the recent years. In the area of language teaching there still is a void in this area. According to the Eurobarometer Flash (119/2002), 72 percent of the Finnish teachers have received an official training in the use computers, 60 percent in the use of the Internet, and 27 percent of the teachers have not received any official training. Only less than one fifth of the teachers had more than three years since the last training event. In the current data, the attendance in further training has clearly increased during the years. The overall attendance in the three data sets is presented in Figure 26.

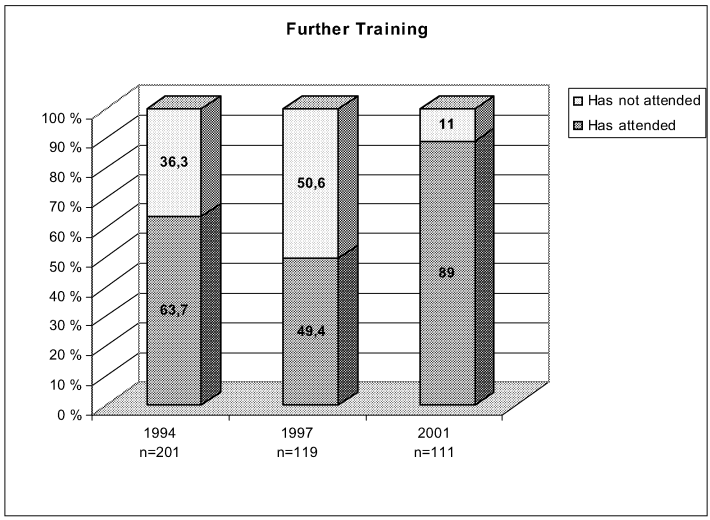


FIGURE 26. The teachers' attendance in further training.

The results do not strongly suggest that the opportunities to attend had risen considerably because of the information strategies; the attendance rate was very high as early as in the 1994 data set and grew from 63.7% in 1994 to 89% in the 2001 data. The number of the missing cases (n=38) in the 1997 responses prevents any valid comparisons between the years. This discrepancy is caused by the formulation of the question in the questionnaire: further training was associated with information strategies and the increased opportunities of attendance, and availability of suitable courses. It can be assumed that the attendance rate in 1997 was very similar to 2001. The reasons for non-attendance have not been explored, and it would be really motivating to add this dimension to the next data gathering. The reasons are probably multifarious and varied, and in many cases the teachers probably do not have control over the decisions made by the school administration.

The types of courses were also explored, but not all teachers had specified the nature of the courses. In 1994 most of the courses that the teachers had taken were for language teachers, whereas in

2001 the numbers were noticeably lower (21.6%, n=24), but in 2001 the course selection was considerably more wide-ranging including courses on the Internet, WWW, multimedia, and on-line learning. In 2001, 20 teachers (18%) had attended general computer courses, 24 teachers (21.6%) teachers had attended courses on the Internet/ WWW, 13 teachers (11.7%) had taken a course in on-line teaching, and 44 teachers (39.6%) had participated in further training on other types of courses for language teachers.

In the chi square tests further training did not show any statistically significant correlations with any other variables in the study. It would probably be too far- fetched to claim that the further training that the teachers had had access to did not bring about any permanent change in their way of teaching and the way they relate to the use of ICT for instructional purposes. But there probably is some truth in this at least on the basis of the data in the current study, because of the fairly large amount of time spent on training courses and the invisibility of the effects of these courses on the teachers' classroom practice.

5.4.3 Ideal Use: Emerging Practices – Innovative Use?

As has become apparent above, the opportunities for technology integration are many and the nature of integration varies from one context to another, from one classroom to another. Even if it is both difficult and risky to judge the practices from the outside, an interpretation is nevertheless attempted in this chapter of the reported pedagogical visions of the teachers in this study. The aim is not to assess these visions per se, but to see what kinds of innovative or emerging practices can be detected in the teachers' responses to the question about their ideas on ideal use of technology in their teaching. The responses from all three data sets will be also be compared to see if any directions and tendencies of change can be identified.

Since this is a complicated issue, support from available literature and studies of teachers' pedagogical practices are used to

establish the framework within which to explore the current data. Innovative practices can have different interpretations and connotations in different countries (Roberts 1998). In the European context alone, the discourse can be significantly different. When in Finland the emphasis is on new ideas and creative responses, in Britain and Belgium the concept is associated with reform with the focus on planned or external change in systems and structures.

The Apple Classrooms of Tomorrow (ACOT) research project conducted a ten-year study on the impact of technology on teaching and learning (Apple Computer Inc., 1995). It was a structured teacher development programme where "powerful technology and effective instruction were joined". The objective was to extend teachers' views on teaching and use technology as a catalyst and means for putting the extended views into practice. Table 13 (next page) shows the chart that the researchers used to define the key elements, roles and characteristics of traditional and extended views. The dichotomies in the chart present the "worst and best case scenarios" and offer no scales or compromises in between. From today's viewpoint, the table serves as a good reminder of the different areas of classroom practice, and also shows that the ACOT project was ahead its time 1995 when launching the project. The research project itself was immense and incorporated co-operation between universities, schools, and corporations and included different approaches, themes, and research groups as well as research objectives.

TABLE 13. The ACOT chart on teachers' traditional and extended views on learning.

	Traditional (instruction)	Extended (knowledge construction)
Activity	Teacher-centred and didactic	Learner-centred and interactive
Teacher role	Fact teller and expert	Collaborator and sometimes learner
Student role	Listener and learner	Collaborator and sometimes learner
Learning emphasis	Facts and replication	Relationships and inquiry
Concept of knowledge	Accumulation	Transformation
Demonstration of success	Quantity	Quality
Assessment	Norm-referenced and multiple guess	Criterion-referenced and performance portfolios
Technology use	Seat work	Communication, collaboration, information access and expression

One of the sub-themes for research concentrated on teachers' beliefs and practices with a longitudinal approach to the evolution in them (Dwyer et al., 1990a). The results imply profound changes in teachers' approaches to teaching practices, but these changes had not taken place just by placing computers within the teachers' reach: comprehensive training and learning technology support was implemented within the research setting. The second part of the study (Dwyer et al., 1990b) describes the data gathering process and the results of this four-year sub-study. According to the results, the direction of change was towards learner-centred rather than curriculum-centred instruction, towards collaborative rather than individual tasks, and towards active rather than passive learning.

In one digest of the initial ACOT report, Rein (2000) explores the most advanced steps in the teacher's development process (the original steps are included in the Dwyer & al. reports from 1990). There are altogether five steps (Entry, Adoption, Adaptation, Appropriation and Innovation) the last two of which are considered to include definite signs of emerging and innovative pedagogical practices:

Stage Four, Appropriation stage takes place when teachers begin to leverage technology for things that it can do best and uniquely makes possible. At the appropriation level teachers consider their teaching objectives, the best way to approach those objectives, and the best tools. This is when technology opens possibilities for higher order thinking, collaboration and cooperation, enhanced comprehension, problem solving, etc. The teachers loosen up the classroom management structure, and instead of a structured computer schedule, computers are more seamlessly integrated into any learning sequence. Student tasks are more holistic, open-ended, and multidisciplinary.

Stage Five, Innovation (or Invention) is described as the stage where the teacher begins to question and explore alternatives for some of the fundamental routines of teaching (that is, the way in which 'the establishment' assumes and claims learning to take place). Learning activities are varied both in terms of time spent on them and in terms of the goals. Technology is an ever-present but transparent part of the curriculum.

The key distinguishing factors of the classrooms of teachers at the Appropriation or Innovation stages (in comparison to the three earlier stages) include at least some of the following: students work at different tasks taking on a variety of roles, including acting as experts after investigating a particular topic. Students collaborate, applying themselves to different aspects of a project, and then bring their collective accomplishments and knowledge together to produce a new result or understanding. Technology is used to do things that could not have been done without it: contacting distant experts or collaborating with another class and sharing data over the Internet. Teachers employ a variety of assessment methods, including performance assessments, peer-review, self-assessment, tests and quizzes.

A more recent scheme for identifying innovation and new approaches to teaching and learning can be found in the IEA SITES study series. Kozma (2003) outlines the distinction between traditional and emerging practice as being in the learning objectives:

traditional practises focus on skills development and on keeping track on all student progress, whereas emerging practices are more tuned in supporting the learners in becoming more active and responsible for their own learning, engaging in co-operative projects and information searches and deciding over their own pace of working. The interplay in the pedagogical setting is understood as taking place between teacher, student, curriculum content and goals, and instructional materials. It is worth pointing out, however, that teaching is in a way always about skills development. The focus is on defining the core skills which then are learned in pedagogic settings, and it is the pedagogical settings that can be evaluated on the traditional – innovative scale. In the evaluation the emphasis is on the ways in which students work with the material to be learned, the ways in which they can approach and construct meaning that makes sense to the students themselves.

The conceptual framework in the SITES research modules is presented in Figure 27. The framework is a comprehensive account of the features and factors that are associated with school improvement and have influence on the outcomes of technology integration in teaching. The idea of innovative pedagogical practices is embedded into a set of levels that influence and also mediate change. The causality between the different levels is multidirectional, the point being in the interdependent, systemic nature of the framework as a whole.

The micro level has the following components: teacher; student; curriculum content and goals; the instructional materials, and ICT infrastructure. The main interest in reference to innovation is to find out how innovative practices can be enabled and constrained by the computer-based technologies. These new practices can deal with the searching, sorting and communicating of information in ways that have not been possible before. The outcome can be new learning activities, new products, and new types of learning. At the meso level a strong linkage is made between leadership and supportive organisational environment. It is likely that new practices will evolve in an environment where the leadership is in favour of the changes

and where the changes and new ideas fit well into the curriculum. The sustainability and transferability of the ideas is more achievable if there has been a problem area that has been addressed by an attempt at finding new approaches and solutions to the situation. At the macro level the classroom practices are affected by the national and policy documents, international trends in, for instance, curriculum, assessment and professional development programmes. In the SITES study these global forces (such as the emergence of information society) and the international trends were in some cases thought to cause tension and to have imposed changes on the national and local policies from the outside.

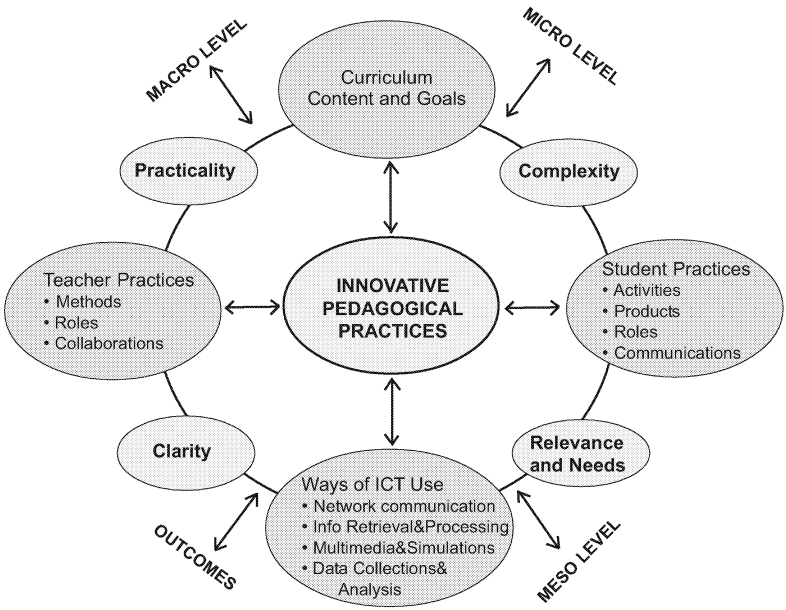


FIGURE 27. Conceptual Framework for Innovative Pedagogical Practices (Kozma, 2003)

It will be necessary to be able to apply these criteria to the classroom level in the present study. The focus is on the smaller units of the realisation of the pedagogic practices in relation to the ICT use in the task designs and example activities that the teachers report to use or plan to use. In this context task designs refer to the pedagogical 'lay-out' of the learning activity or chain of activities. It is important to remember that in the language teaching context it is not always possible to avoid being somewhat material-centred or rule-based as the learning content requires the establishment of a 'structural knowledge base' on which more advanced use of the language can be built. But the task designs can nevertheless vary and bring in aspects of new ways of teaching and learning.

In the present study emerging practices/innovative use are explored on a semi-imaginary basis: in the questionnaire, question number five (four in the 1994 questionnaire) was an open-ended question asking the teachers to describe the ideas they have for technology use without thinking of potential obstacles and problems that they might have in putting these ideas into practice. This was a deliberate approach since this is the closest one can get to the teachers' way of thinking by means of a survey. Had the teachers been directly asked about their pedagogic practices, the result would have been (along with the accurate descriptions) everything ranging from make-believe scenarios of school book examples of 'good practice' to lists of reasons that prohibit the teacher from teaching the way s/he would like to. There were strong indications of this in the 1994 questionnaire, where there were separate questions about actual use, possible obstacles of use, and ideal use. The ideal use question seemed to produce the most illustrative responses.

In the analysis of the responses, the time-wise 'localised' aspects have been taken into account. Such aspects include the way in which the teachers formulated their answers, the main concerns in the discussion of the development efforts within the language teaching of the period, and the commonness and availability of technological resources in schools. Furthermore, the specific features of language teaching in the vocational education context have been

acknowledged. These features include, for instance, the varying status of language skills among the key skills of the becoming professional (internal, school specific emphasis and external, labour market perspectives), the status of language in the curriculum as general subjects (versus vocational subjects) and the student body of very different language learner backgrounds, levels and interests (or lack of thereof) (see for instance Lampinen, 1995, Juurakko & Airola, 2002, Taalas 1995).

The key point in the analysis has been to identify the emerging pedagogical practices versus traditional practices. The emerging practices have been named as innovative even if the actual *innovativeness*[10] of the ideas couls be questioned. Moreover, there are many reasons for teachers' non-innovative use of ICT, and it would be highly unjust to infer from these results only that these people would not be innovative in their classroom practices in many other ways which are not in the focus of this study.

In 1994, the following approaches were considered innovative:

- Process writing or any similar, relatively new approach to the writing process – to do with the idea of using language in a diversified way and working with texts in a more process-oriented way.
- Use of the computer for retrieving and storing of information – to do with the idea of literacy skills and constructive work around and with information.
- Student presentations where the advantages of new information technology have effectively been used (sound, animation, slide shows etc.) – to do with the sharing of interpretations and having real audiences for student work.
- Responsibility for learning has been shared with or given to an individual learner – to do with the idea of supporting learner autonomy and self-directed learning.
- Natural and genuine integration with other subjects – to do with the idea of language skills being integral parts of professional/

10 Defining innovation as: people using new knowledge and understanding to experiment with new possibilities in order to implement new concepts that create new value. (adapted from ThinkSmart.com).

occupational competence and best learned when integrated with other professional/occupational skills.
- Teaching content in a foreign language – to do with the idea that language teaching should be more closely integrated in the content areas that the students work with.

In summary, the emerging practices here deal with the idea of breaking the curriculum barriers, using languages as tools for doing learning and supporting language learners to become more independent.

In 1997, the following approaches were considered innovative:

- Attempts to clearly find more learner-oriented ways of organising the teaching setting (flexibility in task selection, individualised pace of working, shared interests as basis for group formation) – to do with the aims of re-structuring the learning sequences by including alternate paths for students to take and the idea of supporting learner autonomy and self-directed learning.
- Individualised teaching and learning, efforts concentrated on making learners more aware of their specific learning needs and styles (not just with learner style charts and analyses) – to do with supporting of learners to become more self-directed and aware of their own learning.
- Integrative use of the Internet in a wide-ranging manner (critical information searches, use of various electronic reference tools, e-mail projects, use of chat channels, and MOOs) – to do with inclusion of different kinds of communicative elements into course structure and allowing students to work with information from many different sources (moving away from the 'teacher regulated world').
- Use of video conference or Netmeeting as a communication tool in project work between groups working at a distance – to do with the idea of including more communicative, networked elements in teaching practices and implementing the idea of shared expertise.
- Use of simulations and real life tasks – to do with the idea of including doing by learning and bringing multiple representations into the learning setting.

In summary, the emerging practices centre around making the learning setting more learner-centred and flexible.

In 2001, the following approaches and practices were considered innovative:

- Attempts to clearly find more learner-oriented ways of organising the teaching setting (flexibility in task selection, individualised pace of working, shared interests as basis for group formation) – the same as in 1997.
- Individualised teaching and learning, efforts concentrated on making the learners more aware of their specific learning needs and styles (not just with learner style charts and analyses) – the same as in 1997.
- Integrative use of the Internet in a wide-ranging manner (critical information searches, use of various electronic reference tools, e-mail projects, use of chat channels, and MOOs) – the same as in 1997.
- Use of video conference or Netmeeting as a communication tool in project work between groups working at a distance – the same as in 1997.
- Development of critical literacy skills in finding, sorting, evaluating and presenting information, development of transferable skills (for instance, learning about technology in the target language) – to do with a clear focus on literacy skills and the inclusion of continuous learning skills (or transferable skills) in the study objectives.
- Integration of holistic assessment methods along with varied working modes into the course framework (goal setting, criterion-based evaluation, process orientation) – to do with the idea that new learning settings and structures cannot be realised unless the evaluation and assessment practices are adapted and modified according to the changes.

In summary, the emerging practices in 2001 are categorised in a very similar manner to the 1997 categorisation; the additions are in the domains of assessment and evaluation practices and the support for transferable skills (including literacy skills).

A comment often repeated in the teachers' responses was that not all of the ideals were not possible to implement since the amount of contact teaching was decreasing and the need for basic language

teaching was increasing due to the heterogeneity of the student groups. Many of the teachers who did not use computers responded that they emphasised oral skills in their teaching and therefore computers had no role in their classrooms, since the teaching content was mainly aimed for the preparation of the students' oral presentations. It is a very narrow view when we think of the content of the oral presentations: where are they prepared and how, where does the content come from? And what is the target audience for the oral presentations in a classroom of 25–30 students? The other students? How is their motivation ensured to listen to all these presentations? Another quite common comment was the claim that students use computers too much as it is: they should have more human contact, and the language classrooms can be safe havens where technology has no role. These are all valid arguments, but they clearly show that the point of learning technologies as learning tools has been profoundly missed.

Some of the replies were too vague to be classified as innovative ("self-study material", "new learning structures") and therefore the interpretation of the actual pedagogical thinking may be inaccurate. To avoid this as much as possible, the teachers' previous replies on how they currently use technology have been used as supporting evidence since many teachers explain their pedagogical ideas when describing their current use. An illustrative example (1997) is a teacher who says that an ideal use would be "doing more information searches". To the earlier question on how she uses the Internet/WWW she has replied that with a set of www addresses she allows the students to look for information. But she would always check the search path beforehand to keep the students away from "unwanted" pages. The interpretation here would be that the ideal use is traditional since there is no indication of the teacher using the information searches for any higher teaching goals (critical information literacy, information searches for a purpose etc.) than for merely locating pieces of information. Neither is there any indication of task design where the students would have learning objectives other than locating the information the teacher already

has found for them. An example from 1997 where the teacher's ideal use has been interpreted as innovative is when the teacher has explained under Internet/WWW use how they work in an international newsroom project where the students produce a joint newspaper in different languages as one of results of the co-operation. As an answer to question five the teacher simply hopes that they will get e-mail connections for the students as well, so that they can include project work and more structured e-mail co-operation in the overall study plan for the whole year.

Figure 28 shows the results of the analysis. In 1994, according to the classification of emerging practices, 30.8% of the described ideal use included innovative/emergent pedagogical ideas and practices. In 1997 the number had decreased slightly to 26.1% on its way to the 2001 data, where the percentage has fallen to 17.5. There are different reasons for the drop: firstly, the differentiating criteria between the categories have become more demanding as the teachers' awareness, further training and exposure to new ways of teaching have been assumed to have increased along the years. On the other hand, the time pressures and the vanishing hours of contact teaching in the general subjects in vocational education had possibly turned the teachers' task into a catch-22 situation: ever increasingly heterogeneous groups of students and even less time to spend on the core content. Finding time for adequate further training in the new learning environments and experimenting with various new ways of teaching and course settings may simply be an absurd idea. Yet, the question in the questionnaire was on ideal use and the realities of life could have been put aside for just a moment to describe one's true aspirations.

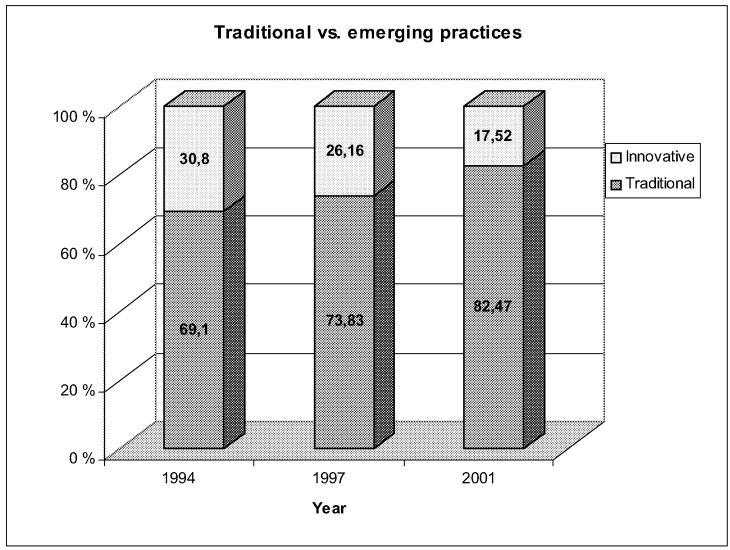


FIGURE 28. Imerging versus traditional practices.

In the chi square tests two statistically significant correlations were found. There was a strong positive correlation (p=0.008) between innovative pedagogical practice and frequency of use of tool programmes. This fits well with the idea that innovative practices include a move away from more fixed and closed materials and applications. The use of tool programmes can be adapted to very different types of learning objectives and learning activities. A statistically very significant dependency (p=0.00) was also found between innovative practices and positive overall attitude towards use of technology in teaching. This correlation is an expected outcome. What is more unexpected, however, is that use of any of the latest technologies (the learning platforms or the various Internet technologies) did not correlate in a statistically significant way. Neither did the further training that the teachers had participated in or the various projects or types of projects that the teachers were planning or taking part in.

5.4.4 General Attitude

The teachers' general attitude towards ICT in teaching is re-constructed from the overall ambiance of their responses. The interpretations have been cross-checked with two other readers, so any wildly incorrect interpretations should not occur. Figure 29 indicates that the general feeling is an increased positive attitude towards using technology in teaching. In 1994 some of the teachers were quite aggressive and hostile in their responses; this type of behaviour was not at all noted in the two later data gathering rounds.

In the 2001 questionnaire there was a question of whether the teacher could be contacted for further questions and a possible interview. Over 90 teachers replied yes, 10 explained why it would not be possible, and 25 teachers (21%) said no. This can be taken as a positive signal and an invitation to further inquiry and cooperation with the teachers.

In the chi square tests this variable correlates in a statistically very significant way with many other variables in the study. As can be expected, a correlation between attitude and use of computers with students can be detected (x^2= 15.894, p=0.014). A very strong positive dependency was also found between the overall attitude and the use of the Internet with students (x^2=15.044, p=0.000) and between overall attitude and innovative visions of computer use (x^2=27.937, p=0.000). A significant dependency was found between overall attitude and use of tool programmes (x^2=24.086, p=0.001) and use of multimedia learning packages (x^2=15.554. p=0.016). No other positive correlations were found. It can be assumed that the positive attitude is the catalyst for experimenting and trying to find new ways of teaching. It seems that between the years the positive attitude towards technology had become more and more common. It is, however, not just the teachers' positive or negative attitude that alone will determine the way in which things progress. The working culture in the schools either supports or prohibits a growth of the kind of teachership that carries on the demands of change and development in the everyday work. A combination of good

working climate, suitable teaching personalities, and wide-ranging training opportunities would most likely encourage sustainable development in the teaching culture.

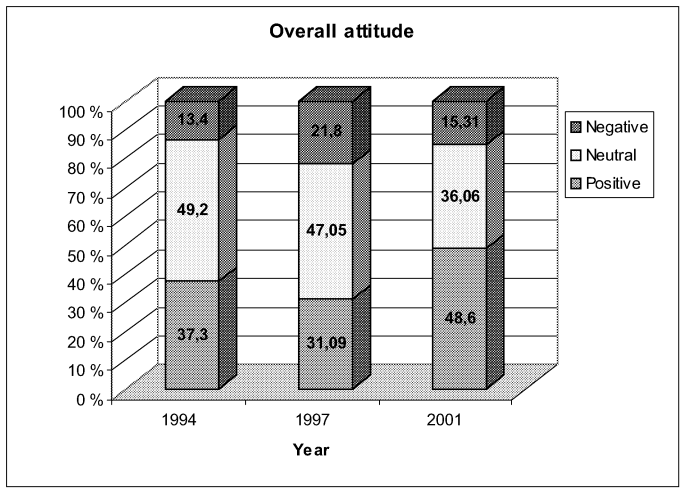


FIGURE 29. The teachers' overall attitude to computer use.

6 Reflections from Part I

The results presented in the preceding chapters portray snapshots of the gradual changes that had been taking place in language teaching in the vocational sector. Generalising these results to language teaching in Finland, may not be wise and perhaps not even possible. But these results certainly function as indicators of the overall situation and provide an interesting contrast to the information available through other sources. The snapshots give first hand information about the working life of the teachers, and each questionnaire offers a direct link to a practising language teacher.

Due to the survey method, many aspects and issues have probably not been asked about and explored, but a great deal has been unveiled and discovered. Implications of this part of the study are discussed further in Chapter 11, but already at this point it can be concluded that the integration of technology in the language teaching practices is not as extensive as could be assumed when considering all the strategic measures in the recent years.

It will be important to update the data in the future, since the longitudinal nature of following the progression is very important. Despite the shortcomings of the data gathering method, there is no other way of reaching such a vast cohort of teachers, and of gathering numerically comparable data. The next data gathering round (in 2005) will include more focused questions on the changing structures of assessment and learner guidance. Also the local development efforts, strategic initiatives and general atmosphere towards new structures should be explored as background variables. A more effective way of really learning about teachers' way of thinking needs to be included in the data gathering methodology: an extensive survey round will still be needed but more individualised ways (such as interviews and on-site observations) of data gathering will be used.

The results of the first part of the study leave many questions unanswered. There are local and pragmatic aspects of change that cannot be captured by predetermined questions that are targeted at individual teachers and will result in personal interpretations of the situation. Even for strategic planning, more holistic view is needed especially in the sense of including more thorough assessment of change as a multivariate, multidimensional process. Part II is needed so that change can be addressed and examined as an organisational process.

Part II:

Building an Understanding of a Change Process

This on-site development section of the study builds on a theoretical framework for systemic development combined with a description of an on-site development project where language learning and new ways of integrating ICT into organisational practices are in the core of the change process. The guiding principles in the development are to combine the organisational and individual levels in a project that would eventually lead to sustainable changes in the working culture of the institution in question. The theoretical framework is built on a systems view of professional development and an adapted combination of theories in the area of organisational learning and educational change. This part is meant to explore the language teaching context in more detail and through that exploration hopefully give more perspective for the findings in Part I.

7 The Study, its Methods and Approaches

The main focus of inquiry in Part II is to better understand the mechanisms of change in an educational organisation. More specifically the context is in language teaching and learning. From the development perspective the case offers a window to the multifaceted and dynamic environment in which language professionals work.

From the research point of view this second part offers interesting methodological challenges. The first consideration is the role of the researcher in the process. The researcher is the same as the planner and coordinator of the development project. Second, there is not just one area of study and not just one set of 'things to improve or change', and so there are no results in the pure sense of the word. Instead, there are things to be learned from the process in both good and bad, and the report on the process is the main content of this second part. Moreover, the organisation in question has a

long history of development work, and it is impossible to pinpoint within which development cycle the different elements of development and their foundations have been created.

The study itself takes place in a dynamic learning environment where it is very difficult to isolate certain phases or stages. Many researchers acknowledge the problem of the dynamically interacting systems (see for instance Barab and Kirshner, 2001). According to them, the dynamic volatility caused by one person's actions within a community of learners makes the application of structure-based research methods quite unfeasible.

In search of an applicable methodological approach and a suitable research instrument an attempt was made to use the paradigm of the design-based research as the basis for the study (The Design-Based Research Collective, 2003). The paradigm "blends empirical educational research with the theory-driven design of learning environments" (p.5), and the idea is to better understand how, when and why educational innovations work in practice. The aim is also to attempt to close the credibility gap of educational research. The authors propose five characteristics which design-based research should show evidence of:

- Central goals of designing learning environments and developing theories of learning are intertwined.
- Development and research take place through continuous cycles of design, enactment, analysis and redesign.
- Research on designs must lead to transferable theories that help communicate relevant implications to practitioners and other educational designers.
- Research must account for how design work in authentic settings.
- The development of such accounts relies on methods that can document and connect processes of enactment to outcomes of interest.

It is also important to note that the goals and design constraints are always drawn from the local context. The researchers work together with the practitioners in order to make meaningful change in the real contexts of practice. Real life links to the practitioners' work are

secured by this principle. So far the paradigm seems suitable for the current study as well, even if the aim is not to develop new theories as such. But as the authors describe the paradigm further, a gap between the aims in this study and the requirements of the method starts to develop. Design-based research requires "thick descriptive datasets, systematic analysis of the data and consensus building within the field around interpretations of the data". Triangulation of the multiple data sources is also expected. Very rightfully the authors voice a concern that design-based research should not become a euphemism for 'anything goes' research and oversimplified interventions. Even if the current study cannot by any means be called an oversimplified intervention and many of the underlying principles tie well in with it, it does not have the required data gathering instruments in place and the paradigm in all fairness can only in parts be applied to it.

Systems inquiry is another recent research approach to change and development in the new designs in education. According to Banathy and Jenlink (2004), systemic reform or systemic approaches to educational renewal remain "hollow and meaningless rhetoric" unless systems inquiry is adapted as one of the research approaches to education. The notion of systems inquiry encompasses concepts that are common to all kinds of systems and acquiring a systems view of education means understanding and describing it as a system. From this understanding come the insights into ways of knowing, thinking and reasoning in a way that makes it possible to apply systems inquiry to educational systems. The authors present three models that can be used as lenses for the understanding and analysing of educational systems as open, dynamic and complex systems. These three models are: the systems-environment model that helps to describe an educational system in the context of its community and the larger society, the functions/structures model that focuses on what the educational system is at a given moment in time, and the process/behavioural model that focuses the inquiry on what the educational system does through time. It would be an overstatement to claim that all these aspects would be included in

this study, but it is well-founded to claim that they are very much present in both in the planning and carrying out of the development process.

As Richey et al. (2004) point out developmental research projects are such complex and novel phenomena that they may resort to multiple research methodologies and designs at various points in the project. They mention case studies, in-depth interviews, field observations, expert reviews, surveys, literature reviews, document analyses, and think-aloud protocols as possible data gathering methods and approaches. Case study research, as Stake (1995) defines it, includes many features that correspond well to the ideological foundations of this study. The case is seen as a 'bounded system' where the case itself is seen as a process and not a product. There should however be evidence and report on rigorous research methods and theoretical relationships throughout the research project.

Action research is an often used method in educational development projects (see Carr and Kemmis 1986, Elliott 1991) where the on-site efforts are aimed at improving the quality of an organisation and its performance. It also offers teachers an opportunity for reflecting and assessing their own teaching/materials/new ideas together with colleagues. This method has been used in the previous development cycles at the institution in question in this study, and has proven to be a constructive method for cohesive and collegial research. In this study there are features that fit well with the principles of action research. First of all, the researcher is herself involved in the development process as the coordinator, and secondly, the underlying objectives and working modes in this study have very similar thematic underpinnings than action research.

As for strategic development tools Szabo and Sobon (2003) have used the innovation diffusion theory (Rogers, 1995) and Fullan's (1993) professional development model as the framework for change and reform in a higher education context in the use of ICTs in teaching. Their reform system starts with a vision building and sharing retreat for the chief academic officers of the selected

institutions followed by a year of training and support programme where that vision was shared on-site with the help of department-based teams. The results show interestingly how the administrative people and teachers do not always share the same language or form their understanding of the same occurrences in a very different way. These individual issues were noted as a big challenge for the university to overcome with respect to the adoption of ICT innovation into its core practices. From the point of view of the current study, these results confirm the importance of making the human side of change into the primary focus of action (see for instance Evans, 1996).

Another strategic tool is offered by Lueddeke (1999) who introduces the Adaptive-Generative Development model (A-GD) to help managing academic change and decision-making. He argues that in the current development efforts, the traditional characteristics of academic organisations are undermined and overlooked. He further claims that there are few realistic and workable models available for guiding the process of change in higher education. The central assumption in the model is that "change results from the shared construction of meaning facilitated by a truly interactive, inclusive team". There are six interrelated elements: Needs analysis, Research & Development, Strategy formation & development, Resource support, Implementation & Dissemination, and Evaluation. These categories are further divided into twelve sub-categories and supporting questions are provided for implementing each of these. The stages of the development process in the present study have similarities with the A-GD categories but they have not been implemented as rigidly and systematically as the model suggests.

There are reports of studies where professional development has been directed at specific areas of technology use. One such study is the Integrating Strategies and Technology in Education Practice (InSTEP™), where rigorous training workshops and their follow-up activities are the means for change (Schmidt et al. 2002). The primary focus of the training is not on technology but on constructivist teaching practices. The research carried out in the programme has shown that teachers see the benefits of integrating technology into

their teaching if they have first discovered the constructivist framework. This approach sounds interesting and could probably be well used in the mass cohort trainings in Finland too. For the current study, the scope is, however, too narrow and lacks the systemic rooting.

It can be concluded that the research methodology, strategic tools and development focus in this study are a combination of the features and methods of all of the frames of reference discussed above. Much of this work is a description of an individual case. Data (interviews, questionnaires, reports) have been gathered during the process, but they have been used to adjust the goals and re-direct the efforts along the way and have not been analysed as such. This study has its main importance in increasing the understanding of the factors affecting change in a teaching organisation when functional models and tools for multimodal language learning environments are being developed. It has been a conscious choice not to have any measurement instruments embedded in the process, because there lays the risk of superficiality and performance-based approach to the development. This study is rather an illustration of a process than a research-based analysis of it. The process itself has been designed on the basis of the theoretical principles and earlier studies described in the text. Systemic approach to change is one of the key elements underlying the design.

8 Setting the Scene

8.1 Systems View – Systemic Change

A systems view is not in itself a theory; it is more a way of thinking, a way of looking at things (see Banathy, 1973). It can be developed through an examination or observation of a system. It empowers us to think of ourselves, the environments that surround us, and the groups and organisations which we live by (Banathy & Jenlink, 2004). According to Banathy (1973, 1–3), systemic development starts with an understanding of the principles by which a system functions. This understanding forms a conceptual scheme which outlines the systems model which is internalised into one's own thinking. The model functions as an abstract image, or as a frame of reference to be used when reality is interpreted in different contexts and that interpretation is shared with others.

Systemic change is change that occurs in all aspects and levels of the (educational) process and affects all of the people included in it – students, teachers, parents, administrators, and community members. It is a cyclical and dynamic process that requires constant communication and evaluation and has implications for curriculum, instruction, assessment, and professional development.

When it comes to school reform and change, it seems that the efforts are often focused on one instructional issue at a time instead of looking at the current situation as a complex setting with complex mechanisms and interlinked chains of function. Banathy (1991) says that this is at least partly due to the fragmented study of education where the various scholars present partial interpretations of the system. He compares the situation to a group of blind men trying to describe an elephant by touching its different parts (p. 9). He further claims that the prevailing approach to research still lies within the strict scientific worldview where every problem has a definable cause and by fixing the cause the problem will disappear. In the contexts

of schools, systemic change should be looked at as a philosophy advocating reflecting, rethinking, and restructuring, and not so much as a detailed prescription for improving education.

Some other change experts say that the attempted changes themselves have become more complex. Robert Evans (1996) for instance states that there are first-order and second-order changes and many of the change efforts typically concentrate on the first-order change when they should be directed or at least include elements of the latter. By first-order change he means single, isolated issues and by second-order change he refers to systemic change which requires people to do a great deal more than do things just a bit differently; they need to alter their beliefs and perceptions.

Systemic change differs from the rational-structural paradigm in many aspects as can be seen in Table 14. Evans (1996) claims that the rational-structural paradigm is the prevailing one, and he is in agreement with Banathy's view of the scientific rule of change. The traditional model is rooted in three assumptions: stability, rationality, and structure. Change itself is seen as a product rather than a process, and it has a specified outcome. The main fault of the rational-structural paradigm is claimed to be that it ignores the people and the sometimes even haphazard turn of events that affect their daily work. The change is planned for the system as it is, and only minor changes, if any, to the status quo are accounted for during the process.

The strategic-systemic paradigm challenges the traditional suppositions of stability and causality. Systems approach has its starting point in the idea that the factors affecting a person or a group of people are complex and many. Peter Senge (1990), one of the major advocates of systems thinking, says that when making plans for change one should, instead of looking at static snapshots, look at the patterns of change. The core idea in the systemic change process is that one cannot change one single element without affecting the rest. In other words, systemic change both requires, but also offers, an opportunity to enact change while moving beyond thinking about individuals and individual organisations, single problems and single

solutions, the interactive loops within these must be acknowledged and recognised. As will become apparent in the coming chapters, the development process in the present study clearly has the characteristics of the strategic-systemic approach.

TABLE 14. Change paradigms.

Rational – Structural		**Strategic – Systemic**
Environment	Stable Predictable	Turbulent Unpredictable
Organisation	Stable Logical	Fluid Psychological
Planning	Objective, linear Long-range	Pragmatic, analytical Medium-range
Innovation	Product Fixed Outcome	Process Emerging outcome
Focus	Structure, function Tasks, roles, rules	People, culture Meaning, motivation
Implementation	Almost purely top-down Disseminating, pressuring	Top-down and bottom-up Commitment-building ("purposing")

(Cited from Evans, 1996)

The introduction of Peter Senge's (1990) Five Disciplines has been a major breakthrough for systems thinking in the corporate world. It is systems thinking that Senge calls the fifth discipline, the other four disciplines being personal mastery, mental models, shared vision and team learning[11]. These are the elements that Senge claims to be crucial and indispensable if any profound change is to be achieved.

11 These ideas have also been adapted to school improvement and change (Senge et al., 2000) but strangely enough the handbook for educators has a very different tone and approach. It is almost as if the intended audience would not have as much understanding of the world as the corporate readers have, and the localising of the ideas sounds patronising and condescending in places.

8.2 Designing for Change

Never before has there been such recognition of the need of continuous professional development. The EU mantra on lifelong learning and the constant and changing demands on the educational structures and outcomes have created an era of CHANGE and development. Models for different kinds of professional development programmes are introduced with breathtaking pace. Restructuring of education seems to be on every political agenda. Change – whatever it may mean in various contexts – has become a permanent element of the working life of an educational professional.

A considerable amount of development work in the area of education and teaching has been criticised for being in one way or another detached from the actual work of teachers. The focus of development has been either on specific skills without any broader context or on the level of an individual teacher without the organisational link. In the educational technology domain the teaching has primarily focused on enhancing the technology skills of teachers. In a most simplistic example, increasing the teacher's knowledge of how to create www pages is assumed to lead to an increased amount of on-line courses (in a sad case scenario this may even happen). Instead of emphasising the mastery of operational skills teachers should be involved in defining an educational vision from which decisions about technology use will be made. As Fullan and Hargreaves put it "training is not learning, re-structuring is not re-culturing" (1996). In these words lies a major wisdom.

8.2.1 New Paradigms and Practices in Professional Development

The extensiveness of available models and toolkits for professional development is overwhelming. The focus is on 'training' and adopting new skills and techniques. In some cases these kinds of training programmes are exactly right for the intended purpose and have thus become dominant even in cases where the approach cannot be and will not be effective. The weakness of the 'tricks and skills'

kind of training is that there often are no real follow-up activities that would ensure at least some degree of integration of the new ideas into the everyday activities of teachers. It is in the integration process that the teachers get a chance to reflect on the effects that the new ideas have on the current practices and see where additional adjustments and changes are needed. These changes may deal with the current structures and practices of teaching, the resources available and the content and context of learning. In the case of technology integration, the time factor is important. Teachers will need enough time for digesting the world of technology, for exploring various ways of use, for experimenting with different pedagogical settings and learners, and for building their own relationship to technology. Superficial tinkering with the wealth of electronic resources will not allow for this kind of exploration. It is all too often that teachers are handed down other people's conceptions of technology and its potential uses, and such conceptions may well be incompatible with the teachers' lifeworlds. Also, as Guskey (1995) puts it, both the systems view and the impact of context are often overlooked in the development and change programmes. According to him, this is one of the reasons why there cannot be precise models for professional development. Only procedural guidelines can be proposed.

According to Miles-Grant (1996), teachers need to extend their vision of technology as an empowering tool for their own work and in their own situation. Technology cannot be seen as an end in itself but a tool for supporting the core practices in teaching and learning and also for supporting teachers' professional growth. Integration into teachers' on-going practices is important as it will push teachers to navigate the changes in their "pedagogical beliefs and habits" as their understanding of technology expands. The atmosphere around teachers should be supportive and encouraging as the learning process is likely to be frustrating at times and involves taking risks and running into dead-ends every now and then.

Professional development can in a way be seen as a reflective process where the capacity for learning is combined with the

teachers' practitioner knowledge and used as a basis for the new approaches. Capacity in the context of change is seen as an internal capacity for continuous learning, which will help the teacher to apply once acquired skills and knowledge to new and novel situations (Stoll & Earl, 2003). Capacity can also be a quality of the organisation, where it is a collective attribute and either supports or hinders change. According to Stoll & Earl (2003:502), "sustainability is the goal, capacity is the engine that will ultimately power the journey".

The principles that best fit in with the current development process design and progress are presented by Hall & Hord (2001) in their Concerns-Based Adoption Model (CBAM) of change combined with the framework that Fullan (1998) presents. Hall & Hord define change with twelve principles (the principles that have been applied to the current development process have been marked in bold):

- **Change is a process, not an event.**
- **There are differences in what is entailed in development and implementation of an innovation.**
- **An organisation does not change until the individuals within it change**
- **Innovations come in different sizes.**
- Interventions are the actions and events that are key to success of the change process.
- **Although both top-down and bottom-up change can work, a horizontal perspective is best.**
- **Administrator leadership is essential to long-term change success.**
- Mandates can work.
- The school is the primary unit for change.
- **Facilitating change is a team effort.**
- Appropriate interventions reduce the challenges of change.
- The context of the school influences the process of change.

Fullan's (1998) key change ideas are:

- **There is no panacea or model of change: there is no set of rules and principles that could be adapted to just any context, every process is different with different challenges and solutions.**

- **Change is a highly personal psychological issue: the change must carry meaning for each individual involved in the process.**
- Resistance and conflict are positively necessary: homogeneous groups are more stagnant while conflicting opinions and ideas in more heterogeneous groups are more likely to contain seeds of break-through.
- Improving relationships is the key to successful change: no amount of political advocacy or technical support will lead to success unless the interpersonal relationships function well.
- motion and hope are crucial motivators: development of emotional intelligence and connecting hope with the other four key factors are trails to constructive change.

Even if these are just lists of features, when combined with the more theoretical foundations presented earlier they make solid principles for understanding the change process described in the following chapters.

8.2.2 Evaluation Issues

There is an abundance of programme evaluation schemes available in the literature on school improvement, professional development and teaching quality enhancement. The emphasis of these schemes is very often solely on the process within the training programme (see for instance Kirkpatrick, 1998). Kirkpatrick's four levels of evaluation are: Level 1: Reaction: How participants react to the program; Level 2: Learning: What participants learned from the program; Level 3: Behaviour: Whether what was learned was applied to their job; Level 4: Results: Whether the application is achieving results. As can be seen, the evaluation is solely concentrated on the programme and its effectiveness. In the present study the scope is wider and more systemic, even if somebody could argue that the development cycle is, in a way, a training programme too.

Ethnography has sometimes been proposed and used as an evaluation framework for change processes in teaching and learning. Roberts (1998) points out that ethnography was never developed for evaluative purposes and it can almost be said to be adverse to

evaluation. She stresses that various ethnographic tools (fieldwork methods and techniques) may well lend themselves to evaluative purposes too. In her case study research of an innovatory development project in a language and cultural study course Roberts used a combination of the relativistic and comparative approach along with the holistic and reflexive habits of thinking and doing. For this study the work by Roberts gives interesting insights and also accredits and validates the 'telling' of a project process as a method of reporting a development project.

Even after an extensive reading of the available literature, the evaluation of the progress of change still remains an open issue. It is difficult to move away from outcomes-oriented evaluation and not base the evaluation on assumptions and general feelings only. This aspect requires considerable research effort in the coming years.

9 Background to the Case in Question

A development process was carried out at the Language Centre of the University of Jyväskylä. This process had as its main starting point the need of a more flexible and dynamic course structure, where the integration of technology would find its natural place in the teachers' pedagogical thinking and in the administrative procedures.

In this development process, many of the ideas, goals and principles presented in the earlier chapters of this study have materialised in a real life context of language teaching. The case has not been called a project but a process to indicate that this process would build and create permanent structures and behaviours without calling these 'outcomes' or 'results' but new institutionalised ideas and insights.

Figure 30 is the timeline for the third cycle in 2001–2004. The processes and concrete activities will be described further in the next chapters.

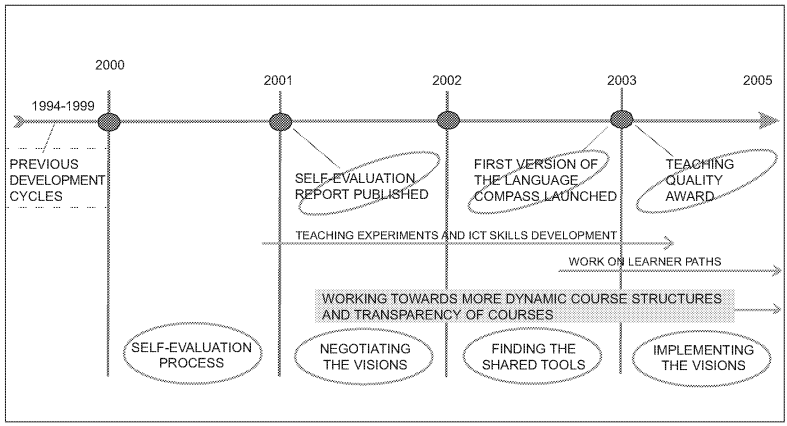


FIGURE 30. The timeline for the development process at the Language Centre.

9.1 The Starting Point at the Language Centre

The Language Centre at the University of Jyväskylä is an organisation dealing yearly with about 15,000 students from all faculties, providing language courses in 12 different languages equalling 12,000 study weeks (one study week equals approximately 40 hours of student work). The staff size is about 60, of whom the administrative personnel make ten, the full-time teachers twenty and the part-time teaching staff the rest. This means that half of the personnel have temporary contracts and the rotation of part-time teachers is fast. At the same time the Language Centre has a direct "pedagogical" contact with all the students, unlike any other institution at the university. This means that the Language Centre could well be in the nucleus of change in the learning culture at the university by demonstrating alternative ways for teaching and learning. This aspect is seldom recognised because of the low status of general language studies in the degree curricula.

Ever since the establishment of the Language Centre system in higher education in Finland (in the 1970s), and especially in the

earlier days, the Language Centres could not really take their positions for granted. At yet another turbulent moment, the discussion on whether to keep the Jyväskylä Language Centre or close it down worked as a catalyst for intensive development activity. The first cycle of development was initiated in 1994. Another development cycle followed in 1996. The third cycle was started in 2001. The first two development cycles and their aims, activities and outcomes can be seen in Table 15. The first action research cycle was about promoting learner autonomy and self-directed learning. The teachers worked in groups to produce teaching and assessment structures that would help achieve the planned goals. The activities included listening to one another's lessons and giving feedback on the teaching practices and joint discussions on features of good teaching on an academic level. The centre received the teaching quality award as a sign of work well done.

The second cycle focused on taking the support for learner autonomy and self-directed learning further. The ICT element was included in the process. The good practices from the earlier cycle were maintained. One tangible product of the cycle was the foundation of the learning centre planned and managed by the administrative personnel.

Following the two cycles, a one year self-evaluation process was carried out in 2000–2001. The results of the evaluation outcomes and findings were published in a report in 2001 (Kielikeskus katsoo peiliin). The process was a part of the University's internal teaching quality development project to identify areas where improvement is needed. The findings in the report are the foundation of the next development cycle described in the next chapter.

TABLE 15. The development cycles at the Language Centre.

	First cycle 1994-1996	Second Cycle 1997-1999	Self-evaluation 2000-2001
Aims	Towards reflective practice Towards learner autonomy	Promote the development of self-directed learning in all Language Centre teaching	Promote co-operation with subject departments Develop an internal and external feedback system to provide insights for pedagogical development
Action	Establishment of action research groups for: analysing teaching practices collegial observation, self and peer assessment joint forms of evaluation and development of readiness for self-directed learning	Seminar to agree on shared values strategic success factors and policies Learner surveys integrated into teaching Establishment of new action research groups which focus on a) developing a pedagogical framework for promoting self-directed learning b) experimenting with the use of new learning environments c) academic speech communication skills Biannual 'harvesting' seminars	KOLA self-assessment (as part of the University's internal teaching quality development project) Electronic feedback from students Visits to and interviews at subject departments Action research to enhance integration of subject teaching and language teaching
Out-comes	Increase of collegial co-operation, commitment, clarification of views, increase of awareness concerning the criteria and implementation of top quality teaching and learning, increase of information about students and their needs and preferences. University of Jyväskylä Teaching Quality Award 1996) Action Research Report	Concrete actions to integrate support for self-directed learning in teaching practices, increased understanding of changing learner and teacher roles, and of future needs and aims in developing teaching, learning, and the use of ICT. Action Research Reports 2–3	Self-assessment report: Updated information about the needs and wishes of the subject departments to be used for tailoring language programmes Report on integration experiments and experiences across departments (in Finnish) Launching of a more tailored development cycle on ICT integration

9.2 Tools and Processes for Development

Building on the principles discussed earlier of staff development and support for change, the content, working methods and objectives for the third development cycle at the Language Centre were defined and agreed upon. One of the main points from the very beginning was that this would be a process affecting both the individual and organisational aspects of the centre. Wagner (1993) affirms that any development project within education should have "a systemic reflection rather than reflexive reaction to outsiders" as the starting point. In line with this statement, the Language Centre's self-evaluation report and the earlier development cycles were used as invaluable tools to establish the goals and locating the desired and needed changes in the current practices. The evaluation report can also be identified as the needs analysis and R&D elements (as in Lueddeke's, 1999, A-GD model). The general idea was to start from the individual and organisational change needs, converting these needs into concrete actions; building cases in the real life context and through these cases share and communicate the evolving ideas to and with the others. Figure 31 is an outline of the objectives and systemic realities of the development project. Most of the figures in this chapter are original versions of the materials that were used during the process.

The underlying structures include the status of the Language Centre within the university organisation. The Centre is an independent teaching institute which receives its funding mainly from the general language and communication courses in the degree programmes and in the international exchange programmes. It is not responsible for complete study programmes and does not grant degrees. For this reason, the centre is sometimes associated with the service units like the library or the computing centre. Yet the Language Centre is a teaching unit with considerable pedagogical challenges with ever increasing demands on flexible teaching structures and with increasingly heterogeneous student groups. Without weighing the pros and cons of the independence, the sta-

tus does affect the way in which some of the faculty-based support channels are not automatically available for the Language Centre staff. For example, the disseminating and development seminars in the faculties are meant for the departments within the faculties only.

The culture of flexible and democratic leadership and a strong sense of collegiality among the staff were from the beginning the basis on which the process structures were built. A culture of team work was created in the earlier cycles and the staff was used to working in many different kinds of compositions. One very fixed form of team were the language groups where the teachers of the same language discuss various issues dealing with the courses, teaching practices, materials. The aspect of atmosphere and the culture of discussion are critical success factors for development work (see Karjalainen, 1991). For the third cycle the administrative staff was included in the core processes and formed a group for their own topics and discussions.

As had become evident in the self-evaluation report, the needs for development were two-fold: from the inside the need was to find ways, and learn how to integrate new technologies into the teaching and administrative routines, and from the outside more transparency and effort was needed in building bridges with the departments. From these aspects three focus points for development were formulated: integration of ICTs into the Language Centre practices, developing the assessment and feedback procedures further, and finally making the course contents more transparent for both the students and the departments. The new structures were to entail more concentrated learner guidance mechanisms and more integration of the ICTs and subject studies in the overall course structure. The development efforts were expected to result in new course structures, learner guidance as a continuing practice, and new pedagogical approaches in the form of multimodal teaching practices. The supervision of the project was shared by the external coordinator of this particular cycle, director of the Language Centre, and a steering group consisting of teachers and administrative personnel (the group was formed during the first autumn).

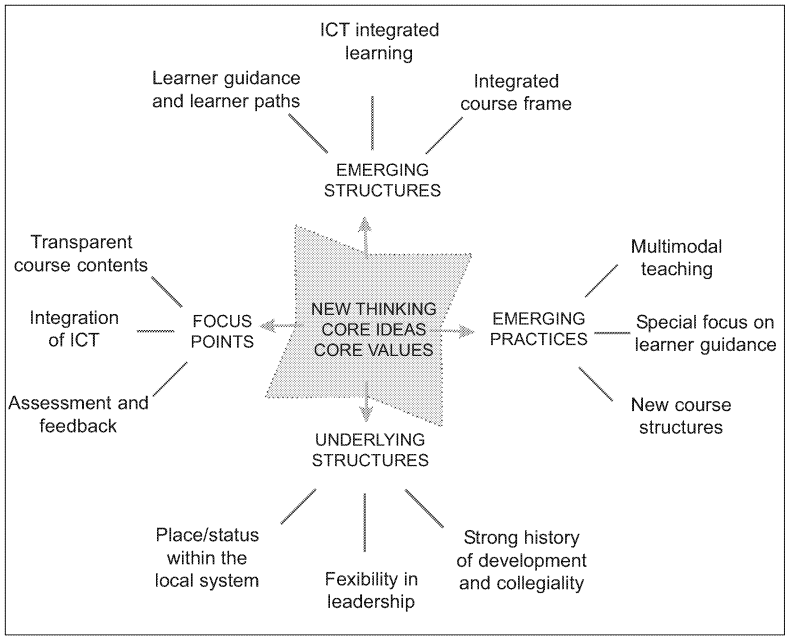


FIGURE 31. The framework for the development process at the Language Centre.

From this framework a concrete action planner was produced. "Think big - start small" was the guiding principle during the first steps of the planning. The original idea was that nobody would be forced to join in the process and the assumption was that about 10-12 teachers and a few administrative people would be interested in participating. As it turned out, almost all of the permanent staff and most of the part-time teachers joined in and started their experimental projects and skills development. Figure 32 demonstrates the action planner for the first year of the process. The activities were organised in a multilayered structure where the experiments, skills development and continuous assistance were the most systematic devices for development and in the core of the process. Joint staff days, study circles, external work counselling supported and maintained the movement. From the organisational side it was agreed that no teaching would take place on Wednesday afternoons,

so that all teachers had an equal opportunity to participate in all joint events. The concept of free Wednesday afternoons was taken even further after the first half year of the project: all full-time teachers got a 24 teaching hour deduction from the regular hours to be able to leave room in their weekly schedules for the development work.

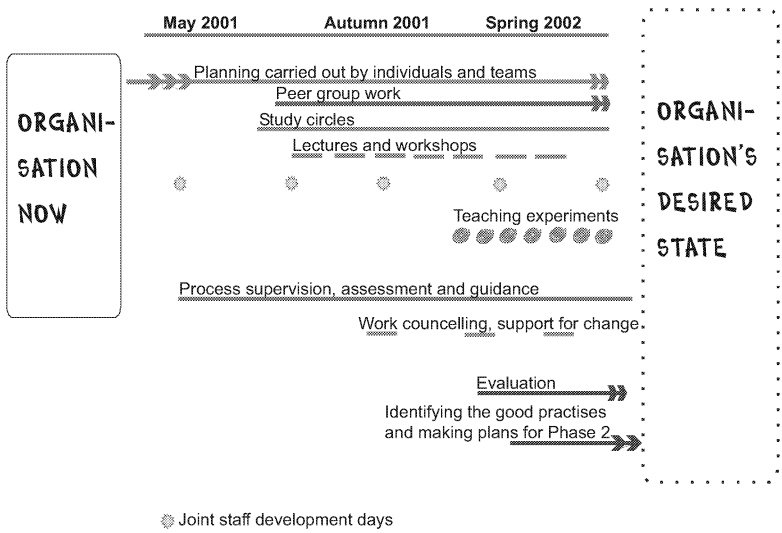


FIGURE 32. The Action Planner and timeframe for the first year of the project at the Language Centre.

The whole process was launched in May 2001 at a two-day seminar where the shared goals were negotiated and discussed. The emphasis was on focusing the goal setting on real life development needs in the whole organisation as well as on the individual level. The possible pitfalls were discussed at length and proactive measures were explored while the inevitable arrival of frustration was also touched upon. The social atmosphere at the centre is very open and conversational, so it was possible to carry on forthright discussions. Yet, small group and individual interviews were carried out in

addition to the whole group discussions to make sure all opinions and ideas had been heard and taken into account before moving on.

The instrument in Figure 33 was used for the initial analysis of both the individual and organisational development needs. Attention was called to the ways in which people carry on their current work and to changes that they would need along with the new approaches they would like to try out. Many of these change needs had to do with the integration of technology into the course framework and implementing new forms of assessment. The bottlenecks in the organisation side had to do with the access to information, some of the administrative software applications, and the overall course structure with the 6-week course system.

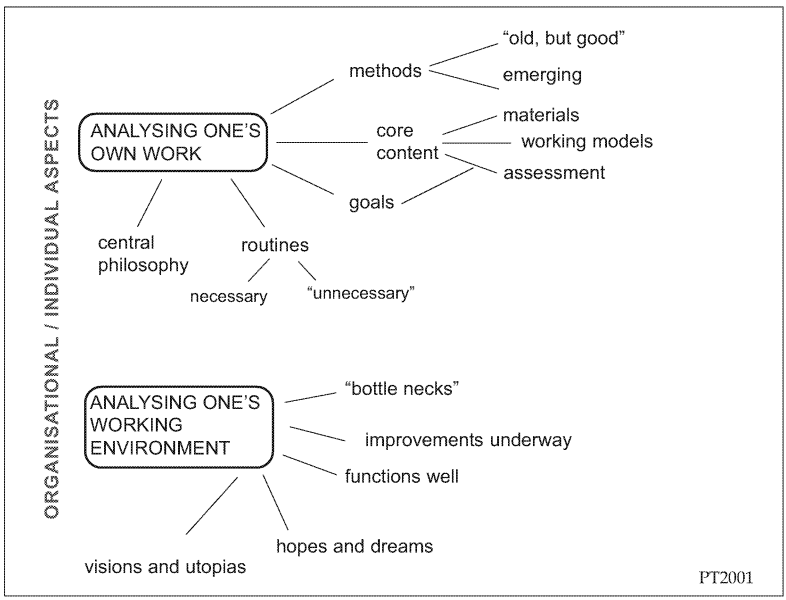


FIGURE 33. The tool for initial analysis of the development needs.

In the area of technology skills, no initial skill level was assumed and the participants were given a chance of assessing their own training needs. Table 16 presents the needs analysis results in various areas of technology use.

TABLE 16. The training needs and interests of the participants.

Course description / Theme	Must know	Should know	Nice to know	OK!
1. Windows (functions, folders, clip board etc.)	6	1	1	18
2. Internet (downloading, browsing, search engines)	7	2	3	13
3. E-mail (Eudora & WebMail – basics)	4	-	5	15
4. Word processing (MS Word basic functions)	5	1	2	18
5. Spreadsheets (MS Excel basic functions)	2	5	11	5
6. Presentation programmes (PowerPoint)	6	6	9	6
7. Graphics (scanners and digital cameras)	11	9	7	-
8. WWW pages (basic editing features, ftp uploads)	11	4	5	7
9. WebCT –learning platform, working with LMS's (meaningful use and available tools)	**19**	**2**	**5**	**-**
10. Teachers' on-line tools	**16**	**5**	**5**	**-**
11. Multimodal teaching and learning	**13**	**5**	**6**	**-**
12. Tutoring/mentoring on-line	**14**	**5**	**6**	**-**
13. Designing e-materials	**16**	**6**	**3**	**-**
14. WWW-pages, advanced course	10	3	8	1
15. Technology integrated language teaching	13	3	5	-
16. Web-based writing	9	6	9	-
17. Graphics on-line	11	5	6	-
18. Sound on-line	9	5	9	-
19. Assessing and evaluating e-materials	11	5	5	-

On the basis of the results, a training scheme was planned. The virtual university project at the University contributed in a considerable manner by providing the Language Centre with training and support and organised tailor-made courses. Almost all of the "must know" needs fell into the area of new learning environments, e-materials, and technology-integrated language teaching. (This seems to slot in well with the skills level of the teachers in Part I as well.) Apart from enhancing their technology skills, the

teachers also attended the training sessions arranged by the Teaching Quality Project (Oplaa!) at the university. Both the Oplaa! and the virtual university projects also provided some funding for the development work.

An on-line events calendar was produced where the tailor-made training sessions, own workshops and other learning opportunities were collected for easy access. The training set-up can be seen in Figure 34. An important aspect throughout has been the process that all training and learning is rooted in the development goals and the actual experimental project cases of the teachers. Even if the focus is on ICT skills, they have never been separated from the context of language teaching and pedagogical thinking. All training on technological skills was paired with a pedagogical workshop.

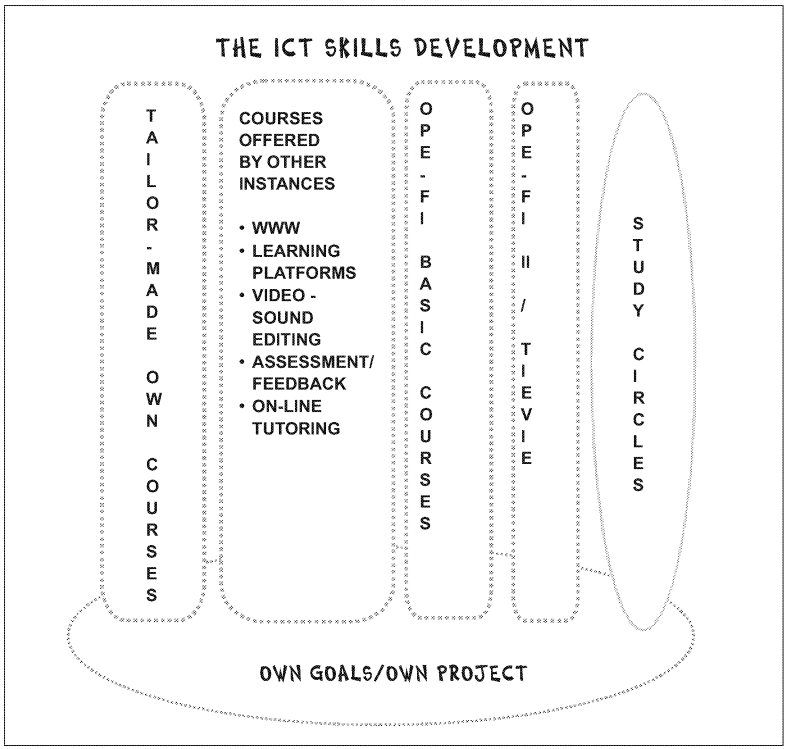


FIGURE 34. The training scheme.

Very early on it became apparent that more negotiation of meaning was needed. The central terms in the area of technology-supported language teaching and on-line teaching were understood in many different ways and a whole afternoon was devoted to finding a grounded and shared understanding of the terms. The model presented in Chapter 4.2.3 (The new language learning designs) was accepted and agreed as the pedagogical model for the development of the new course structures. The process of finding a shared understanding was rewarding for many of the participants and mentioned in many discussions afterwards.

In search of the shared concepts, a need for shared tools was becoming more acute. The available infrastructure did not contain elements that would directly support the new approaches and the new needs of teaching and learning (and the administrative support). An idea of an 'electronic activity space' was gradually emerging. There were no examples of such a space around, but it were to be something that could be used before, during, and after the language courses to support the idea of continuous language learning and give students an activity space outside the courses where they could find language material to work with. It would not become a repository for grammar and vocabulary exercises and it would not become a replacement for face-to-face courses. It would also be a mission statement and a window to modern language teaching that the Language Centre stands for. The activity space became a website called the Language Compass (Figure 35), which was officially launched in January 2003.

The current sections of the Language Compass are the closed staff section where all the administrative information is stored and constantly updated, the teaching section where the language groups are in control of their own language pages, the learners' own space where a multitude of various language resources are available in the learner training sections, the culture club and the cinema and the various independent learning modules. Version two of the Language Compass will be launched in the autumn of 2004 and the major modifications include emphasised support for planning

language studies, learner guidance, improved navigation, and easier up-dating and maintenance.

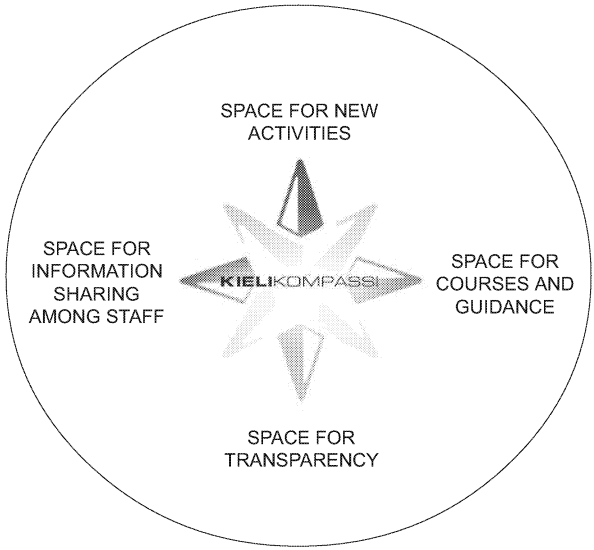


FIGURE 35. The Language Compass.

The first year of the development process was an exhaustive and breath-taking venture. The teachers had almost twenty different course experiments either in progress or just completed and new plans underway. At the 'harvesting' seminar in May 2002 many teachers openly said how much they looked forward to the summer break. They also said that only now did they understand the link between technology-integration and new pedagogical practices. More interaction between the teams and small groups was wished and more time was hoped for small group work. The second year of the cycle was designed to accommodate for the requests (see Figure 36). The pace was slowed down, and more exchange of ideas and working group meetings were scheduled. A new set-up of cross-language working groups was established to focus on the area of skills development in language learning. The groups worked on

defining the skills, and sharing their teaching methods and materials and made recommendations to the other teachers in the other groups based on their common understanding. The groups worked together on oral, writing and reading skills not only across languages but also in the mother tongue teaching of communication skills. Another new element was a reporting mechanism for both to report on the development projects in a common format (sharing the main development objectives in each project, presenting the materials used and produced and describing the main pedagogical points) and to set interim goals for one's own development work (and explaining the links of the personal goals to the overall development process) at the beginning of each semester. These goals were reflected upon at the end of every semester.

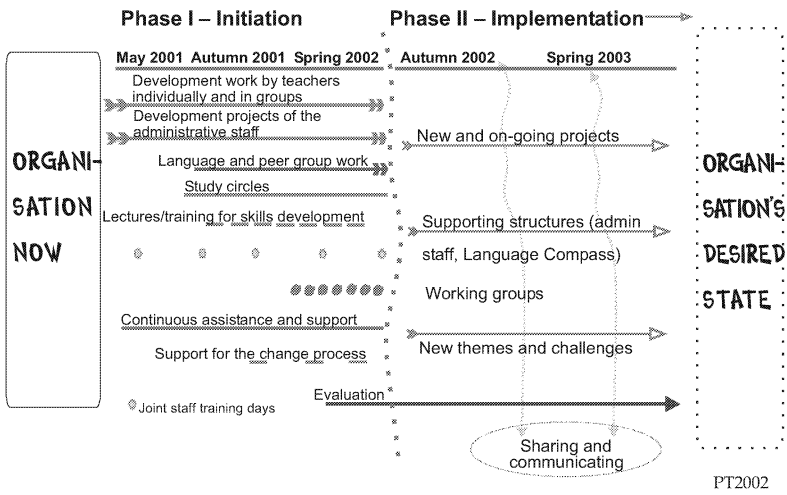


FIGURE 36. The Action Planner and timeframe for the second year of the project at the Language Centre.

Early on in the autumn, it was decided that the Language Centre would apply to become one of the centres of excellence in teaching. Another concept that had been emerging was the idea of learner paths in academic language learning (see Figure 37). This concept

was made the central theme in the application and became a significant tool for the overall development process. The central idea of the learner path was to look at the course structure as a more dynamic and transparent system and this way help students choose the courses that would best suit their current needs. In a typical situation the students would take the obligatory language courses when they had time from their other studies, which meant that the content and aims of the language course were not suited and supportive of the students' language needs at that moment. For that reason, the language studies were put into a progression scale of competence development where the early stages are directed at supporting the language needs at that point in the studies, the middle stage is for research reporting in all forms, and the final university leaving stage is directed at the working life language needs.

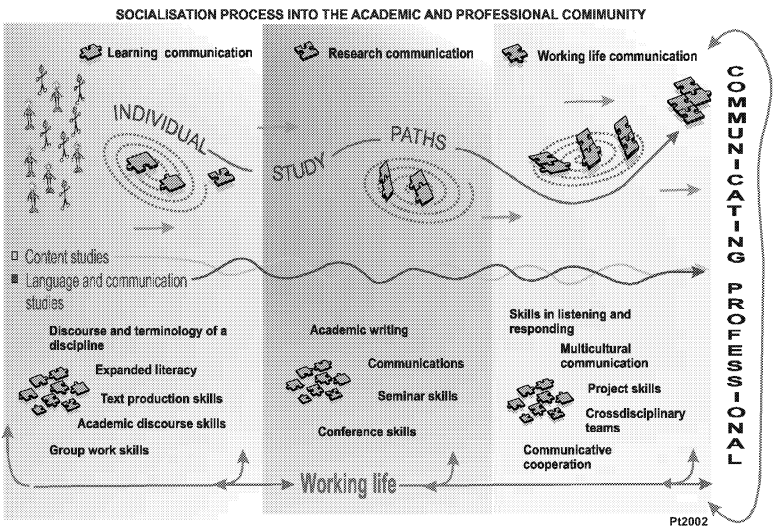


FIGURE 37. The idea of learner paths at the Language Centre.

In pedagogic terms the learner path converted itself into an idea of integrative pedagogy (see Figure 38). The term was introduced in the same centre of excellence application to demonstrate the

multidimensional thinking at the Centre and the way in which all the developments are interlinked. The integration could mean integrating the language course to a content study course run jointly by the language teacher and the subject teacher, integrating two language courses (for instance written communication and spoken communication courses), integrating technology into the various learning phases, and so on. The application itself did not make it to the final group of proposals, but the teaching quality award and the best director award were granted to the Centre in 2002.

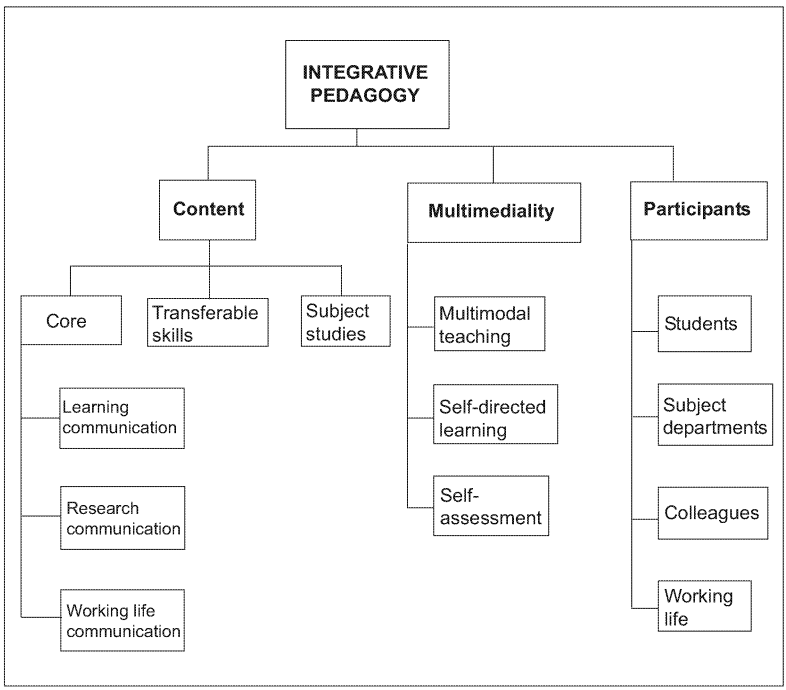


FIGURE 38. Integrative pedagogy at the Language Centre.

In Lueddeke's (1999) terms this phase or element could be called 'Strategy formation and development'. The work on the application was carried out in the steering group but the ideas were negotiated among the staff on a regular basis. The development of the idea of

learner paths can be said to be one of the strategic hallmarks in the process. As soon as the idea was shared and finalised, concrete measures were taken to initiate the work of converting the existing course structures to support the learner path idea. This work was in the core of activities the following, third year.

For this reason, the third year of the process was more loosely tied in with the initial goals for development. The deduction of teaching hours was increased to 48 per teacher to allow even more time for the development work. More parallel processes have materialised and the teachers' relationship to the area of technology integration has become everyday practice. In Hameyer's terms (Chapter 1.3 in this study) the change process has reached the institutionalisation stage at least in some respects. For instance, the teachers integrate the learning platform Optima into their courses with considerable ease and they can also substantiate the use of the platform in pedagogical terms. They have also assumed a clear ownership and authorship of their own language sections in the Language Compass. The joint development efforts have concentrated on an analysis of the core content across and within languages, negotiation of the key concepts, and working together to make the courses transparent and that way make the learner paths tangible for the students as well (see Figure 39). This work will be introduced to the larger public in the next version of the Language Compass and that will mark official closing of the third development cycle.

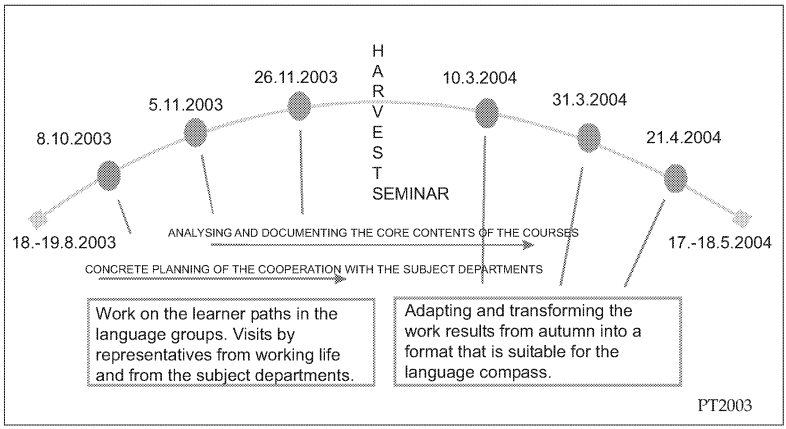


FIGURE 39. The Action Planner for the third year of the project at the Language Centre.

10 Reflections from Part II

Since no development programme can accommodate for all styles and types of teaching and teachers, the best way is to leave room for individual manoeuvres and concentrate on negotiating the core goals for the shared work. The main point is to respect each individual and base the knowledge creating processes on the existing knowledge in the organisation, and not arrogantly pour it in from the outside only. The structure of the process would also need some refinement, as the people come and go, there should be cycles within cycles to ensure that the shared vision is really shared and communicated to the newcomers and returnees. In retrospect, more effort should have been put into guaranteeing that the shared vision is regularly re-visited and re-formulated. The successful elements in the process were the early discovery of shared tools for development (especially the concrete concept of multimodal pedagogy, the learner path and the Language Compass as one

collective and tangible 'product'). The next cycle in the development continuum at the Language Centre has already been initiated with the focus on the integration issue and the development of guidance and quality enhancement tools for the whole organisation. Also a feedback and assessment system will be developed further to support the current state of development by giving teachers (a) information about the way things are going from the (b) process evaluation with adjustable timelines (c) tools for capturing the indicators of quality. It has quite often been proposed that the support for change should first be directed at the early adopters of the new ideas or at designated pilot groups (see Moore, 2000, Senge, 1999). It is doubtful how well the idea would work in the end in the kind of development projects described in this chapter. The decisions of limited access and support tend to create permanent structures and gaps between the groups of people and their individual styles and ways of working. The process of integrating technology into teaching and learning is not about developing all-inclusive, one-size-fits-all types of models pioneered by some selected representatives of a group, but rather an individual explorative journey into one's own beliefs and pedagogical habits to see how and where the new medium slots in. Also, early adopters are sometimes solo artists who venture into realising their own visions and these visions are perhaps not linked to the visions of the organisation and its development goals. In an effort to achieve sustainable changes in the teaching culture, the goals as well as the activities have to be shared and negotiated. Expertise is built both within and from the outside, and there is no right or wrong way to do it. Neither is there a point when it could be said that the development is finished and the work done. Almost equally problematic concept as the early adopters is the trend of identifying 'best practice' in ICT integration and using that as an example for the others to follow. 'Best' is very much a value-laden concept and should need to be defined with a clause including information as to "best for whom and in what kind of context". Furthermore, the policy level 'best' is not necessarily the same as the practice level 'best'.

This takes us back to the evaluation mechanisms that would provide information from both the strategic and pedagogic aspects of development.

It is clear that there is an extreme need for further development of research and evaluation methods for this type of development projects. The design-based research approach would, definitely in a modified format, be perfectly applicable to this type of a cyclic development process. More tools are also needed to understand the social dynamics of the learner community or any groups of people within it. It is central to identify where the understanding of change lies within the social community and to better be able to recognise the meaning making processes. Such tools could perhaps be found in modified versions from the areas of social networks analysis (Scott, 2000) or from research on the interactional elements of the various ecosocial communities (Lemke, 1999).

The corporate world oriented measurement and analysis tools are also becoming more localised for non-profit contexts. Such tool is The Balanced Scorecard (see for instance Kaplan & Norton, 2001), which can be used both as a planning and an evaluation aid in processes where the multidimensional nature of goals and actions are in the central focus. This type of approach sensibly combined with more non-figurative approaches would lend itself very well to re-culturing processes where learning enhancement is in the innermost core of action and objectives. But it is still apparent that more empirical experiments, more research and more co-operation between different disciplines and institutions are needed to develop sound frameworks for educational development processes.

11 Discussion

It is now time to look back on the objectives set for this study and to explore the way in which they have materialised into concrete conclusions and proposals for further inquiry. The objectives were:

- To view the impact of the current information strategies and implementation policies on the schools in the area of language teaching and thus produce useful information about the current situation in information technology implementation in schools;
- To examine the ways in which technology can be integrated into language teaching in a holistic way and to present a design model for technology integration; and
- To present an example of a professional development process where systems thinking is the fundamental basis for action.

The first part of the study gives an overview of the state of technology implementation in the Finnish vocational schools. In the seven year time span the use has increased but it has not become institutionalised or common practice. The lack of technology skills is often assumed to be the reason for non-use in the classroom. The results show, however, that the teachers have become quite computer literate which, contrary to the common belief, indicates that at least a part of the reason for not using technology in the classroom has to do with something else than mere technology skills. It can be assumed that the gap between administrative and educational use has to some extent to do with the lack of pedagogic skills of using learning technologies. Many of the teachers also seem to have problems with getting enough computer time for teaching purposes even if the infrastructure in the schools has improved as a result of the strategic incentives. The situation may be worse within the vocational sector where the facilities are used mostly in subjects where technology is an expected element and the general subject teachers are not automatically guaranteed a quota of the available resources.

The further training situation needs highlighting and further reflection. It is symptomatic that the teachers' computer use is affected more by the general projects the schools participate in than by attending further training courses directed at teachers. This gives an obvious signal of the need to rethink the ways in which professional development is maintained and ensured in schools. The general ICT training offered by the government strategies and initiatives does not seem to bring about the desired and needed change in teaching practices on a larger scale. The gap between using technology and using it in the classroom persists. Both the content and structure of the courses need to be looked into: there is an obvious need for more pedagogically oriented input on technology use where the teaching objectives and contexts are met with the various ways of employing technology for learning purposes. The courses also need to tie in more closely with the development efforts of the individual teacher but also with the institution s/he works at.

It is quite bizarre that such a great effort is put into training our in-service teachers **after** they graduate from the universities. This seems rather contradictory to the guidelines the Ministry of Education has given to the teacher education departments (see the OPEPRO project). According to these guidelines and recommendations, learning to use ICTs for teaching in a meaningful way is among the objectives for the pedagogical content in teacher education. The other main objectives deal with learning to guide, design and evaluate/assess different learning processes with the students and within the teaching community by and large.

The curricula of the Finnish universities for language teacher training (2003 Study Guides of the Helsinki, Joensuu, Jyväskylä, Oulu, Tampere, Turku, and Åbo Akademi teacher training departments) reveal that there is alarmingly little evidence of varied exposure to the integration of technology in language teaching practices. Alternative assessment methods, new approaches to writing, a reflective approach to teaching as a profession, and new ways of looking at languages seem to be featured at least to some extent in the studies in all of the universities. Apart from a few

exceptions (the Universities of Helsinki and Joensuu), the area of ICTs in language teaching is in a marginal role both as a learning tool and a learning space. This shortcoming was noted already five years ago in an evaluation report on the overall curriculum for the subject teacher's pedagogical studies (Jussila & Saari, 1999), and recommendations were made to improve the status of ICT integration. In 2004, this recommendation has mostly been ignored in the language teacher training programmes. Fullan (1993) calls the state of teacher education as society's missed opportunity. He argues that the teacher education has the honour of being the worst problem and the best solution in education. One can claim that the state of the pedagogical use of ICTs in our language teacher education programmes clearly supports Fullan's argument.

It is obvious that the governmental numeric measures for technology-integration and the newly graduated teachers who do not have enough knowledge of technology-integration make a problematic combination midst the demands of the information society. The new teachers will need to be able to identify relevant aspects among the various educational trends as well as to be able to position themselves around the ICT potential on the basis of their own pedagogic coordinates. This thinking process should without a doubt be initiated and encouraged during teacher education. The new teachers simply cannot cope with today's and tomorrow's demands if they are provided with skills from yesterday.

The teacher training curriculum offers many opportunities for using technology as a multidimensional resource for learning. Figure 40 presents a design of the roles that technology can have in the various processes throughout the teacher training. The main point is to appreciate the different functions technology can serve in the curriculum. Firstly, technology is present as a learning tool for the becoming teachers within the study programme. This offers the student teachers a hands-on experience of being learners in a technology-integrated learning setting which in turn helps them design such learning settings for their future students. Secondly, technology is a target of exploration as a medium for language

teaching and different kinds of experiments can be carried out during the training lessons. This way the teacher trainees have a 'safe' training field for their thoughts and ideas and a chance for reflection and for feedback from the other students and teacher trainers. Thirdly, the learning by doing setting allows the teacher trainees to become profoundly familiar with learning technologies and understand the future challenges of teaching in the multimodal, dynamic learning environments. The idea of transferable skills is present throughout the scheme widening the focus of learning from the core content to continuous learning skills.

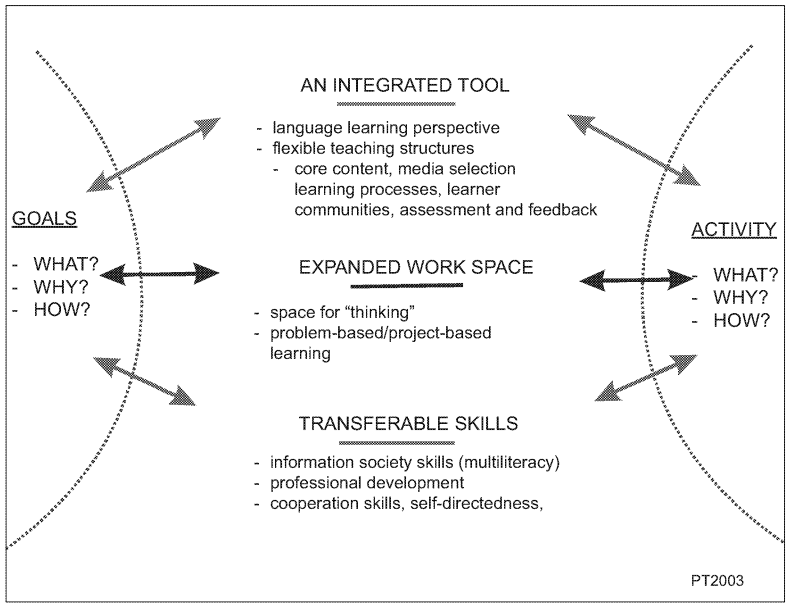


FIGURE 40. A proposal for technology-integration for language teacher education.

Even if the link to teacher education is not specifically in the focus of this study, it is important to realise the causal relationship between the state of teacher education and the state of multimodal teaching practices reported in this study. Today's teacher trainees are among the most influential vessels of change in the coming years and to

educate them to understand the challenges of new literacies, information technology and the changing educational structures is a key issue. The strategic measures will need to work wonders to make up for the missed opportunity in the initial teacher training.

The second research objective is two-fold: there are both organisational/ strategic and pedagogical aspects involved. If we are to strive at new structures and practices that are not just cosmetic touches of the current winds, the sustainability aspect has to be seriously examined. A more systemic approach to the change process is needed as well as a proper framework for understanding the systemic causalities and interdependencies. Of course, the starting point for any development process is in the shared appreciation of an agreement on the added value that the process will bring to the teaching organisation as a whole. Yet, the shared appreciation needs to identify and agree upon the bottle necks and areas where joint effort is needed to be then combined with the individual goals and needs. It seems that he current way in which technology is "worked into" the language teaching practices seems random and often lacks links to parallel processes across curriculum.

Figure 41 is a systemic framework that highlights the existence of parallel and interdependent processes and participants in a development setting. This framework incorporates many of the change principles and structures from the earlier chapters in this study (see for instance page 161 for discussion on Guskey and Miles-Grant). The framework should be interpreted as a sub-system that focuses on the area of language teaching in a larger organisational development process. The basic underlying elements/themes are **support**, **resources** (both mental and financial), and **theoretical links to learning, language learning, and assessment**. Support mechanisms for teachers are needed in technical skills, pedagogical thinking, and collegiality aspects (for instance, in the sense of helping the teaching staff to develop into a learner community with both shared and individual missions). Long-term, individual professional development plans are needed to ensure that teachers adequately maintain and update their

knowledge of not only technical skills but also of language learning and learning in general. A space for experimenting with different course structures, for interaction with colleagues and for implementing new ideas is needed to make the effects of the training long lasting. These experiments and new course plans benefit greatly from networks of teachers where an exchange of ideas, collegial feedback and discussion can take place. Teachers' possibilities of setting up their own projects should also be encouraged and improved. EU projects are such heavy league undertakings that they are often not the most appropriate alternative for setting up national or international networks.

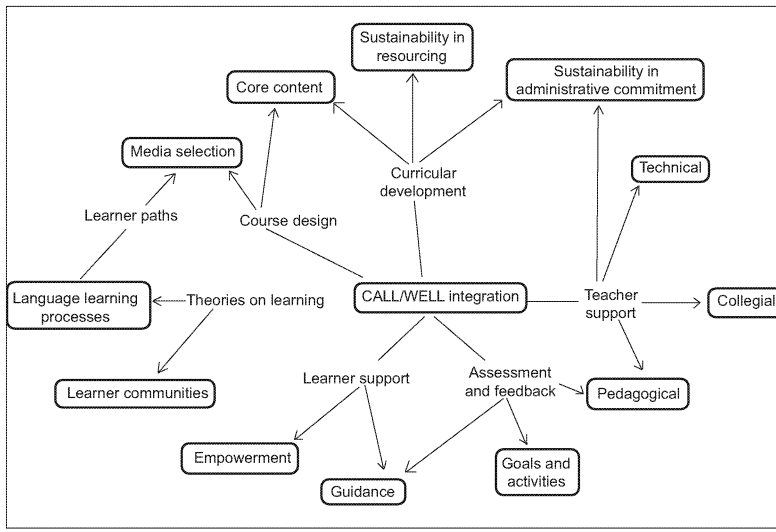


FIGURE 41. A framework of sustainable ICT integration.

Almost all teachers are already involved in curriculum development, but the practices vary from school to school. Curriculum development is at its best an ongoing process, of which the changing and evolving course designs are a part. It seems that the curriculum work is understood as 'curriculum work' with the objective of producing a curriculum in a given timeframe. For instance, an

alignment of content with various teaching and learning modes is not automatically included in the planning process. In fact, a fundamental part of curriculum development should be about designing courses for varying groups of learners and with varying goals and expected learning outcomes. Curriculum planning should also be seen as a meaning making process where a shared base for development is made explicit and concrete for all involved. This process should also be used for distinguishing the areas where special attention is needed in the overall development continuum.

Course design incorporates core analysis and media selection which are necessary tools for accommodating different learners and different learning objectives successfully. With the help of core analysis the teachers can define the core learning content, the focus of assessment and learning goals (for instance, the desired competence level or the cut points for course completion). Media selection is the process where the teacher makes the design for the actual course by choosing the various media to be integrated in the different phases and activities according to the overall course objectives and the needs of the learners. (The concept of media in this context covers all teaching media from face-to-face, group work, lecture type of teaching to virtual settings, from analogue teaching materials to e-materials.)

Learner support and training are important elements in the framework as learners are to become more aware and active in their own learning processes. Seldom are learners automatically active and autonomous, but rather need assistance in identifying and employing the relevant strategies and skills that suit them best. Learner guidance along with assessment and feedback are seen as pedagogical instruments for making the process more transparent for both teachers and learners. Feedback and assessment criteria are also relevant tools for meeting the course objectives and should therefore always be interlinked with these.

Behind the pedagogical re-thinking and re-building process is a firm administrative commitment and an understanding of the overall aims and scope of development. This is usually one of the

fateful pitfalls of the development efforts: from the funding/administrative perspective permanent structures and visible change are expected to happen in an unrealistically short time span. This can lead to the false belief that "we've done it, not much was gained," or to the conclusion that the effort was a mere failure and it or any similar attempts should not be funded any longer. The administrative/strategic goals will need to tie in with the pedagogical aims in a way that is transparent to all parties involved in the development work. This way the administrative expectations become more reasonable and vice versa.

The second part of the second research objective is pedagogical. Along with educational planning and curriculum work new thinking is needed in the concrete course planning. The designs for learning that have been discussed earlier in this study are an undertaking in that direction. As has been pointed out many times over, the new designs will need to be understood as multidimensional and multilayered, and the concept of course will need to be understood as dynamic and flexible. The idea of learner paths can materialise only if the learning setting is built in a multilayered manner. The course process and the pedagogical design are not just about the teaching content and actions, but very importantly also about setting goals and assessment criteria that are interlinked throughout the course process. This type of design was presented earlier in the study (see page 78). The design has been expanded and improved further during the development project at the University Language Centre described in Part II of this study. It became one of the important tools for re-thinking and planning the courses and also for understanding the concepts of multimodal teaching, media selection and for approaching continuous assessment in more concrete terms.

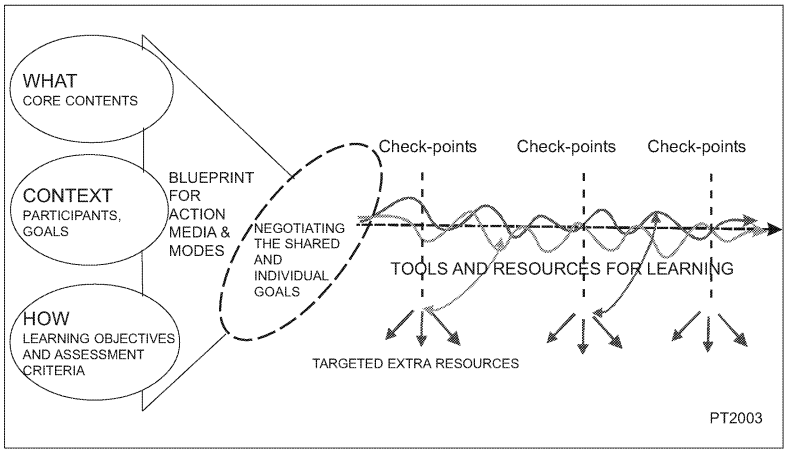


FIGURE 42. A multilayered, multimodal design for learning.

Figure 42 is the most current visualisation of a multilayered course design where different types of check points guide the learning process and offer extra resources for learning if and when needed. The pedagogical thinking includes also a set of tools that are not necessarily pre-defined to be used for certain purposes but are available for the learners at any point during the course process. These tools take on many forms and ideas; they can be graphical (for instance, mind map and web authoring) tools for sharing ideas among the learner groups, they can be linguistic tools for revision and exercising certain aspects of language, they can be web blogs for portfolio type of process reflection, they can be group discussions where topical problems are dealt with, they can be focused activities in information searching, reading strategies, presentation techniques (these can equally well be a part of the course content), and so on.

The main pedagogical decisions in the design involve the use of different media to support different working modes, allowing for many-sided interaction, and applying feedback and assessment procedures to the process while it is in its active phases. The point is not whether teaching takes place on- or off-line, but how learning is best supported and guided. It is also in the realisation that both on-

line and off-line worlds offer good resources and tools for learning. The focus is thus on how the different media can be built into the learning process in a way that expands the learning continuum both for the individual and for the whole learner group. This line of thinking is also linked with the technology integration issue (see pages 86–88): what kinds of roles are designed for the learner and how can technology best accommodate for carrying out these roles.

All in all, it could be a good idea to tone down the word *technology* and direct and expand the thinking towards *pedagogical development* in multimodal learning environments. That way curriculum development, use of ICTs, teaching quality enhancement, professional and organisational learning would all fit into the same discussion of change and be included in the consequent development processes.

The line of reasoning above leads nicely into objective three which actually is Part II of this study. The design, its principles and processes constitute a development venture that has its rooting in the strategic-systemic thinking. The narrative in which the process is described allows the readers to follow the process from its very early stages and to see the guiding principles and structures in the undertaking in its various phases. Among the main findings is the realisation that shared goals need to be articulated in concrete terms that are transparent to all participants. In this case these terms were converted into concrete tools (the multimodal design, learner path, integrative pedagogy and the Language Compass) that were used for the individual and joint development efforts. In addition to the tools, respect, collegiality, and continual negotiation characterise the ideology of the process.

In a study like this, it is inevitable to again and again bring up the question of suitability of the available research approaches and methodologies in the area of educational change, new teaching cultures and learning technologies. It is worth to notice the distinction between strategic tools and research methods even if in the discussion of educational change and professional development these two easily overlap as they can be very intertwined in the

process. Nevertheless, research instruments are needed a) for the understanding of the relationships between various levels, actors and goals, b) for the analysis of the situational processes, and c) for the evaluation. The strategic tools are internally used schemes that can be analysed as a part of the research setting.

As was established in the reflection on Part II (see pages 181–183), many of the current research methods and progress evaluation tools fall short of capturing the essence. 'Change' as a process is often present as reflections and actions in a momentum, and the nowadays very numeric instruments can construct only partial portrayals of the situation. These instruments are often based on typologies and analysis patterns that unavoidably need concrete numeric or otherwise quantifiable representations of the outcomes in order to work. More discussion is needed on the idea of 'outcome' to agree on a balanced way of serving both the pedagogical and strategic needs. For instance, in the core of technology integration there should be a pedagogical re-culturing process, not merely a process of building a technological infrastructure. Yet, the strategic decisions need to be based on something that is tangible and progressive in quantity which is why the types and numbers of computer software and hardware, Internet connections and online courses are too often used as indicators of 'change'. There seem to be two isolated change movements taking place. The strategic, governmental approach to change looks at the infrastructure and sets its goals in numbers, whereas the learning theoretical change movement is focused more on learning and making better learning possible. These two levels need to co-exist but there has to be more interaction between them. More interaction and dialogue is needed between the policy-makers and practitioners/researchers; teachers and researchers; and so on. Multi-disciplinary research and new forms of research (for instance on-site research with teachers) need to be supported.

Also, more research is needed on the idea of quality enhancement. We need to be able to think of quality in a multitude of ways: the institution needs to ensure quality in the overall

performance; teachers need to be able to have mechanism for understanding and managing quality in their own teaching; students need to realise quality as something they do not just receive but also need to contribute to, and so on. As was stated earlier in the reflection on Part II, the discussion can benefit from the corporate models of quality management and research, but cannot use them as such.

Language experts should not evade their responsibility of partaking in the development of more suitable research and development tools and in the creation of more dynamic language learning environments. Technological innovations and resources need innovative users in all corners of the educational domain.

References

Ahtikari, Johanna & Eronen, Sanna. 2004. A Journey Towards Web Literacy – the electronic learning space Netro. A Pro Gradu Thesis. Department of Languages. University of Jyväskylä.

Alessi, Stephen & Trollip, Stanley. 2001. Multimedia for Learning. Methods and Development. Boston: Allyn and Bacon. 3rd edition.

Ammatillinen koulutus Suomessa (Vocational education and training in Finland). 1997. CEDEFOP publications. Http://ww2.trainingvillage.gr/etv/publication/download/monograf/537fi/537fi.html (Accessed 15.04.2004).

Appel, Christine. 2003. Tandem Language Learning on the Internet: theory, tool development and empirical exploration. Unpublished PhD thesis. Centre for Language and Communication Studies, Trinity College, University of Dublin.

ASHE-ERIC Higher Education Report. 2001. Vol. 28 Issue 4. New Jersey: John Wiley & Sons, Inc.

Association for Educational Communications and Technology. 1977. The definition of educational technology: A summary. In The definition of educational technology, 1–16. Washington, D.C.: AECT

Anderson, Lorin & Krathwohl, D. (eds.). 2001. Taxonomy for Learning, Teaching, and Assessing, A: A Revision of Bloom's Taxonomy of Educational Objectives, Abridged Edition 1/e. Addison-Wesley.

Apple Computer, Inc. 1995. Changing the Conversation About Teaching, Learning & Technology: A Report on 10 Years of ACOT Research. Apple. Available at the ACOT Library at Http://www.apple.com/education/k12/leadership/acot/library.html. (Accessed 14.03. 2004).

Bailey, Mark. 2002. Education and Values: Interface on the Internet Reconceptualizing Teaching and Learning in a Technocracy. Berglund Centre for Internet Studies. Http://education.ed.pacificu.edu/aacu/workshop/index.html. (Accessed 18.02.2004)

Banathy, Bela. H. 1973. Developing a Systems View of Education – The Systems Model Approach. San Francisco: Lear Siegler/Fearon.

Banathy, Bela. H. 1991. Systems Design of Education. A Journey to Create the Future. New Jersey: Educational Technology Publications.

Banathy, Bela, H. & Jenlink, Patrick, M. 2004. Systems Inquiry and Its Application in Education. In Johanssen, David, H. (ed.) Handbook of Research on Educational Communications and Technology. 2nd

edition. New Jersey/London: Lawrence Erlbaum Associates Publishers.
Barab, Sasha, A. & Kirshner, David. 2001. Guest Editors' Introduction: Rethinking Methodology in the Learning Sciences. The Journal of the Learning Sciences, Vol. 10, No. 1&2. Lawrence Erlbaum.
Bascia, Nina & Hargreaves, A. (Eds.). 2000. The Sharp Edge of Educational Change. Teaching, leading and the realities of reform. Educational Change and Development Series. London/New York: Routledge and Falmer.
Becker, Henry Jay. 2001. How are Teachers Using Computers in Instruction. Paper presented at the 2001 Meetings of the American Educational Research Association. Http://www.crito.uci.edu/tlc/findings/conferences-pdf/how_are_teachers_using.pdf (Accessed 05.03.2004)
Beatty, Ken. 2003. Teaching and Researching Computer-Assisted Language Learning. Applied Linguistics in Action Series. London: Pearson Education.
Benson, P & Voller, P. 1998. Autonomy and Independence in Language Learning. London: Longman.
Better eLearning for Europe. 2003.The European Commission. Http://europa.eu.int/comm/dgs/education_culture/publ/pdf/elearning/en.pdf (Accessed 31.05.2004)
Bledsoe, Glen. 2002. Taxonomy of Technology Practices. The Oregon Writing Project. Http://www.willamette.org/owp/pages/tech/taxonomy.html. (Accessed 18.02.2004).
Brown, John, Seely & Duguid, Paul. 2000. The Social Life of Information. Boston: Harvard Business School Press.
Cameron, Keith. (Ed.) 1989. Computer Assisted Language Learning. Oxford: Blackwell Scientific Publications.
Carey, D. M. 1993. Teacher Roles and Technology Integration: Moving from Teacher as Director to Teacher as Facilitator. Computers in the Schools. Vol. 9(2/3), 105–118.
Carr, Wilfred & Kemmis, Stephen. 1986. Becoming critical. Education, knowledge and action research. London: The Falmer Press.
Chapelle, Carol. 2000. Is networked-based learning CALL. In Warschauer, Mark & Richard Kern. (Eds.). Network-based Language Teaching: Concepts and Practice. Cambridge Applied Linguistics Series. New York: Cambridge University Press
Chapelle, Carol. 2001. Computer Applications in Second Language Acquisition. Foundations for teaching, testing and research. Cambridge Applied Linguistics Series. Cambridge: Cambridge University Press.

Childerhouse, Polly. 2004. Frodo's Supplies. A winning lesson plan at Onestopenglish.com. Http://www.onestopenglish.com/lessonshare/elt-esl/tefl_lessons_children/frodo.pdf (Accessed at 21.03.2004)
Cohen, D. K. 1987. Educational Technology, Policy and Practice. Educational Evaluation and Policy Analysis, 9, 153–170.
Collins, A. 1991. The Role of Computer Technology in Restructuring Schools. Phi Delta Kappan, 73 (1), 28–36.
Common European Framework for Languages: Teaching, Learning, Assessment. Case studies. 2002. Language Policies series. Strasbourg: Council of Europe Publishing.
Conacher, Jean, Taalas, Peppi, and Vogel, Thomas. 2004. New language learning and teaching environments: how does ICT fit in? In Chambers, Angela & Conacher, Jean (eds.). ICT & Language Learning: Integrating Pedagogy and Practice. Birmingham: Birmingham University Press.
Cope, Bill & Kalantzis, Mary. (Eds.) 2000. Multiliteracies: literacy learning and the design of social futures. London: Routledge.
Crook, Charles. 1994. Computers and the collaborative experience of learning: A Psychological Perspective. London: Routledge.
Cuban, Larry. 1990. Reforming again, again and again. Educational Researcher, 19(1), 3–13.
Cuban, Larry. 2001. Oversold and Underused. Computers in the Classrooms. Cambridge: Harvard University Press.
Cummins, Jim & Sayers, D. 1990. Education 2001: Learning Networks and Educational Reform. In C. Faltis & R. DeVillar (eds.). Language minority students and computers. New York: The Haworth Press.
Design-based Research Collective, The. 2003. Design-Based Research: An Emerging Paradigm for Educational Inquiry. Educational Researcher, Vol. 32. Number 1.
Dillenbourg, Pierre. 2002. Over-scripting CSCL: The risks of blending collaborative learning with instructional design. In P.A. Kirschner (Ed). Three worlds of CSCL. Can we support CSCL. Heerlen: Open Universiteit Nederland.
Douglas, M. E. 1980. Computer Literacy: What is it? Business Education Forum, 34 (1), 18–22.
Dubagne, M., and Krendl, Kathy, A. 1992. Teacher's Attitudes Toward Computers: A Review of the Literature. Journal of Research on Computing in Education, Spring, Vol. 24, Number 3.
Dwyer, David C., Ringstaff, Cathy and Haymore Sandholtz, Judith . 1990a. Teacher Beliefs and Practices. Part I: Patterns of Change. The Evolution of Teachers' Instructional Beliefs and Practices in High-Access-to-Technology Classrooms First–Fourth Year Findings.

ACOT Report # 8. Apple Computer Inc. Available at the ACOT Library at http://www.apple.com/education/k12/leadership/acot/library.html. (Accessed 30.04.2004).

Dwyer, David C., Ringstaff, Cathy and Haymore Sandholtz, Judith. 1990b. Teacher Beliefs and Practices. Part II: Support for Change. The Evolution of Teachers' Instructional Beliefs and Practices in High-Access-to-Technology Classrooms First–Fourth Year Findings. ACOT Report # 9. Apple Computer Inc. Available at the ACOT Library at http://www.apple.com/education/k12/leadership/acot/library.html. (Accessed 30.04.2004).

eEurope 2005 Mid-term Review. 2004. Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions. Http://europa.eu.int/information_society/eeurope/2005/doc/all_about/acte_en_version_finale.pdf (Accessed 31.05.2004)

Education, Training and Research in the Information Society. A National Strategy. 1995. Helsinki: Ministry of Education.

Education, Training and Research in the Information Society. A National Strategy for 2000–2004. 1999. Helsinki: Ministry of Education.

Education at a Glance – OECD Indicators. 2001. OECD Publications. Available at Http://www.oecd.org/dataoecd/26/44/1958411.pdf. (Accessed 11.05.2004).

eLearning Action Plan, The. Designing for tomorrow's education 2001. The Commission of the European Communities. Http://europa.eu.int/eur-lex/en/com/cnc/2001/com2001_0172en01.pdf (Accessed 30.05.2004)

Elliott, John. 1991. Action research for educational change. Developing teachers and teaching series. Oxfordshire: Open University Press.

Ellsworth, James, B. 2000. Surviving Change. A Survey of Educational Change Models. ERIC Clearinghouse on Information & Technology. New York: Syracuse University.

Eraut, Michael. 1989. Conceptual Frameworks and HistoricalDevelopment. In M. ERAUT (ed.), The International Encyclopedia of Educational Technology. Oxford: Pergamon Press.

Evans, Robert. 1996. The Human Side of School Change. Reform, Resistance, and the Real-Life Problems of Innovation. San Francisco: Jossey-Bass.

Felix, Uschi. 2003. Pedagogy on the line: identifying and closing the missing links. In U. Felix (ed.) Language Learning Online – Towards Best Practice.

Fullan, Michael. 1993. The Professional Teacher. Why Teachers Must Become Change Agents. Educational Leadership. Vol. 50, no. 6.

Fullan, Michael. 1998. Linking change and assessment. In P. Rea-Dickins & K. P. Germaine (Eds.) Managing Evaluation and Innovation in Language Teaching: Building Bridges. Applied Linguistics and Language Study Series. London: Longman.
Fullan, Michael & Hargreaves, Andy. 1996. What's Worth Fighting for in Your School. New York: Teachers College Press.
Fullan, Michael. 2001. The New Meaning of Educational Change. 3rd edition. New York: Teachers College Press.
Gagne, R. M. 1968. The Conditions of learning. New York: Holt, Rinehart & Winston. 2nd edition.
Gilster, Paul. 1997. Digital Literacy. New York: Wiley Computer Publishing.
Gordon, David.(Ed.) 2003. A Nation Reformed: American Education 20 Years After a Nation at Risk. Cambridge: Harvard Education Press.
Grant Miles, Cathy. 2000. Professional Development in a Technological Age: New Definitions, Old Challenges, New Resources. TERC Publications.
http://ra.terc.edu/publications/TERC_pubs. (Accessed 01.03.2004).
Guskey, Thomas. Professional Development in Education. In Search of the Optimal Mix. 1995. In Guskey, Thomas, R. & Huberman, Michael. (Eds.) Professional Development in Education. New Paradigms & Practices. New York: Teachers College Press.
Hall, Gene, E. & Hord, Shirley, M. 2001. Implementing Change. Patterns, Principles and Potholes.Boston: Allyn and Bacon.
Hameyer, Uwe. 2002. Behind the Secret of Success. How to Support and Sustain School Improvement in Information Society. In E. Pantzar (ed.). Perspectives on the Age of the Information Society. Tampere: Tampere University Press.
Hardisty, David & Windeatt, Scott. 1989. CALL. Resource Books for Teachers. Oxford: Oxford University Press.
Hargreaves, Andy. 1995. Development and Desire: A Postmodern Perspective. In Guskey, Thomas, R. & Huberman, Michael (eds.). Professional Development in Education. New Paradigms & Practices. New York: Teachers College Press.
Hodas, Steven. 1993. Technology Refusal and the Organizational Culture of Schools. Education Policy Analysis Archives, A peer-reviewed scholarly electronic journal, Vol. 1, no. 10.
Holec, Henri. 1981. Autonomy in Foreign Language Learning. Oxford: Pergamon. (First published 1979, Strasbourg: Council of Europe.)
Holec, H. (Ed.) 1988. Autonomy and Self-directed Learning: Present Fields of Application. Strasbourg: Council of Europe.
Hutchinson, Tom & Waters, Alan. 1987. English for specific purposes: A learner-centered approach. Cambridge: Cambridge University Press.

Häkkinen, Päivi. 2002. Challenges for design of computer-based learning environments. British Journal of Educational Technology, 33(4)

IEA Study of Computers in Education: Implementation of an Innovation in 21 Education Systems. Pelgrum, W. J. , and Plomp, T. (Eds.) 1993. Volume 13. Exeter: The Pergamon Press.

Information Society Programme for Education, Training and Research 2004–2006. 2004. Publications of the Ministry of Education, Finland 2004:14

International Society for Technology in Education (ISTE) – National Educational Technology Standards (NETS) publications. Http://cnets.iste.org/

Johnson, Donna, M. 1991. Second Language and Content Learning with Computers, in P. Dunkel (Ed.) Computer Assisted Language Learning and Testing. Research Issues and Practice. New York: Newbury House.

Jonassen, David, H. 2000. Computers as Mindtools for Schools – Engaging Critical Thinking. New Jersey. Prentice-Hall. 2nd edition.

Jonassen, David, H., Howland, J., Moore, J., and Marra, R.M. 2003. Learning to Solve Problems with Technology. A Constructivist Perspective. New Jersey: Pearson Education, Inc. Revised edition of Learning with Technology.c1999.

Jones, Christopher & Fortescue, Sue. 1987. Using Computers in the Language Classroom. Longman Handbooks for Language Teachers. London: Longman Group UK Limited.

Jussila, Juhani & Saari, Seppo. (Eds.). 1999. Opettajankoulutus tulevaisuuden tekijänä. Yliopistoissa annettavan opettajankoulutuksen arviointi. Korkeakoulujen arviointineuvoston julkaisuja 11. Helsinki: Edita.

Juurakko, Taina & Airola, Anneli. 2002. Tehokkaampaan kielenoppimiseen. Häme polytechnic Publications A:17. Saarijärvi: Häme polytechnic.

Kaplan, Robert, S. & Norton, David, P. 2001. The Strategy-focused Organisation. How Balanced Scorecard Companies Thrive in the New Business Environment. Boston: Harvard Business School Publishing Corporation.

Kalantzis, Mary & Cope, Bill. 2000. Changing the Role of Schools. In Cope, Bill & Kalantzis, Mary. (Eds.). Multiliteracies: literacy learning and the design of social futures. London: Routledge.

Kankaanranta, Marja. 2002. Developing digital portfolios for childhood education. Research Reports 11. Jyväskylä: Institute for Educational Research.

Karavas-Doukas, Kia. 1998. Evaluating the implementation of educational innovations: lessons from the past. In P. Rea-Dickins & K. P. Germaine (Eds.) Managing Evaluation and Innovation in Language Teaching: Building Bridges. Applied Linguistics and Language Study Series. London: Longman.

Karjalainen, Asko. 1991. Ammattitaidon myytti – rehtorin päänvaiva? Reports from Faculty of Education. No 79. Oulu: University of Oulu.

Kennedy, Kristen. 2003. Writing With Web Logs. tech Learning. The Resource for Education Technology Leaders. February 15, 2003. Http://www.techlearning.com/db_area/archives/TL/2003/02/blogs.html (Accessed 02.03.2004).

Kent, Todd, W. & McNergney, Robert, F. 1999. Will Technology Really Change Education? From Blackboard to Web. Critical Issues in Teacher Education series. California: Corwin Press, Inc.

Kerr, Stephen. (Ed.). 1996. Technology and the Future of Schooling. Ninety-fifth Yearbook of the National Society for the Study of Education, Part II. Chicago: The University of Chicago Press.

Kielikeskus katsoo peiliin. 2001. Self-evaluation report. Documented by Eija Aalto & Merja Almonkari. Jyväskylä: University of Jyväskylä, Language Centre.

Kirkpatrick, Donald, L. 1998. Evaluating Training Programmes: The Four Levels. New York: Pfeiffer Wiley.

Koski, Jussi, T. 1998. Infoähky ja muita kirjoituksia oppimisesta, organisaatiosta ja tietoyhteiskunnasta. Saarijärvi: Gummerus.

Koulutuksen ja tutkimuksen Tietostrategia 2000–2004: Hankesuunnitelmat 2002. Helsinki: Ministry of Education. http://www.minedu.fi/julkaisut/pdf/tietostrategia/2002hankesuunnitelmat.pdf

Koulutusopas. 1993. Helsinki: National Board of Education.

Koulutusopas. 1997. Helsinki: National Board of Education.

Kozma, Robert, B. (Ed.) 2003. Technology, Innovation, and Educational Change. A Global Perspective. A Report on the Second Information Technology in Education Study. Module 2. A Project of the International Association for the Evaluation of Educational Achievement (IEA). Oregon: International Society for Technology in Education (ISTE).

Kuk, George. 2003. E-Learning Hubs: Affordance, Motivation and Learning Outcomes. Paper presented at the BEST Conference: Creativity and Innovation in Academic Practice. 9-11 April, 2003. Brighton, England. Http://www.business.ltsn.ac.uk/resources/reflect/conf/2003/kuk/kuk.pdf (Accessed 07.08.2004).

Kuure, Leena, Saarenkunnas, Maarit & Taalas, Peppi. 2001. Inside and Outside of Webwork: Utilizing Web Projects as Resources for Collaborative Language Study and Learning. In W. Fowler & J.

Hasebrook (Eds.) Proceedings of WebNet 2001– World Conference on the WWW and Internet, Orlando, Florida; October 23–27, 2001, Norfolk, VA. Association for the Advancement of Computing in Education.
Kuure, Leena. 2002.Literacy perspectives into text accessibility. Academic Dissertation. Oulu: University of Oulu.
Kuure, Leena, Saarenkunnas, Maarit & Taalas, Peppi. 2002. Negotiating a New Culture of Doing Learning? A Study of Interaction in a Web Learning Environment with Special Focus on Teacher Approaches. Applied Language Studies – Apples Vol. 2 Issue 1.
Lampinen, Osmo. (Ed.) 1995. Ammattikorkeakoulut - vaihtoehto yliopistolle. Tampere: Gaudeamus. Otatieto Oy.
Lave, J. & Wenger, E. 1991. Situated Learning. Legitimate Peripheral Participation. Cambridge: Cambridge University Press.
Lemke, Jay, L. 1999. Discourse and Organizational Dynamics: Website Communication and Institutional Change" Discourse and Society Vol. 10 No. 1.
Lehtinen, Erno. 2003. Computer-supported collaborative learning: an approach to powerful learning environments. In E. De Corte, L. Verschaffel, N. Entwistle, J. van Merrienboer (Eds.). Powerful Learning Environments: Unravelling Basic Components and Dimensions. London: Pergamon Press.
Levin, J. A., and Souviney, R. 1983. Computers and Literacy: A time for tools. Quarterly Newsletter for the Laboratory of Comparative Human Cognition. 5 (3), 45-68.
Levy, Michael. 1997. Computer-Assisted Language Learning - Context and Conceptualization. Oxford Linguistics. Oxford: Oxford University Press.
Little, David 1991. Learner Autonomy 1: Definitions, Issues, and Problems. Dublin: Authentik.
Longstreet, W. S., and Sorant, P. E. 1985. Computer Literacy-Definition? Educational Horizons. Spring, 117–120.
Lueddeke, George, R. 1999. Toward a Constructivist Framework for Guiding Change and Innovation in Higher Education. The Journal of Higher Education. Vol. 70. No.3.
Luukkainen, Olli. 2003. Opettajuus – Ajassa elämistä vai suunnan näyttämistä? (Teachership – Living in time or leading the way?). Acta Universitatis Tamperensis; 986. Tampere: University of Tampere.
Mehlinger, Howard. 2003. Information Age Anthology. Part Two: Business, Commerce and Services.
Http://www.dodccrp.org/antpart2.html. (Accessed 12.12.2003).
Miles Grant, Cathy. 1996. Professional Development in a Technological Age: New Definitions, Old Challenges, New Resources. In Fulton

et.al. Technology Infusion and School Change. Perspectives and Practices. Cambridge: TERC.
Milstein, M. M. 1976. Impact and Response. Federal aid and State education agencies. Policy analysis and education series. Columbia University, New York: Teachers College Press.
Mills, Douglas. 2001. Computers in Language Learning: Possible Roles. Http://www.iei.uiuc.edu/resources/possible.roles.html. (Accessed 19.02.2004).
Ministry of Education. 2000. SUOMI (O)SAA LUKEA.Tietoyhteiskunnan lukutaidot -työryhmän linjaukset. Ministry of Education. 4:2000. Helsinki.
Moore, Geoffrey. A. 1991.Crossing the CHASM. Marketing and Selling Technology Products to Mainstream Customers. 2nd edition. New York: Capstone Publishing Ltd.
Mällinen, Sisko. 2001. Towards Online Pedagogy. Teachers' beliefs about learning and ICT in instruction at Lahti Polytechic. MA dissertation. England: Loughborough University.
Nevison, J. M. 1976. Computing in the Liberal Arts College. Science. 194, 396-402.
The New London Group 2000. A pedagogy of Multiliteracies designing social futures. In Cope, Bill and Kalantzis, Mary (eds.) Multiliteracies: literacy learning and the design of social futures. London: Routledge.
Nikki, Maija-Liisa. 1998. Kielikoulutuspolitiikan toimeenpano. In Takala, Sauli and Sajavaara, Kari (Eds.). Kielikoulutus Suomessa. Jyväskylä: Centre for Applied Language Studies.
Nunan, David & Lamb C. 1996. The Self-Directed Teacher. Managing the Learning Process. Cambridge. CUP.
Oxford, Rebecca, L. 1990. Language Learning Strategies. What Every Teacher Should Know. New York: Newbury House Publishers. OPEPRO publications. Http://snor.joensuu.fi/oph/
Pachler, Norbert and Daly, Caroline. 2004. Professional teaching learning in virtual environments: myth or reality? Paper presented at the 11th International Literacy and Education Research Network Conference on Learning. Havana, Cuba, 27–30, June.
Palmberg, Rolf 1991. En Introduktion till Datorstödd Språkundervisning. Karperö: Palmsoft Publications.
Palmberg, Rolf. 2003. CALL for You. E-book. Karperö: Palmsoft Publications.
Papert, Seymour. 1980. Mindstorms. Children, Computers and Powerful Ideas. All about LOGO – how it was invented and how it works. New York: Basic Books Inc.

Passey, D., and Ridgway, J. 1994. The Current Impact of IT, and the Stages of School IT Development: Are There Any Prospects for the Future?, Computer Education, February, 2–5.

Perelman, Lewis., J. 1992. School's Out. A Radical New Formula for the Revitalization of America's Educational System. New York: Avon Books.

Pisa reports. Http://www.pisa.oecd.org/

Promoting Language Learning and Linguistic Diversity: An Action Plan 2004–2006. 2003. Commission of the European Communities. COM(2003) 449.
http://europa.eu.int/comm/education/doc/official/keydoc/actlang/act_lang_en.pdf

Raudaskoski, Pirkko. 2002. Situated Learning, Interaction and Technology Use as Empirically Researchable Practices. In Kärkkäinen, E., Haines, J., Lauttamus (eds.). Studia Linguistica et Litteraria Septentrionalia. Oulu: Department of English, University of Oulu.

Rein, Debra. 2000. What is Effective Integration of Technology, and Does it Make a Difference? A paper presented at the International Conference on Learning with Technology, Philadelphia, Pennsylvania, March 8–10, 2000.
Paper available at Http://l2l.org/iclt/2000/papers/181a.pdf (Accessed 01.05.2004)

Resnick, L. B., Levine, J. M. & Teasley, S. D. (Eds.). 1991. Perspectives on socially shared cognition. Washington, DC: American Psychological Association.

Richey, Rita, C., Klein, James, D. and Nelson, Wayne, A. 2004. Developmental Research: Stuides of Instructional Design and Development. In Johanssen, David, H. (ed.) Handbook of Research on Educational Communications and Technology. 2nd edition. New Jersey/London: Lawrence Erlbaum Associates Publishers.

Risku, Pekka. 1992. Tietokonepohjainen matematiikan opiskeluympäristö teknillisessä koulutuksessa. Institute for Educational Research. Publication series A. Tutkimuksia 49. Jyväskylä: University of Jyväskylä.

Roberts, Celia. 1998. Language and cultural issues in innovation: the European dimension. In P. Rea-Dickins & K. P. Germaine (Eds.) Managing Evaluation and Innovation in Language Teaching: Building Bridges. Applied Linguistics and Language Study Series. London: Longman.

Rogers, E. M., and Shoemaker, A. 1971. Communication of Innovations. New York: The Free Press.

Rogers, E. M. 1983. Diffusion of Innovations. Third Edition. New York: The Free Press.

Rogoff, B. 1990. Apprenticeship in thinking. New York: Oxford University Press.
Saarenkunnas, Maarit, Järvelä, Sanna, Häkkinen, Päivi, Kuure, Leena, Taalas, Peppi & Kunelius, Esa. 2000. NINTER. Networked Interaction: Theory-based Cases in Teaching and Learning. Learning Environments Research.
Saarenkunnas, Maarit, Kuure, Leena, & Taalas, Peppi. 2003. The polycontextual nature of computer supported learning. Theoretical and methodological perspectives. ReCALL 15 (2). Oxford: Cambridge University Press.
Saarenkunnas, Maarit. 2004. Multidimensional Participation in Polytextual Computersupported Language Learning. Acta Universitatis Ouluensis. E 74. Oulu: University of Oulu.
Sarason, Seymour, B. 1996. Revisiting "The Culture of The School and The Problem of Change". New York: The Teachers College Press.
Schön, Donald, A. 1987. Educating the Reflective Practioner. Toward a New Design of Teaching and Learning in the Professions. San Francisco: Jossey-Bass Publishers.
Scott, John. 2000. Social Network Analysis: A Handbook. 2nd edition. Thousand Oaks: Sage Publications.
Seels, Barbara & Richey, Rita. 1994. Instructional Technology: The Definition and Domains of the Field. Washington, D.C.: Association for Educational Communications and Technology.
Senge, Peter. 1990. The Fifth Discipline. New York: Doubleday.
Senge, Peter, Kleiner A., Roberts, C.,Rossa, R., Roth, G. & Smith, B. 1999. The Dance of Change. The Challenges of Sustaining Momentum in Learning Organisations. London: Nicholas Brealy Publishing.
Senge, Peter, Cambron-McCabe, N., Lucas, T., Smith, B., Dutton, J. and Kleiner, A. 2000. Schools that Learn. London: Nicholas Brealey Publishing.
Sinko, Matti & Lehtinen, Erno. 1999. The Challenges of ICT in Finnish Education:Tieto- ja viestintätekniikka opetuksessa ja oppimisessa. SITRA publications. Helsinki: PS-Kustannus.
Skinner, B.,F. 2003. The Technology of Teaching. Published in 1968 originally. Reprinted by the B.F. Skinner Foundation in 2003.
Smith, Hedrick. 1995. Rethinking America. Innovative Strategies and Partnerships in Business and Education. New York: Avon Books.
Snyder, Ilana. 2002. (Ed.) Silicon Literacies. Communication, Innovation and Education in the Electronic Age. Literacies Series. New York, London: Routledge.
Stakes, Robert, E. 1995. The Art of Case Study Research. Thousand Oaks: Sage Publications.

Stoddart, T., & Niederhauser, D. 1993. Technology and Educational Change. Computers in the Schools, Vol. 9, 5-22.

Stoll, Louise & Earl, Lorna. 2003. Making it last: building capacity for sustainability. In Davies, Brent & West-Burnham John (Eds.) Handbook of Educational Leadership and Management. London: Pearson Education Limited.

Study Guide for Language Teacher Training at University of Helsinki. 2003. http://www.malux.edu.helsinki.fi/okl/koulutus/ao/ (Accessed 20.05.2004)

Study Guide for Language Teacher Training at University of Joensuu. 2003. Http://www.edu.joensuu.fi/opiskelu/aineenopettajat/default.htm (Accessed 20.05.2004)

Study Guide for Language Teacher Training at University of Jyväskylä. 2003. Http://www.jyu.fi/tdk/kastdk/okl/opiskelu/ops/opsao0304.pdf (Accessed 20.05.2004)

Study Guide for Language Teacher Training at University of Oulu. 2003. Http://wwwedu.oulu.fi/kasope/AO/ainedid.htm (Accessed 20.05.2004)

Study Guide for Language Teacher Training at University of Tampere. 2003. Http://www.uta.fi/opiskelu/o-opas/kasvatuspedagogiset_opinnot. pdf (Accessed 20.05.2004)

Study Guide for Language Teacher Training at University of Turku. 2003. Http://www.edu.utu.fi/opas/opinto_opas_2003.pdf (Accessed 20.05.2004)

Study Guide for Language Teacher Training at Åbo Akademi. 2001 Http://www.vasa.abo.fi/pf/studerande/studiehandbok/A_amneslarutb.pdf (Accessed 20.05.2005).

Szabo, Michael & Sobon, Sonia, A. 2003. A case study of institutional reform based on innovation diffusion theory through instructional technology. Submitted to Canadian Journal of Learning Technology. Available at http://www.quasar.ualberta.ca/DRMIKE/szabo.htm. (Accessed 16.05.2004)

Taalas, Peppi. 1995. Educational Technology at Vocational Schools. In J. Lasonen & M-L. Stenström (Eds.) Contemporary issues of occupational education in Finland. Institute for Educational Research. University of Jyväskylä.

Taalas, Peppi. 1996. Computers in Education – A Survey of Computer Use Among English Teachers in Vocational Schools and Commercial Colleges in Finland. Vocational Teacher Education College

Publications no.14. Jyväskylä: Vocational Teacher Education College.
Taalas, Peppi. 2000. Information and Communication Technologies for Language Teachers (ICT4LT), Modules 1–5. London: CILT.
Taalas, Peppi. 2003. Nya undervisnings- och läroformer – ny teknologi. An unpublished plenary speech in Lund, Sweden (26.08.2003).
Tammelin, Maija. 2004. Introducing a Collaborative Network-based Learning Environment into Foreign Language and Business Communication Teaching. Academic Dissertation. Helsinki: University of Helsinki. Http://ethesis.helsinki.fi/julkaisut/kay/sovel/vk/tammelin/ (Accessed 21.08.2004).
Teaching and Learning. Towards learning society. White Paper on Education and Training. 1995. The European Commission. http://europa.eu.int/comm/education/doc/down/lb-en.pdf (Accessed 30.05.2004)
Tickton, Sidney. 1970. To Improve Learning: An Evaluation of Instructional Technology. New Providence: Bowker.
Tomei, Lawrence, A. 2002. The Technology Facade. Overcoming barriers to effective instructional technology. Boston: Allyn and Bacon.
Tuomi, Ilkka. 2004. Tietoyhteiskunnassa etiikka on ymmärrettävä laajemmin. Helsingin Sanomat, Vieraskynä, 14.05.2004.
Utbildningen 1993. Helsinki: National Board of Education.
Utbildningen 1997. Helsinki: National Board of Education.
Wagner, Tony. 1993. Systemic Change: Rethinking the Purpose of School. Educational Leadership, September, 24-28.
Warschauer, Mark. 1996. Computer-assisted language learning: an introduction. In: Fotos S. (Ed.) Multimedia Language Teaching. Tokyo: Logos International.
Warschauer, Mark. 1999. Electronic Literacies. Language, Culture and Power in Online Education. New Jersey: Lawrence Erlbaum Associates.
Warschauer, Mark & Richard Kern. (Eds.) 2000. Network-based Language Teaching: Concepts and Practice. Cambridge Applied Linguistics Series. New York: Cambridge University Press.
White Paper on Education and Training – Teaching and Learning – Towards the Learning Society. 1995. COM (95)590. Http://europa.eu.int/en/record/white/edu9511/index.htm (Accessed 31.05.2004)
Winnans, C., and Brown, D. S. 1992. Some factors affecting elementary teachers' use of the computer. Computers and Education, Vol. 18, No. 4, 301–309.

WWW-LINKS

Dialang Assessment System – http://www.dialang.org

Electronic Portfolios References – http://plato75.ncl.ac.uk/Portfolio.htm

Grammar Safari – http://www.iei.uiuc.edu/web.pages/grammarsafari.html

Grand Canyon – http://www.iei.uiuc.edu/travelsim/

HotPotatoes – http://web.uvic.ca/hrd/halfbaked/

ICONS – http://www.icons.umd.edu/

IECC – International Email Classroom Connections – http://www.iecc.org/

The Geology Explorer Page – http://oit.cs.ndsu.nodak.edu/menu/home.ie.htm

The Valley of the Shadow – http://valley.vcdh.virginia.edu/

The WebQuest Page – http://webquest.sdsu.edu/

Using Weblogs in Education – http://www.weblogg-ed.com/

Who Killed William Robinson – http://web.uvic.ca/history-robinson/indexmsn.html

WIMBA – http://www.wimba.com

Appendix 1: List of Software Titles

Software titles in 1994

Language Learning Software:

Visama (by SUKOL), a modifiable textmill type of a program, which has been heavily marketed for the use of English teachers in vocational schools.

Rainbow (by Softmill), a relatively new series of modifiable packages for text manipulation.

Textmills (by Softmill), a series of older packages still in use in many schools.

Bio-Syntax, one of the early programs, an unmodifiable program with text about nutrition, chemistry and such. Used in vocational education.

Alfa Grammar English (Alfasoft), a partly modifiable package with cloze exercises, crossword puzzles. So far, more popular in the comprehensive school because the exercises suit the curriculum better. The program selection is being extended to vocational education too.

Days in London (a.k.a. Zeikkailu) (Palmsoft Publications), an imaginary trip to London with grammar and vocabulary exercises.

Language Colossi (Brainware), a text editor plus text manipulation.

Additional Programs in the Swedish Responses:

Corona CALL, a text manipulation package widely in use in Sweden.

The Missing Links, a series of exercises, used by Finnish teachers as well.

Software Titles in 1997 and 2001

Language Learning Software

A-files, The
Advanced English
Alfasoft products
Business English
Business or Pleasure
Business Territory

Cross-Cultural Assessor
Expert Gallery
Here you are
Kapusta
Private Teacher
Promentor products
Vox Pop
Whole in One: Lester's Choice
Working English

Reference Tools

Cambridge International Dictionary of English
Cambridge UP
Echo
Encyclopedia Britannia
Euro Translator
EuroWord
Grolier
Microsoft Encarta
M.O.T dictionary (and other Kielikone products)
New Cambridge Dictionary
Pc Globe, Maps and Facts
WordFinder
WSOY electronic dictionaries

Learning Platforms and Electronic Web Tools (in 2001 only)

Englishtown
Internetix
Lotus Learning Space
Pedanet
Portti
Telsi (Pro)
Verkkosalkku
WebCT