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ABSTRACT

This volume examines current trends in media education, modern information and communication technologies (MICT), open and distance learning (ODL), and science and technology education. Papers include: "Towards a Communal Curriculum: Strategic Planning and the Emerging Knowledge of Media Education" (Seppo Tella, Marja Mononen-Aaltonen, & Heikki Kynaslahti); "The Concept of Media Education Revisited: From a Classificatory Analysis to a Rhizomatic Overview" (Seppo Tella); "Considerations on Eduscape" (Heikki Kynaslahti); "A Learning Environment--A Euphemism for Instruction or a Potential for Dialogue?" (Marja Mononen-Aaltonen); "From Telepresence to Social Presence: The Role of Presence in a Network-Based Learning Environment" (Maija Tammelin); "Towards the Recontext of the Virtual School" (Seppo Tella, Heikki Kynaslahti, & Jukka Husu); "From Cooperative Learning Towards Communalism" (Anu Passi & Sanna Vahtivuori); "The LIVE Project--Developing Pedagogical Networking through Teacher Education" (Tomi Nummi & Riikka Ristola); "The Role of Distance Education Instruction: Attitudes, Skills, and Strategies" (Jusri DeVries & Seppo Tella); "Current Research Activities in the LUONTI Project" (Jari Lavonen & Veijo Meisalo); "On-Line Distance Learning Environment and Tools To Create It: Design Based on Theory and Practice" (Solveig Jakobsdottir, Sigurjon Myrdal, Haukur Agustsson, & Nicholas A. Kearney). (AEF)

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Publications 8

Seppo Tella (ed.)

Aspects of Media Education

Strategic Imperatives in the Information Age

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Aspects of Media Education
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PREFACE: AGAINST THE GRAIN OR LIKE A HAMSTER ON A THREADMILL?

Background to the Series

Media Education Publications of the Media Education Centre, Department of Teacher Education, is the continuation of an earlier series called **OLE Publications**, created in late 1995. Its purpose was to provide a forum for teachers and researchers to publish articles in English, French or German on themes and topics connected to two European Union-based open and distance learning (ODL) projects, coordinated by the Department of Teacher Education, University of Helsinki. The two projects were **the OLE Project** (Open and Distance Learning in Teacher Education to Promote the European Dimension; 1995–1997, and **the APPLAUD Project**[1] (A Programme for People to Learn At University-level at a Distance; 1996–1998).

The Media Education Publications series consists of articles dealing with media education, modern information and communication technologies (MICT), telematics, computer-mediated human communication (CMHC), distance education (DE), open and distance learning (ODL), flexible learning (FL), dialogic communication, and comparative education with a special emphasis on the European dimension.

Background to the Present Volume

The present volume of the Media Education Publications series aims at looking into some current trends in media education, modern information and communication technologies (MICT), open and distance learning (ODL) and science and technology education. The authors discuss a number of

[1] The APPLAUD project is documented on the following Web page: http://www.helsinki.fi/kasv/media/projects/applaud/applaud.html.

topical issues, connected to an emerging information and communication society, teacher education, communalism and dialogic communication as well as teaching, studying and learning. The main theme in this publication, however, is the analysis of the notion and content of media education.

The authors' attitude towards the topics they discuss could be called critically enthusiastic. They seem to be convinced that the areas they look into are important and worth researching. At the same time, the writers' undertone is appropriately critical, as it should be. A good critique also always contains the discussion of possible threats, the "cons" of the matter in question. Some of the major issues discussed in this publication call for further comment from the editor.

One of the key issues behind much of the discussion is the concept of an information society. As stated in some of the articles in this publication (cf. e.g., Tella et al. 1998; Tella 1998), an information society is an umbrella-like term that covers a number of different phenomena. One of the extreme viewpoints (Stachon 1998) argues that all societies are and have been knowledge-based societies, because the survival of human beings has always depended on knowledge and communication. This argument is interesting but does not perhaps take into sufficient account the fact that it is the relation between an individual and his or her access to the enormous amounts of information that has changed, together with another fact, which is the increased level of collaboration needed in work life. The time of lone wolves is not over, of course, but co-operation, collaboration, communalism and dialogism are some of the new prerequisites that cannot be neglected.

Even if several variations of an information and communication society are briefly introduced in this publication, the main focus will not be on *virtual society frameworks*. As a foretaste—or instructed by omniscient hindsight—one figure will be presented in this respect, viz. Agres, Edberg & Igbaria's virtual society framework (1998, 72). The basic definition of a virtual society, based on Agres, Edberg & Igbaria's work (1998, 72) will be given by Tella (1998, in this publication), namely, *cultures based on the logical rather than the physical.* From the point of view of the articles presented in this publication, it is interesting to notice that many components of the virtual society framework will be discussed, though. For instance, as Agres, Edberg & Igbaria (1998) speak of two main components, that is, driving forces and issues, many of these will be touched upon by the writers of this book. Global economies, for instance, are related to globalisation, enlightened population may refer to the requirements the school system has to face, namely providing all citizens with adequate know-how in information handling skills. Telework and CSCW (computer-supported collaborative work) will be discussed by Tella (1998, in this publication). Issues associated with communities and learning organisations will also be discussed. The tension between individual and world is highlighted in Passi & Vahtivuori's (1998, in this publication) ideas of individualism vs. communalism.

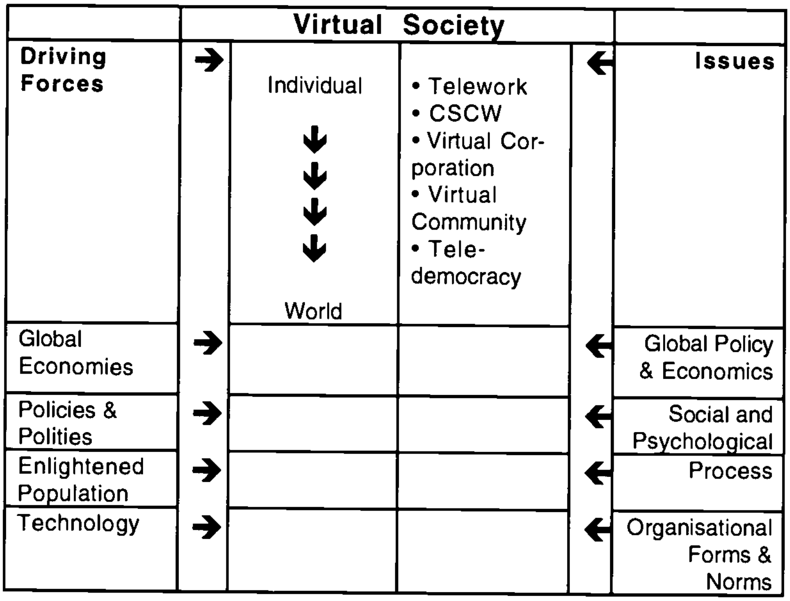

FIGURE 1. VIRTUAL SOCIETY FRAMEWORK (AGRES, EDBERG & IGBARIA 1998, 72).

Agres, Edberg & Igbaria's framework (1998) is an evolutionary model that aims at conceptualising an entity hierarchy for virtual societies. Its strength is that it attempts to summarise many of the relevant features that need further research. In this sense, it is a thought-provoking catalyst and thus worth citing and being analysed in the context of media education.

All the authors of this publication are teacher educators either in initial teacher education or in in-service teacher education. Therefore it is only natural that many of the reflections are mirrored in teacher education and the Finnish school system. Nummi & Ristola, for instance (1998, in this publication) remind us of the aim the Finnish Ministry of Education (Ministry of Education 1995) set a few years ago, namely that all Finnish schools should be networked by the year 2000. In the major co-authored article in this publication (Tella et al. 1998), this aim is being assessed. The authors remark that in 1997, 65% of all schools were already networked and that more than 1,000 primary and secondary level schools (out of 4,800) already had a home page on the Web in 1997. Sinko & Lehtinen (1998, 30–32), however, in their interim report about the *status quo* of ICT in Finnish schools, show figures that do not bode well for the future; even if 75–80% of lower and upper secondary schools are networked in 1998, the situation is worrying as far as hardware goes. They continue that against current belief, the situation in Finnish upper secondary schools is inferior to the average in EU countries. In the UK, for instance, secondary level institutions have one machine per 9 students (target: 1 machine per 6 students), while in Finland in 1998 there is one machine per 12 students (target: 1 machine per 8 students). Sinko & Lehtinen (1998, 31) also criticise the fact that teachers' ICT in-service education is completely the responsibility of the municipalities. — The argument presented in this publication is somewhat different; we argue (Tella et al. 1998, in this publication) that more attention should be paid to knowledge strategic planning by the schools and the municipalities.

On the other hand, it is also easy to show off with statistics in which Finland comes first. For instance, the Top Ten list of the number of Internet access points consists of all the Nordic countries, the USA, Canada, Australia and a number of others. The highest figure comes from Finland with her 5.52 Internet access points per 100 inhabitants[2].

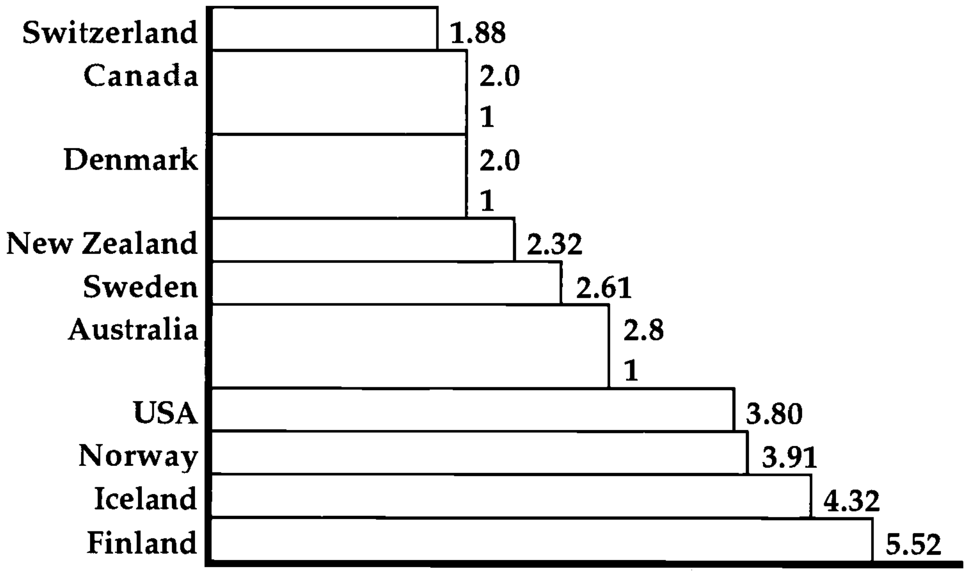

FIGURE 2. The number of Internet access points per 100 inhabitants in 10 countries (ITU World Telecommunication Indicators Database. Network Wizards, 1997).

Admittedly, these figures do not directly correlate to the quality of use of these points but are still indicative of many present-day trends. From our point of view, these kinds of statistics *are* important, as a growing number of activities related to media education is concerned with access to the Internet and the WWW. Technology facilitates networking but it alone "does not guarantee the viability of the virtual society, for the technological power must be used intelligently and deliberately by an informed population" (Agres, Edberg & Igbaria 1998, 72; cf. also Mononen-Aaltonen 1998, in this publication).

² Today's figure is 6.23 according to the latest Finnish statistics.

During the past few decades, one megatrend in education has emphasised co-operation, collaboration and experiential learning. These play an important role in this publication as well. Even if on the whole, they contain positive things and have contributed to the development of the teaching–learning interaction most beneficially, we should also bear in mind that their basic values are not always necessarily the ones Finnish culture has in the past appreciated as such. Ryffel (1997) points out two *caveat*s in experiential learning, when analysed from a cross-cultural (or transnational) perspective. The first *caveat* is concerned with commercial materials which tend to be written primarily for native English speakers in mind. The second *caveat* is about the basic values embedded in the principles of experiential learning:

> "The second caveat is that experiential teaching is primarily based on U.S. values—for example, learner centeredness, teacher as facilitator, learning by doing, verbalization, peer interaction, self-disclosure, and small-group work. Although similar notions are popping up elsewhere, many of these are part of the North American educational experience. In addition, many of these activities assume trust and risk taking among the participants because many experiential exercises by their very nature make students vulnerable. It is important to remember that a large portion of the world ... comes from collectivist cultures where relationships and harmony are of prime importance, maintained through indirect or less direct communication. Students from such cultures may have initial difficulty articulating opinions that could threaten group harmony, such as discussing sensitive, personal issues with others with whom they do not yet have a relationship. Strategies that guarantee students a rather safe environment for exploring potentially sensitive topics are therefore desirable." (Ryffel 1997, 29–30)

What has this to do with media education and modern information and communication technologies? Quite a lot, I would argue, as modern telecommunications can be used to create experiential learning situations, especially when constructivist or social constructivist learning is encouraged. In these situations it might be advisable for teacher educators, teachers and tutors to remember that not all students benefit from all the features embraced by this approach. True, most educators would agree that the majority of the principles mentioned by Ryffel (1997), for instance, are worth using in classrooms and in lecture halls. Yet Finland has belonged—and she still belongs—to the high context cultures, in which indirect communication is highly thought of. When social presence or telepresence is being discussed (Tammelin 1998, in this publication), the above characteristics also need to be borne in mind and to be reconsidered.

One final comment about the content of the articles in this publication. Kynäslahti (1998, in this publication) analyses the highly sensitive nexus of time and place and poses the intriguing question of where we really are if we—or at the very least our communication—become independent of time, place and location. Castells (1996, 464) proposes an idea of *timeless time* as a label for the dominant temporality of our society. Timeless time, in Castell's terminology, occurs when "the characteristics of a given context, namely, the informational paradigm and the network society, induce systemic perturbation in the sequential order of phenomena performed in that context" (Castells 1996, 464). Timeless time, being always accessible, acting like a hamster on a threadmill ... do they not tell something about our own time? About that aspect of an information and communication society, about modern information and communication technologies, witnessed by most of us, that make us feel that using technology does not liberate or emancipate us from inauthentic labour; rather, dealing with time and coping with heightened expectations of what can be done by and with technology is about to create a situation where human resources and technology become incompatible, because technology is too efficient and leaves no space for a human being to breathe, to be alone, to think. Is presenting this kind of idea going against the grain or is it one of the survival skills we would have to teach all our students? Coping with learning and working situations in which everybody expects us to react more and more quickly (cf. Tella's comment on Chomsky and Bourdieu, 1998, in this publication). This is one of the issues that probably needs more analysis than has been given to it in this publication. The faster the communication and the more efficient the technology at our disposal, the less time we have to react, to reflect, and to think about what we would really want to say to people who try to contact us. Timeless time is very aptly put; it summarises some of the threats we are facing in an information and communication society unless we realise and learn how to use technology wisely and in a humane way.

It should be borne in mind that, first of all, media education is not about technology; it is about media, education, human-to-human interaction, dialogic communication, culture, arts. Media education is about things that take time. We should learn again how to respect the old saying "Take your time". Technology comes second, but yet at its best it helps us strive for our first *credo.*

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I would now like to introduce the authors and their articles in this publication.

Seppo Tella, Marja Mononen-Aaltonen and **Heikki Kynäslahti**, in collaboration with **Tomi Nummi, Anu Passi, Riikka Ristola, Janne Sariola, Sanna Vahtivuori** and **Petra Wager** deal with two major topics. First, they analyse the way towards a communal curriculum through intensive dialogic discussions, literature reviews and finally concretising their plans regarding knowledge strategies. Second, and in perfect harmony with the first goal, they envision an ideal Media Education Centre, in which the best ideas and ideals could be carried out. This article is a major contribution to the present volume, and even more as it highlights the main emphases as felt and expressed by several members of the staff of the Media Education Centre. The article is complemented with a selected list of references concerning strategic documents in the Finnish context as well as at the European and international levels.

Seppo Tella analyses the concept of media education from several viewpoints (Education, Psychology, Sociology, Philosophy, Culture and Technology). He also highlights some of the key terms and concepts that appear regularly in the research literature. Gradually, in his article Tella moves from a rigid classification towards a more flexible rhizomatic metaphor.

Heikki Kynäslahti launches a new concept of 'eduscape' while discussing some of the megatrends in media education and modern information and communcation technologies, such as the time–place nexus, transnational culture, globalisation and deterritorialisation.

Marja Mononen-Aaltonen analyses the notion of a learning environment, relating it to a dialogic interpretation. One of her main arguments is that the characterisation of learning environments must emerge from research. She concludes that in an information-rich and knowledge-intensive society the most important feature will most probably consist of theoretical knowledge, a source of value and of growth to every human being.

Maija Tammelin looks into different roles of 'presence'. She distinguishes between telepresence and social presence and gives a number of examples of how social presence manifests itself in a network-based learning environment.

Seppo Tella, Heikki Kynäslahti and Jukka Husu first analyse how the school, traditionally, has been the place where teachers and students meet each other. Their primary argument is that ICT has enabled to establish virtual educational environments called 'virtual school', 'virtual classroom', 'virtual university',for instance. Moving from traditional schools towards more sophisticated forms of schooling necessarily calls for considerations of both the context of present school and of the possible contexts, or *re*contexts, of virtual schools. The authors see the emergence of the virtual school as a paradigmatic change within the school institution.

Anu Passi & Sanna Vahtivuori deal with some salient differences between co-operative, collaborative and communal learning. The Sharans' Group Investigation is presented as a model of collaborative learning. Their article then focuses on the construct of communalism, especially in the framework of a school-based project between four EU countries.

Tomi Nummi & Riikka Ristola build a three-level model of networking in teacher education (physical, social and pedagogical networking). Their article is grounded on current research findings gathered from the LIVE project, in which they both work as researchers and tutors. The writers see the skill of creating functional networks as a challenge for future teacher education.

Jusri DeVries & Seppo Tella discuss the role of the faculty member in a distance education setting and argue that distance education requires new skills and attitudes different from those required in a "traditional" classroom. Since many educators are unfamiliar with this innovative educational setting, training concerning both the technical aspects of the system and the strategies for teaching students at a distance would benefit both teachers and students. Their article combines experiences gained especially in Canada, the United States and Finland.

Jari Lavonen & Veijo Meisalo introduce some current research activities connected to their LUONTI project. While highlighting some of the crucial focuses in science and technology teaching at the moment, their article also deals with certain fundamental issues related to teaching and learning, such as co-operation, good school practice and assessment.

Sólveig Jakobsdóttir, Sigurjón Myrdal, Haukur Ágústsson and **Nickolas A. Kearney** discuss on-line distance education tools and materials. They outline some pedagogical needs that could drive the design of powerful new tools or help educators select from the range of distance education authoring tools already available.

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On the whole, this publication is a product of multidimensional co-authoring and collaboration, which, hopefully, will contribute beneficially to the development of media education as well as teaching and learning in general.

I would like to extend my heartfelt gratitude to all the authors of this publication. Also, I would like to thank all of you who contributed to the illustrations of this publication. Most of the figures in the first co-authored article were generated in hectic group discussions by several members of the staff of the Media Education Centre, as explained in the article itself. The original illustrations were then drawn by several persons, of whom I would like to mention **Riikka Ristola** and **Petra Wager** in particular, without, however, forgetting that also **Anu Passi**, **Sanna Vahtivuori** and **Tomi Nummi** contributed to the final versions of these figures. Some of them were slightly modified by **Seppo Tella**, who also rendered the Finnish-language originals into English, and finally by **Kari Perenius**, who redrew some of the other figures in this publication, although the basic work was always done by the authors of the respective articles.

I am deeply indebted to **Kari Perenius,** for taking good care of the technical side of the publication. The new format (B5), together with a lot of illustrations and the number of authors, brought about a legion of small or big technical problems that Kari was able to solve in his professional way.

I am most grateful for having the chance to add this publication to the present series of **the Media Education Publications of the Media Education Centre** of the Department of Teacher Education.

Helsinki, August 15, 1998

MEDIA EDUCATION CENTRE

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Towards a Communal Curriculum:

Strategic Planning and the Emerging Knowledge of Media Education

Seppo Tella, Marja Mononen-Aaltonen & Heikki Kynäslahti

in collaboration with Tomi Nummi, Anu Passi, Riikka Ristola, Janne Sariola, Sanna Vahtivuori and Petra Wager

Abstract

The Chair of Media Education was established in the Department of Teacher Education in the Faculty of Education at the University of Helsinki on 1 August 1996. A month later, the Media Education Centre began operating as a unit providing teaching in media education and investigating it as a discipline. This article discusses the knowledge strategic thinking of media education as a science and the Media Education Centre as a functional community. The reflections are based on the current rapidly developing and changing *milieu* which gave rise to media education. Life-long learning and a new communalism are educational phenomena connected with these aspects. On a theoretical level the article provides a survey of the starting points of the communal curriculum.

The article also foresees a new role for teachers and changes in the role of the teacher in an information and communication society and discusses the new challenges faced by teacher education, particularly from the point of view of media education. The main focus lies on knowledge and the emergence of knowledge, which are analysed through Popper's theory of three worlds. Knowledge strategy and its implementation are approached from various directions and practical instructions for establishing a knowledge strategy are provided. Finally we shall outline and envision the Media Education Centre as the best possible learning and teaching community.

Keywords: Media education; knowledge; strategy; knowledge strategies; communalism; teacher education; learning; teaching.

1. BACKGROUND

Knowledge strategies are being discussed more than ever. It is easy to say that they are just a fad which will soon pass if we have the patience to wait a little while. However, instead of considering it just as a temporary phenomenon or passing whim, the writers of this article see the discussion on knowledge strategies as an important working method with regard to one's own future and development. During its early days and in 1998 in particular, the staff of the Media Education Centre[1] have reflected extensively on what knowledge strategies really are and how their analysis can facilitate the development of media education as a discipline associated with education and pedagogy. Knowledge strategic thinking also constitutes the strategic planning of the operations of the Media Education Centre. The processing of knowledge strategies is also part of our own personal development. The writers of this article all participated in the discussion on knowledge strategies in late autumn 1997 and spring 1998.

[1] The Media Education Centre was established on August 28, 1996 as part of the Department of Teacher Education at the Faculty of Education at the University of Helsinki.

This article constitutes the first phase of a long-term strategic development, whose aim is to establish principles for future action, to see past everyday toil, and to ascertain the limits of media education and the skills and facilities needed by a future-oriented researcher and teacher of media education. The main components of this thinking are shown in Figure 1. The main objective is to outline a knowledge strategy for media education as a separate discipline. At the same time, the strategy will be consolidated for the Media Education Centre so that it can serve as a basis for a communal curriculum. A parallel objective is to consolidate a knowledge strategy for parties closely connected with our own community, teacher education in particular; after all, the Media Education Centre is part of the Department of Teacher Education.

Our thinking is based on the idea that the development of a community which is significant and meaningful for the people operating in it is connected with a deeper *understanding* of its operational principles. People determine the meaning themselves and add a personal significance to it.

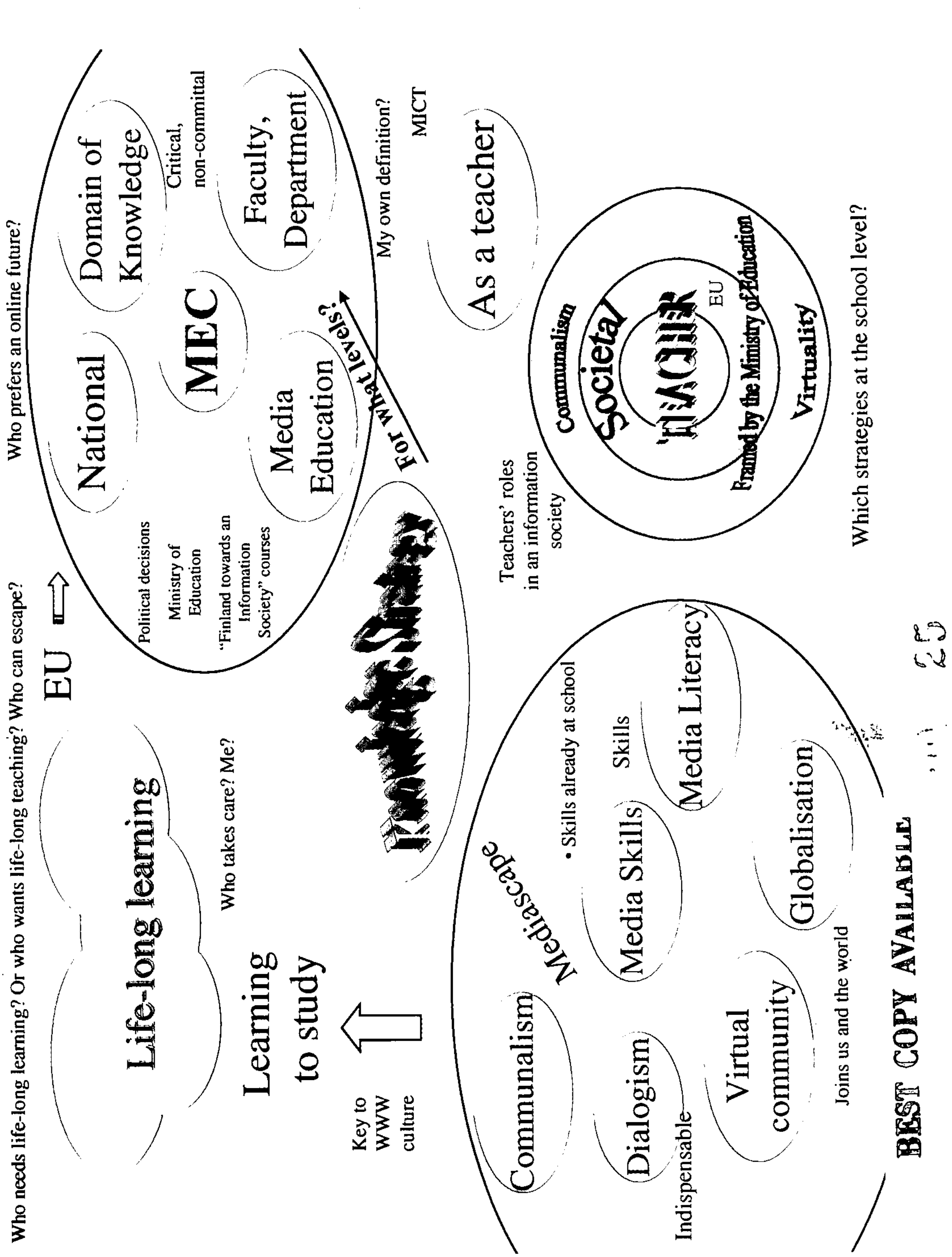

FIGURE 1. Elements of Knowledge Strategic Thinking.

2. Scapes of Media Education

1.1 The *Milieu* of Our Time

The intensive use of information and communication technologies (ICT) is often linked to the umbrella-like concept used to describe our era, that is, post-modernism. The roots of post-modernism are now searched for in architecture, now in the social changes which took place at the turn of the 1960s. In terms of media education, the matter can be approached from the point of view of the development of the social theory studied by Kumar (1995), following the path marked by Bell (1973) and Toffler (1970; 1981). The writers see the economic crises of the early 1970s as another turning point: we are moving from industrialism to post-industrialism. Kumar (1995) derives from this turning point three interconnected theoretical developments: post-modernism, post-Fordism, and the information and communication society. We shall first look at post-modernism and its train of thought, proceeding to a discussion on the effect changes in industrial production have on education. Finally, we shall analyse the concept of information and communication society and some of its synonyms.

Post-modernism is not a straightforward or simplistic view of our time; rather, it is characterised by eclecticism and fragmentedness. Thus, post-modernism provides media education with different viewpoints for observing our world. Information and communication technologies have been expected to increase democracy. Another approach is the post-modernist view practised in particular in critical pedagogies (e.g. Aronowitz & Giroux 1991; Giroux 1992; McLaren 1995). As implied by Lyotard's famous statement on the death of great narratives, small narratives now take the place of great ones. The emphasis post-modernists give to minorities and the powerless evokes a response by the above-mentioned representatives of critical pedagogies, who speak for the voiceless people, for example. In the field of dialogism (see Chapter 4 of this article) parallel views are presented elegantly under the concept of polyphony i.e. the dialogue of many voices (Tella & Mononen-Aaltonen 1998).

Were ethnic majorities or post-colonialist overtones not as central issues in Finnish society as in the writings of post-modern critical pedagogies, a similar point of view of the common people is still present in media education research. This is most apparent in the wide interest in projects whose aim is to develop educational conditions in the rural areas and to secure the existence of small schools by utilising the opportunities offered by modern information and communication technologies. Those media educators also speak for the common people who, using its own weapons, attempt to fight the danger of marginalisation which is also connected with the development of the Finnish information and communication society. Such weapons include offering people opportunities for use of extensive information, and improved opportunities for communications and control over their own learning or work.

Post-modern trains of thought are also manifest in our relationship towards knowledge and reality. Knowledge is the result of production (Lyotard 1985; Finnish edition), a product in the same way as the products of industrial manufacturing. Castells (1996) regards production through the conceptual framework of *informationalism* and, like Lyotard, sees production as a knowledge-producing phenomenon.

Media education lives in a world characterised by loss of context. We can also term it decontextualisation. The definition of knowledge may also be based on this starting point, in which case knowledge without a context is termed information. Fundamental issues also include the relationship between the real world and a world created through simulation, which has brought with it the problems involved in virtual environments. This relationship, as simulations in general, has been studied by Baudrilliard (e.g. 1988), whose ideas of the endless simulation circles of the *simulacra* constitute a description of post-modern phenomena. These views have also been employed in the field of media education in the study of virtuality. On the other hand, many theoretical approaches also find free flows amidst the context-dependence of our world, in the fields of culture, economics, communications, and other walks of life. These flows have been analysed under the concepts of *space of flows* (Castells 1996) and *scapes* (Appadurai 1990). These phenomena are international, so in addition to decontextualisation they include a global aspect. Within the limits of a national education system we are not used to paying much attention to the effects of globalisation on education. With regard to media education, however, globalisation is a key phenomenon whose importance to the knowledge strategy of the discipline is crucial. One of the tasks of media education is to study the global flows of education and to analyse their relevance and effects on education in Finland. This brings us close to the study of globalisation in distance education whose key aspects include the analysis of the relationship between globality and locality (e.g. Evans 1995; Edwards 1995; Evans & Rowan 1997; Bartlett et al. s.a.).

Of various theoretical approaches to globalisation, those most useful in terms of media education are the ones which regard globalisation as an activity between individuals and groups which overcome national and cultural boundaries (see Robertson 1992; Spybey 1996). This approach can be applied to the study of an individual school as a user of global flows, for example. On the other hand, globalisation does not happen equally in all parts of the world; so far, globalisation has only taken place in developed countries. The several global flows and the changes they effect lead to speculation on the emergence of an international community instead of individual national states. (Lash & Urry 1994) Globalisation creates several social groups which spread outside the borders of an individual independent national state. Traditional democracy gives way to a new, cosmopolitan democracy. Its main components are communities which have been established through various power networks. Today, communities are established around time, not space. The media open new opportunities and bring distant events closer. Correspondingly, people find they can create imagined worlds where culture and meaning are based on global communication. (Lash & Urry 1994)

The post-industrial society has also given rise to a trend called post-Fordism. Several analyses suggest *flexible specialisation* as its key aspect (Kumar 1995; Jencks 1996). The change in production from a Fordist production line to other forms of production enabling flexible response to demand sets new requirements for the skills and know-how of the workers. The changing tasks call for continuing education, which is one of the factors underlying the educational thinking called life-long learning. Naturally it is also a question of correspondence between education and productional needs in a novel situation (Brown & Lauder 1992; Arnold 1996). On the other hand, educational organisations themselves can be analysed through post-Fordist organisation. Carter (1997) calls this approach the *school as flexible firm* approach. In media education, a corresponding theoretical framework has been applied to the study of school networks and the teacher's job description (Kynäslahti & Husu 1997; Tella & Kynäslahti 1997, 1998). This has continued the recent theoretical discourse on distance education and open learning conducted in the magazines *Open Learning* and *Distance Education*, for instance, and based on the theoretical trend of distance education founded on Otto Peters' theory of industrialisation.

In our *fin de siècle*, the discussion, of interest with regard to the entire society, has focused on the information and communication society. The concept of the information society derives from Yonedi Masuda's ideas of the development of Japanese society in the early 1970s. His concept was translated into English as 'information society'. This translation in itself was problematic, and the same problems are found in Finnish between 'information society' (informaatioyhteiskunta) and 'knowledge society' (tietoyhteiskunta). Ilkka Niiniluoto considered this question in the late 1980s without arriving at "any recommendations or requirements of the 'correct' use of language" (Niiniluoto 1988, 8).

Finnish societal discussion has largely adopted the latter term, which is also used in the programme called "Finland Towards an Information Society". Although part of the operations of the Media Education Centre fall under this heading, we—as the reader may have noticed by now—prefer the term 'information and communication society'. This emphasises the communicative component of the term as communication is becoming an increasingly important part of our society. This term is also referred to by the key concept of information and communication technologies (ICT), now used instead of the earlier term 'information technology' (IT). Thus the existence of an information and communication society is indicated by the prevalence of the relevant technologies in various contexts such as education.

Another element is an increase in knowledge-based work, as indicated by use of the term *knowledge worker* (e.g. Kumar 1995). This is further connected with the question of the importance of knowledge in production discussed above. Finnish information and communication society and its future are a subject of ongoing discussion. The present article is connected with this discussion.

Living in a period of social change must take us back to values. We must think about what kind of development is desirable as we construct the Finnish information and communication society. In our opinion we must set out to establish a society which caters for all the citizens and where no-one is marginalised. For example, each citizen must be given an opportunity and a right for equal education and for acquiring the media competence required by the information and communication society. All quarters of the society must commit themselves to supporting and contributing to the information and communication society. Networking facilitates a novel innovativity and productive learning. Individualism is not without importance, either. As individuals control their own lives, it is easy to establish networks and relationships between various partners. Individualism and communalism (*yhteisöllisyys*) are allowed to walk hand in hand supporting each other.

The information and communication society is currently referred to with several terms which underline different characteristics of the post-industrial society. For example, *Tulevaisuuden sivistysbarometri* (the Barometre of Future Trends in Education 1996) refers to an 'understanding and wisdom society'. This we can aspire to by combining humane and technological viewpoints in accordance with socio-cultural concept of learning. Communalism and communal learning will increase, while in education the emphasis will increasingly lie on interaction, learning together, and working together.

Himanen (1995) talks about a 'society of encounters' (kohtaamisyhteiskunta). His definition emphasises the opportunity offered by the network-oriented society for diverse interaction where individual lifestyles are shaped by various social communities. Such communities may emerge irrespective of time and place, in which cases we talk about virtual communities. In a society of encounters interactive know-how and skills are not an opportunity but a requirement. Global encounters also require adopting new attitudes (Himanen 1995, 183).

The concept of a society of encounters includes an idea of technological changes in communications and new communication methods, which are reflected in the societal reality and the forms of communalism. The development of information and communication technologies has led to changes in the tools which now support social action (Lipponen 1997; Tella 1994). Information and communication technologies may promote a new kind of sociability.

The ability to learn to communicate in different communities and to learn to use new tools is essential for operating in modern society. Communication and media skills alone are not enough. In the new multimedia-based study environments the ability to work together is indispensable. No-one manages on their own. In addition to media skills, learners should be taught teamwork and interactive skills (cf. e.g. Johnson & Johnson 1996, 1017–1018). These skills should be learned in as early a stage as possible. Educational institutions and individuals have answered the challenge of the development of information and communication technologies and seek new, alternative forms of study and modes of action. Now we must consider the role of technology in learning, and how communication is affected by information and communication technologies.

If school in the wider sense of the word is to be developed towards a greater openness, the first step is to improve communication in general. In future educational institutions individuals will have opportunities for multidimensional communication and studying throughout life. The importance of general education will increase and it can be regarded as an ability to challenge authorities. An open and creative learning environment is based on aspects arising from the needs and interests of the learner, and it also provides an opportunity for co-operation and social interaction (Tella 1994, 53–55).

The recent process of societal changes is becoming a permanent state. There is not just one correct theory about the future, nor one clear vision. What is on offer are alternative theories and interpretations. Thus, living at this moment in time and setting out from it cannot be realised by looking backwards. We must face the future by evaluating various developmental trends, various scenarios. Permanent changes and a range of options present new claims on an individual which were unknown in previous societies. We are continuously facing a novel situation which requires new kinds of studying skills, learning, and renewed qualifications.

2.2 We Live and Learn

A human being is always an embryo, a novice capable of development, who daily hears, sees, reads, or experiences something he/she has never encountered before. In a rapidly changing society people are never all-capable, all-knowing or all-competent. To be able to operate as a fully qualified member of society people must keep abreast of the times, study, and learn new things. While studying continuously a person also remains capable of development. In the information and communication society, work and studying have formed an eternal alliance. When work and study overlap so that work feels like studying, we have reached a situation where one of the main areas of life corresponds to the ideal of continuous, life-long learning.

Although the adoption and internalisation of the idea of life-long learning depends on the individual and although it is a result of internal insight, continuous learning must be supported in all environments and phases of life. To be able to continuously learn new things people must nevertheless have sufficient basic skills and knowledge to build on. In Finland, the foundation of learning is laid in a comprehensive school system which provides high-quality general education for the entire age group. Those with only basic-level education need special support for raising their level of attainment. Moving towards life-long learning an individual needs, in addition to a solid basic education, skills for studying both alone and in a group, and the ability to evaluate his/her own learning. Society also has its obligations: among other things, it must create opportunities for life-long learning. We shall first look at issues related to the individual.

The idea of life-long learning is best adopted when individual learning styles and needs are supported from the very beginning of education. Each individual has a special talent which should be developed. Education should develop facilities to support learning techniques and attitudes with an eye to the future. This will emphasise the cross-curricular knowledge and skills (Kaivo-oja et al. 1996). In expert cultures everyone knows something, but no-one knows everything. Communal social action results in a learning and creative community where the acquired skills and knowledge are used for the common good. In communal thinking specialist knowledge is not productive when isolated; instead, the aim is to establish such operational communities where different abilities complement each other. The objectives of life-long learning are necessarily ambiguous. What is important is the process where several people work together and study for the future. It is also of crucial importance to continuously evaluate the said process and thus the progress of learning. Continuous assessment of one's own actions and self-development based on it are part of a human being's target-oriented behaviour. In life-long learning it is essential to recognise the need for change in oneself and in society and to evaluate the learning process in a holistic manner. (Markkula & Suurla 1997)

Life-long learning also sets certain obligations on society. To achieve extensive life-long learning people must have a number of opportunities for learning new things; the range of options must be extended further (Committee Report 1997:14). Current educational institutions do not yet provide the best possible framework for the realisation of the principles and ideals of life-long learning. This brings us to the concepts of open learning environments and networking. They further underline the importance of co-operation between communities and meta-level interactive skills. Open and flexible learning includes access to studying environments irrespective of time and place and the provision of equal opportunities for everyone willing to study (cf. also Tella 1998). Openness and flexibility guarantee that each individual can in any phase of life study and learn. In accordance with the idea of life-long learning, studying and learning are linked with individual experiences and thus constitute a part of one's personality.

Modern information and communication technologies (MICT) enable the implementation of new open and flexible environments. The opportunities provided by telematic communications are studied in several projects at different school levels. For example, the National Board of Education is currently developing methods, applications, and practices in a distance education project where adults study the courses of the senior secondary school (lycée) in accordance with the principles of open and flexible learning. The networking of various educational institutions, homes, and workplaces may help to prevent the inequality hidden in the information and communication society.

To be able to establish new paths of study, an individual needs information and outside support offered by experts on learning and studying. The importance of the role of the teacher, tutor, mentor, and adviser is underlined in the open study environments with an emphasis on information and communication technologies. Life-long learning means independence and development, but most of all assuming responsibilities. A target-oriented attitude is also included in the main objectives of life-long learning, where the targets are largely set by the student him/herself. However, proper tutoring supports learning and helps the learner to better analyse his/her goals, which leads to the motivation remaining high.

The expertise and attitude of the teachers and other mentors is of crucial importance regarding the attainment of these goals. Inservice education is particularly important in new fields which support the development of the information and communication society, such as media education.

At the Media Education Centre we make an attempt to follow the principles of life-long learning: learning is an opportunity, self-development almost a duty, life-long learning an attitude. We aim to awaken in our students an interest in self-development also after attaining formal qualifications and in adopting a continuously learning attitude. The value of know-how becomes as important as the value of formal education. The teachers' inservice education programme "Finland Towards an Information Society" is a functional example of our teaching activities where adults already in employment are supported and encouraged to continuously develop themselves and their existing skills. Our task is to provide expert support, help, and consultation, while our community maintains interactive relationships between initial and inservice education. Thus our community becomes more closely involved in networking between various educational sectors. These aspects are also paid attention to in our strategic plan which thus supports our own operations and goal-setting and helps us see our major objectives and goals from the point of view of teacher education.

2.3 Towards Communalism

2.3.1 Philosophical Background of Communalism

The idea of the role of communalism (*yhteisöllisyys*) as a social pillar derives from the roots of Western civilisation, the philosophers of ancient Rome and Greece. Regarded as the philosophers of individualism and communalism, Aristotle and Hegel maintain that people can only realise themselves as members of communities. The community is of fundamental importance with regard to the development of an individual's identity and development. According to Hegel, individualism and communalism go together and the truth is found in the overall context. The fundamental question is, how can individuals realise themselves in communities. For example, Kotkavirta (1998, 101–121) has observed that authentic individualism and genuine communalism can only emerge when individually free and equal people co-operate.

According to Kopper (1988), Solomon (1993) and Taylor (1995) also emphasise the importance of communalism in society. Solomon, for example, sets out from a good life, happiness, and prosperity. The good life depends on the communal and cultural milieu in which the individual operates. The individual must take into account the values and methods of the community and the part his/her own task or role plays in it. Co-operation, solidarity, loyalty, and commitment are the concepts Solomon associates with community (Kopperi 1998, 149–163).

Taylor (1995) addresses the major problems of our time, such as the loss of the meaning of life and the egoism typical of our age. Taylor offers a solution by emphasising the community as a resource for human beings' survival. The central challenge is to find other solutions to societal problems than just legislation and social norms. Problem-solving requires co-operation, joint responsibility, and the renunciation of self-interest.

Solutions to the challenges presented by current societal changes may be sought in the social theory of Habermas (1982) and Frankfurt, which is based on the critical school thinking. Habermas sees education as a process aiming at mutual understanding. A human being is self-directed and active. Education is an interactive dialogue between equal operators. According to Habermas, critical theory seeks to reflect the communal developmental process which has resulted in the current societal situation (Habermas 1982, 17; Latomaa 1994, 66–71).

The aim of Habermas' (1982) critical theory is the enlightenment and the social emancipation it brings about. Critical theory aims to determine a target group which could serve as the bearer of this enlightening process. Media education as an interdisciplinary social science provides the opportunity to serve as the active initiator of this process. In the light of Habermas' (1982, 9-10) thinking, it is in the interests of media education to seek liberation from the obstacles to mutual understanding and equal dialogue.

2.3.2 Communalism as an Opportunity

We live in an age which requires people to act communally both when planning their actions and when acting (e.g. Johnson & Johnson 1996, 1017–1018). Teamwork skills are a prerequisite for success at work and work management. Cooperation, communal studying, and communalism are possible and functional working modes in telematic environments (see Passi & Vahtivuori 1998). In cooperative groups, it is equally important to give and to receive help. Learners understand that they can only reach their goal if the group, the community, reaches its goal (e.g. Johnson & Johnson 1996).

A human being has an innate need to belong, to be accepted and loved, and to act as a member of a social community. Understanding learning and studying as an interactive process is an old idea, but it is central to both constructivist and socio-cultural concepts of learning. The conscious desire to communicate becomes the major element of learning. A social situation gives an individual the chance to externalise his/her thinking to others and thus to create his/her personal interpretation. Interpretation is an important step when information is processed into knowledge. Language has a crucial role in the development of understanding (e.g. Sharan & Sharan 1992; Rauste-von Wright & von Wright 1995, 128; Sharan & Rickett 1996). According to various theorists of co-operative and communal learning, most learning takes place when the learner's own thinking is analysed either orally or in writing and information is produced interactively. From the point of view of the Media Education Centre, the present strategy document represents this kind of integrated thinking and joint writing.

In communal learning the learners discuss, externalise, and interpret information. Dialogic communication and interaction are associated with trust and sharing. Dialogue is a tool of communal learning and thus of genuine communalism. When aiming at communal learning, the teacher's role and ability to initiate dialogue in the group are crucial. The teacher's task is to teach co-operative and collaborative skills and to support the group processes of the learners, whether at school, university, or their virtual equivalents, such as virtual school or the Internet (Tella & Mononen-Aaltonen 1998).

Learning is a matter of changing concepts in a communal learning situation. This means that information *per se* changes, not only increases. Genuine knowledge results from the processing of pieces of information in a social situation. A change in the perspectives and roles of the group deepens individual thinking. Technology may promote new communalism and, on an emotional level, convey touching experiences which form components of effective learning (cf. Passi, Ristola & Vahtivuori 1996). With the help of technology, individuals may act as catalysts for each other's thoughts. Genuine communalism includes a desire and an ability to understand otherness. Another human being, another philosophy and culture should be met with open arms (Sivistyksen tulevaisuusbarometri 1996; Varis 1995, 6–9).

Know-how and the importance of networks only emerges with a better understanding of each other and of communication. Communal action and learning are linked with the concept of shared expertise. Socially shared expertise means that people complement each other and that the group should be more intelligent that the individuals together. We find it valuable that these thoughts have found a place in documents outlining the future of our nation (cf. e.g. Tulevaisuuden sivistysbarometri 1996). Communal thinking is emphasised, since information produced by specialists is not productive when separate. Action is successful when different skills complement each other.

Communalism is not easily established by authoritarian instructions. Change begins in the people themselves. The need for communal action arises with the recognition of its benefits and opportunities for growth. Teachers have a grave responsibility ("Opettajat on pantu paljon vartijoiksi" Simola 1995). They hold key positions when future generations are educated towards active participation in an information society. Without a change in them there will be no change in the work culture of the school.

2.4 Teachers' New Roles

Teachers' status and roles in the information and communication society are closely connected with the strategic patterns of thought at the Media Education Centre. According to Tella & Kynäslahti (1998), the development of teachers' status is subject to at least two simultaneous and important changes. First, teachers are now confronting pedagogical issues similar to those long considered by distance teachers, since distance teaching and distance learning have become familiar through the application of sophisticated technologies in contact teaching. On the other hand, network-based learning (NBL) is becoming increasingly popular, as the use of the Internet becomes more widespread on different school levels (e.g. Tella 1997). A change in the communication and type of interaction in a teaching and learning situation towards partial or complete use of information and communication equipment gives raise to a question on the role of the teacher. Does it differ from the roles of the teacher in the traditional class-based system? If so, how?

In the future the teachers' task is to *teach* new generations to learn more quickly, to teach them to independently create new kinds of information systems and the ability to abandon old beliefs and the ability to tolerate various belief systems. Teaching a dialogue between various belief systems will probably be crucial, as will the ability to fashion new things based on otherness. *Socialising* new generations to the existing culture at a younger age and *inspiring* them towards life-long learning are also considered part of the teacher's tasks. Above all, Niemi (1996) argues that the teacher must *convey* an active understanding of information to his/her students. The teacher becomes a tutor for spontaneous and responsible i.e. active learning.

Active learning includes asking questions, determining problems, questioning, independent thinking, finding new information by investigation, experimentation, and discussion (Helakorpi et al. 1996). Metacognitive skills and skills of learning to learn also become crucial. The teacher directs the different learning processes of individual learners and the development of their competence for learning. This requires high and varied expertise of the teacher, so that he/she can serve as a *learning manager* and to carry the overall responsibility for education at a local level.

Niemi (1996) maintains that the emphasis of the teacher's duties lie on the planning of learning and of one's own work, analysis, self-evaluation, and co-operation, and on co-operative and interactive skills in particular. The teacher is an active partner promoting opportunities for education, growth, and learning, but also an active seeker of such opportunities. He/she must thus be capable of dialogue with both students and the more extensive school community, and possess an ability for collegial co-operation. The teacher is a professional who *possesses an inquiring mind, processes cognitive information* and *aims to increase self-understanding,* who develops and studies the teaching and learning process and the curriculum. In other words, teaching as a profession is seen as a forum for the development of the teaching and learning process and the curriculum. Thus we could define another task for the teacher, also in accordance with the principle of life-long learning, that of being a *student*.

Current teacher studies maintain the importance of the teacher's communicative and interactive skills (e.g. Niemi 1996; Niemi 1998). These do not only refer to oral communication, but more generally the ability to listen, pay attention, combine, negotiate, and participate in the discussion on education. In addition, a teacher naturally needs the ability to utilise the information and communication technologies in his/her work and in the development of the students' studying and learning environment. The tools already exist, and if the teacher masters their use for teaching purposes, his/her work emphasises mediated interaction (cf. e.g., Tella & Mononen-Aaltonen 1998). These skills were previously not needed to the same extent as today.

Many researchers are content to refer to the teacher's status in an information and communication technology-oriented studying and learning environment simply by remarking on the shift in the teacher's role from traditional distributor of information towards the role of a tutor and co-learner. Sometimes the role and even the presence of the teacher in a learning situation is called into question. According to Husu (1997) and Sariola (1997), however, the status of the teacher in an information and communication technology-oriented studying and learning environment is crucial. Kynäslahti (1997) also finds that more attention should be paid to the teacher when discussing the use of technology in teaching. The importance of the teacher is also emphasised in a dialogic communication culture (Tella & Mononen-Aaltonen 1998). The uniformity and action of the class rely heavily on the teacher, whose teaching is the very reason why the members of the virtual class have gathered together. The teacher is responsible for the entire interactive network and he/she must master both contact and virtual teaching situations. The teacher is behind everything.

Emphasising the teacher's role does not necessarily have to lead to a teacher-centred approach. According to Husu (1997), the task of the teacher, in both standard and virtual classroom, is to "add to and reinforce that which is deemed valuable, to create added value [to the student] so that he/she could be something more to him/herself and the community". According to Husu, the purpose of technology is to support the achievement of the objectives mentioned above. Compared with contact teaching, Rönkä (1997) also underlines the role of the teacher in a virtual classroom particularly as a conveyor and controller of interaction and as a motivator and mentor.

According to Sariola (1997) the work model of a virtual teacher is close to research in character; indeed, the teacher utilises previous research data in establishing and analysing an open and flexible learning environment. The work of the virtual teacher takes place largely at the planning stage, as compared with traditional classroom education. Distance education requires more careful advance planning and more flexibility at the working stage. New components of the work include the selection of the media, and image, sound, and graphic design. The teaching situation itself focuses on group learning, teamwork, network thinking, and reliance on the self-directedness of the student. For instance, videoconferencing does not allow the teacher to see and hear everything. The teacher's role as an evaluator also changes: his/her task is to direct the students towards self-assessment and at the same time to internalise the importance of process evaluation compared with traditional product evaluation.

As providers of initial and in-service education for teachers, it is our task to direct them towards continuous creative and innovative action and to encourage independent thinking. We do not regard teachers as opposers of communication and its new equipment but as active experimenters and appliers of information and communication technologies, as testers of various models, and as creators of a new user culture,

Indeed, every teacher should acquire basic skills in media education, which in our opinion provides the foundation for the work of a modern, future-oriented teacher. This approach has nothing to do with technological determinism, even though a media educator can undoubtedly increase the interest the learners feel towards technology. We see modern information and communication technologies both as a tool, a new context, and as an element of the learning environment contributing to deep and extensive development of thought (cf. e.g. Tella 1997, 42–46). However, the main objective of teacher education and our action is to develop pedagogical and scientific thinking of the teacher and to encourage the independent analysis and development of one's own work and actions. Every teacher is a media educator.

3. WHAT ARE KNOWLEDGE STRATEGIES?

2.5 Definitions and Outlines of Knowledge Strategies

What does 'knowledge strategy' mean? How do we understand it? Is knowledge strategy a strategy or strategic thinking about knowledge? How should knowledge be understood in this context and what should it include? If knowledge strategy is a concept on the organisational level, what is its equivalent on the level of individuals? *In this article knowledge strategy refers to long-term, methodical reflection on the essential nature of the Media Education Centre and its future action, which finds concrete expression as operational procedures or tactical measures, slogans, goals, forms of operation, working methods arising from discussion about values, and evaluation measures connected with them.* Knowledge strategy is also connected with our thoughts on what kind of theoretical material the telelogically defined media education in particular can be approached with. Knowledge strategy may also be described as a meta-level systemic process through which the community, in this case the Media Education Centre, selects, implements, and adapts various modes of work, action, decision-making, and problem-solving. Seen from this macro- or meso-perspective, knowledge strategy can be compared with cognitive strategies on the micro-level, the level of individuals, which people use to select and modify their learning, remembering, and thinking functions (e.g. Gagné, Briggs & Wager 1988). In this context *knowledge is understood as mental information structures modified by the individual on the basis of thinking and earlier knowledge,* resulting in versatile knowledge.

Knowledge strategy can be approached from various starting points and directions. In Finland a considerable amount of national knowledge strategy has been produced since 1993 when the Government drafted the first strategic documents. The 1993 Government decision regarding measures for the reformation of central and local administration in principle is considered significant for the Finnish information community policy as the decisions made included a decision on the outlining of a knowledge management strategy (completed in 1993) and information society strategy (completed in 1994; "Finland Towards an Information Society—National Guidelines"). The strategies described in the following paragraph are largely based on these two documents (e.g. Lilius 1997, 2).

The "National Strategy on Education, Training and Research", advocated by the Finnish Ministry of Education in 1995, set up some goals to provide every student with the basic skills in acquiring, managing, and communicating information, necessary in the information society if interpreted as an interactive network between people and information systems[2]. The strategy was supplemented in 1996

[2] Cf. e.g., http://www.minedu.fi/eopm/strategi/2.html.

by another document "Towards a Culture-Oriented Information Society". Both strategic documents aimed at guaranteeing all citizens equal opportunities in the new information environment. Some of the key elements included high-quality education, training, research, and culture, with opportunities for lifelong learning available to everyone. One of the key development projects aims to have all senior secondary schools and vocational institutions networked by 1998, and all comprehensive schools by the year 2000 (The Development of Education 1994–1996). In 1997, 65 % of all schools were already networked. More than 1,000 primary and secondary level schools (out of 4,800) had a home page on the Web in 1997, and new pages appear with increasing speed. This network would open up new opportunities for students to receive high quality teaching regardless of their geographic location. The telematic infrastructure is exceptionally well developed in Finland, so networking schools via telematics and with the aid of various technological tools is not that far-fetched. Sceptics might still ask whether simple physical networking between schools is enough; what would really count is the collaboration between the schools (cf. Nummi & Ristola 1998, in this publication about pedagogical networking). Networking of schools calls for collaboration likely to lead to organisational integration in which it is difficult to distinguish any geographical, educational or administrative boundaries between schools. At the Media Education Centre, we have already found some new sociologically interesting phenomena taking place when schools get networked, viz. decentralisation, integration, and fragmentation (e.g., Tella & Kynäslahti 1997). Networks of schools are likely to become a constitutive element in the development of schooling in the Finnish information and communication society. We are convinced that networking is one of the ways that help facilitate the uneasy alliance between technology, culture, and communication.

As regards these national strategic documents and documents prepared by the different Ministries in particular, it can be said that *technological development has in some cases progressed more rapidly than envisioned by the various committees.* For example, the Internet and use of global networks and different levels of networking have progressed more quickly than expected. Different universities and their faculties may also have their own strategic plans and documents. Probably some of the most important strategic documents prepared by the Department of Teacher Education are by Meisalo & Lavonen (1995) and Tella (1996). Indeed, we hold the opinion that the planning of knowledge strategy should be included in the important operations at each school and institution. *Instead of simply reforming their curriculum, we think schools and municipalities should progress towards developing their knowledge strategic thinking. One of the aims of this article and the entire publication is to provide viewpoints for such thinking.*

This article emphasises the view adopted by the Media Education Centre towards knowledge strategic thinking. The aim is not to create a general knowledge strategy for the Faculty of Education or the Department of Teacher Education but to consider the matter from the point of view of our own Centre. However, corresponding trains of thought are also likely to emerge on other organisational levels. The ideas would probably be related to the development of organisations and the basic nature of a learning organisation in particular.

3.2 Different Interpretations of Knowledge Strategy

Knowledge strategy can be understood as different interpretations, for instance the background idea of a community or the thought of action, mode of action, vision, strategy, and also as information on or information structure of what is done and why. These viewpoints are discussed briefly in the following.

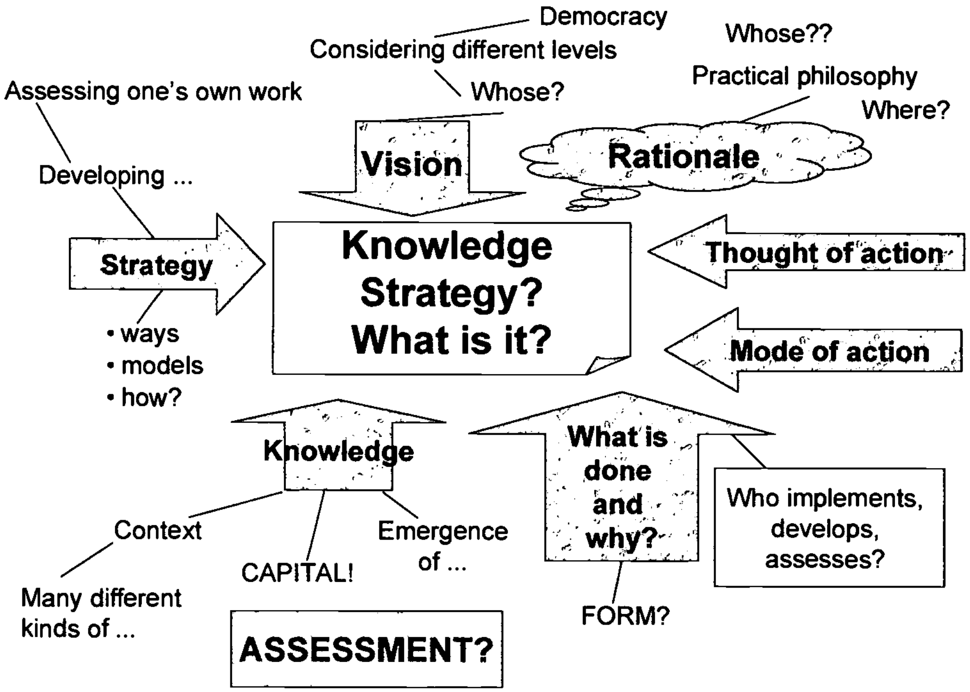

FIGURE 2. DIFFERENT INTERPRETATIONS OF KNOWLEDGE STRATEGY.

3.2.1 Background Idea and Thought of Action

Knowledge strategy can be seen as the background idea of a community or an idea of what the community does, what it should do, and how the community's actions, structure, and tasks are placed among those of other communities. Knowledge strategy can thus be understood as the functional philosophy of the community or practical philosophy.

3.2.2 Mode of Action

Understood as the mode of action or operational idea of a community, knowledge strategy is associated with structural or systemic claims through which it is possible for those outside the community to perceive the target-oriented dimension of the community's action. The basic structure of the mode of action may be more concrete and practical that that of the background idea or thought or action, which include a larger amount of philosophical reflection on values, goals, and objectives. The finality of the mode of action (rationale) is more pragmatic, and it often leads more naturally to a continuous reform and analysis of communal action. The mode of action may be regarded as a theory on communal practice.

3.2.3 Vision

The interpretation of knowledge strategy as a vision arises from the idea that the development of a community requires withdrawal from everyday routines and facing the future. The importance of visions is reflected in many sayings, for example, "Don't do what's most important, do what's most urgent." Unfortunately, the *just in time* principle, typical of our times, often leads to a deviation of such principles. However, the importance of visions to the development of the community and for an individual's mental growth is undeniable. In his book on the great leaders of the world, Gardner (1997) describes a phenomenon which focuses on people who make important decisions. He considers how several successful leaders have every now and then almost forcibly attempted and managed brief respites from the 'rat-race' to be able to think about various issues and the future policies of the communities they direct.

An analysis of the work of teachers and teacher educators easily leads to the impression that their work is so hectic and exhausting that it leaves no time for visions. The most important thing is to do one's job well, often only a day at a time. Should not attention be paid to the planning of the future, however, to what we want our work community to move towards? In this respect visions as part of knowledge strategic thinking are connected with the idea of development, the attempt to work for the realisation of one's vision. Vision has connotations of looking ahead, of anticipating. An English dictionary defines vision as *power of seeing or imagining, looking ahead, grasping the truth that underlies facts.* A French dictionary contains the following definition: *«perception du monde extérieur par les organes de la vue; action de voir; façon de voir; conception»*. This definition is based on seeing as a concrete action and proceeds towards a more personal seeing, a view of something. It has sometimes been said (e.g. Tella 1993) that in the school world *vision* has been less evident than *revision, division,* and *supervision*. The importance of visions in education has not been overly emphasised; for instance, the famous handbook by Wittrock (1986) does not list vision as an entry (nor strategy). Having studied the development of the school community in Finland, Leppilampi (1991, 149) maintains that visions have been more common in the business community where the operations of a successful enterprise must be guided by a vision accepted and internalised by as many members of the work community as possible. If the vision is integrated as part of the knowledge strategy, it may be said that it serves as a developmental idea of the community, a state-of-the-art ideal on which the community is developed like any thinking, collegial community which reflects its actions and opportunities.

Like strategies in general, vision is also directed towards the future. It is a future-oriented view, an abstraction which can be made concrete through goals and targets and tactical measures. Leppilampi (1991, 150) defines vision (according to Bennis, Nanus & Berman 1985) as simple, easily understandable, clearly desirable, desired, and energetic, while a target is concrete, measurable and scheduled so that it can be achieved by a given time. Visions should take into account the different strata of the community. A vision must be made known to and internalised by all key operators. If this is done, visions also promote democracy in the work community. It may be claimed that a shared vision increases shared communalism and partnership in the community. A more closer analysis of how visions are compared with beliefs, [pre]conceptions, and knowledge (see e.g. Tella 1993) is not possible in this context. Let us note briefly that Pajares (1992), for instance, makes references to researchers who maintain that beliefs may finally prove to be the most valuable psychological constructs in teacher education. Little research has been done on the understanding of beliefs, however. Another problem is where to draw the line between knowledge and belief (e.g. Pajares (1992). However, according to a generally accepted definition, knowledge equals a justifiable, true belief. We are thus justified in concluding that knowledge is based on belief. What is more difficult is to define what is a true (and what a false) belief. This reasoning leads to the assumption that vision is not only based on beliefs, but also on knowledge to some extent, since knowledge is by definition included in the area of beliefs.

3.2.4 Strategy

The etymology of strategy conveys an idea of action directed towards a common target. According to Webster's Dictionary, strategy is *the science and art of using all the forces of a nation to execute plans as effectively as possible during peace or war*. On a more concrete level the same source defines it as *a plan of action resulting from strategy or intended to accomplish a specific goal*. It is a question of a deep, far-reaching goal, the achievement of which calls for the harnessing of a considerable amount of common resources. As indicated by this etymology, strategy also involves conscious reflection on the practical measures needed to reach the goals.

The potential goals created through visions are achieved through strategy. It is a tool for determining the issues which must be taken into account in order to reach the desired goals. Strategy provides a framework for the plan of action, which concerns the acts carried out within the strategic framework. Not only are one's own actions taken into account, but the importance of other, closely connected areas are also calculated. Thus knowledge strategic planning in media education also includes reflection on the importance of closely related disciplines, such as education as a major science, other disciplines, and the various aspects of society which affect media education (for a closer analysis, cf. Tella 1998, in this publication).

Strategy involves an analysis of one's own strengths and areas requiring development. Attention is also paid to the corresponding factors on the above-mentioned related areas. For the strategy to succeed, potential threats which may hinder the achievement of goals must also be evaluated. For the evaluation of the strategy to succeed, the achievement of goals must be measurable, for example, on the basis of a temporal dimension or effectiveness. Such measurability must be taken into account at the planning stage. It is of primary importance that those involved in the outlining of a common strategy are unanimous enough on and committed to its methods and goals. This requires strategic design to take place through dialogue which leads to a common discourse between all partners.

4. KNOWLEDGE AND DIALOGUE

3.3 Concepts of Knowledge

Media education and the Media Education Centre are products of the post-modern cultural *milieu* we live in, whose current stage of development may be called the information and communication society. It survives on knowledge and knowledge-based work: knowledge is manifest everywhere in production, work, products, and services. Information is both a product, productional power, and a tool, and it can be transmitted from one corner of the world to another in the blink of an eye. At the same time, post-modern criticism shows a strong tendency towards science and scientific information, particularly its truth value. If the search for truth is an illusion, science is of no use and there is no reason to prefer one theory to another any more than distinguish between the working method of scientists from other work: hypothetical-deductive thinking is practised in all walks of life (Bereiter, Scardamalia, Cassells & Hewitt 1997, 330–333).

Closely associated with post-modernism, the intensive use of information and communication technology has brought forth new concepts to supplement the concept of knowledge, of which concepts 'information' and 'data' are used as synonyms for knowledge in everyday language. What knowledge are we basing our strategy on? Knowledge as a product, or as something that is dead like history, great narratives, and literary characters? Everyday thought or binary sequences which are transmitted around information networks and, reaching the screen of our computer, turn into images, words, sound, movement? Data is hardly enough to base our knowledge strategy on, but what is our attitude towards information?

4.2 Quantitative and Qualitative Information

Theories on information society use the term 'information' as an overall concept for all written text, images, and sounds, and for numerical data which can be processed and transmitted either physically or electronically using a given medium (Hautamäki 1998, 60). However, a distinction between information and data can also be made using the term 'data' to refer to something 'given' (cf. Latin *do, dedi, datum, dare: datum* = given, *data* = the given), to unprocessed information lacking an interpretation. Data becomes information when people give it a meaning or interpretation. Information is external and its associations emphasise the role of the human being as a recipient, as is evident in the original meaning of the Latin term: *in-formare* = to form into. In other words, information is something that has been given from the outside (Venkula 1987, 4). Niiniluoto (1988) also bases his analysis of the concept of information on Latin, but in our opinion his analysis of the etymology remains half-finished when compared to that of Venkula's, since he only emphasises aspects to do with form (*forma;* see Niiniluoto 1988).

Consequently, data and information refer to quantitative information which exist physically in equipment used in knowledge-based work, computer's memory, or data networks and is often transferred by media. Such information is easy and simple to process, it can be referred to quantitatively, either in general or in a given medium, and it can be transferred like any other physical entity. In addition to quantitative (physical) information, we talk about qualitative (semantic) information, which also has a pragmatic dimension, or knowledge (Hautamäki 1998, 60–61; see also Niiniluoto 1988).

Knowledge differs from data and information in that it is connected to a human being, a subject who knows, who has knowledge. Information is interpreted to be transformed into knowledge only when it is integrated with larger contexts or information structures (contextualised). In other words, knowledge refers to a construct based on information and processed in the human mind, which can include value statements: true, correct, justified (Meisalo & Tella 1988, 22) These statements connect Meisalo and Tella to the classical definition of knowledge, according to which knowledge refers to a justifiable, true belief. However, data and information can also be well-founded or unfounded, or correct or incorrect. However, excepting trivial issues, we cannot know for sure whether a statement is true or false, which is why it has been proposed that the classical definition of knowledge should be relaxed and the more extensive definition of 'knowing' accepted. Knowing would be justifiable, but instead of true only relevant or important (Hautamäki 1998, 60). Like a philosopher, Hautamäki associates truth with propositions and their truth value. The idea of knowledge associated with propositions does not say anything about how knowledge is born, which is the key question with regard to learning.

4.3 Knowledge of Three Worlds

Definitions of the concept of knowledge often rely on Popper's famous theory on three worlds (e.g. Hautamäki 1998, 60), but the theory has also been applied to the fundamental questions of learning and teaching, particularly to the analysis of the constructivist concept of learning (e.g. Yrjönsuuri 1993, 52–56). Popper himself describes the worlds as follows: "... [f]irst, the world of physical objects or of physical states; secondly, the world of states of consciousness, or of mental states, or perhaps of behavioural dispositions to act; thirdly, the world of *objective contents of thought*, especially of scientific and poetic thoughts and of works of art" (Popper 1979, 106).

According to Popper, traditional epistemology belongs to the second world, since it is interested in knowledge and thought in the subjective sense of the word: "...[k]nowledge or thought in a subjective sense—in the sense of the ordinary usage of the words 'I know' or 'I am thinking'" (Popper 1979, 108). Scientific information belongs to the third world, "...[t]o the world of objective theories, objective problems, and objective arguments" (Popper 1979, 108).

From our viewpoint Popper's third world is important because, in addition to theories, it also includes their origin—discussion and arguments. According to Popper, the third world is populated in particular by "[t]heoretical systems; but inmates just as important are problems and problem situations. And I will argue that the most important inmates of this world are critical arguments, and what may be called—in analogy to a physical state or to a state of consciousness—the state of a discussion or the state of a critical argument; and, of course, the contents of journals, books, and libraries" (Popper 1979, 107). Popper further argues that the third world exists more or less independently (1979, 107).

Popper's ideas provide a direct link to dialogism, which has been a central theme of discussion during the entire existence of the Media Education Centre. Dialogue in its Bakhtinian and Vygotskyan sense is the undivided origin of all knowledge, thought, and thus also learning. Knowledge becomes "a social, communicative, and discursive process, inexorably grounded in talk" (Duffy & Cunningham 1996, 181). Since dialogism has been discussed in a previous publication in greater detail, we recommend the reader familiarise him/herself with our thoughts in volume 7 of the Media Education Publications series (Tella & Mononen-Aaltonen 1998).

Popper's categorisation clarifies the discussion on information society and knowledge strategy. We understand that data, information, and knowledge can be entered in Popper's worlds as follows: as physical objects, data and information belong to the first world, knowledge as a subjective construct to the second world, and objective or scientific information to the third world. This basic idea gives rise to four statements regarding the information and communication society.

First, the commonly heard slogan 'Information society in on its way!' cannot become reality simply through global implementation of information and communication technologies, since such technologies can only process objects inhabiting the first world, that is, data and information. Second, knowledge strategy cannot be based on the skills of processing and transferring physical information inhabiting the first world. Third, it should be noted that the information-based economy of the information and communication society requires a search for information on the one hand, and the establishment of new knowledge and understanding on the other hand. Fourth, since the work done by top researchers and its results increasingly take a digital form parallel with other data and information, the separation of scientific information from everyday non-scientific nonsensical information requires extensive subjective knowledge as well as knowledge and understanding of the origin and criteria of scientific information, in other words knowledge in the sense of Popper's second and third worlds. We find it extremely important that such interpretations be taken into account in knowledge strategic thinking, since they help us to understand the fundamental differences between data, information, knowledge and knowing, and understanding, which must be considered in the teaching–learning process. From the point of view of the currently popular constructivist view of learning, knowledge of Popper's worlds helps both the teacher and the student to improve their understanding of the aspects connected with information and its processing.

4.4 Thinking as a Skill

Scientific activity has often been considered the superior form of human action and as an ideal field for action: "It should be and it is possible to transfer to other areas of human action those skills and intellectual habits used in the scientific gathering of information" (Venkula 1989, 25). In the information and communication society, the majority are involved in the immaterial production of information as a commodity which increasingly requires the ability to use the highest forms of mental action, particularly abstract thought (Kaivo-oja, Malaska, Jokinen & Rubin 1996, 41).

Pragmatism sees human action and experience as the main source of information. The significant aspect of the pragmatist view of knowledge that thinking is understood as a skill which can be developed through action. (Venkula 1989, 25) According to Venkula (1987), attention paid to action and skills is justified since "in unpredictable situations people apply habits and skills. When analysing new problems the skill they need most is the skill of thought, the ability to find what is essential in the situation and their own modes of thought. This skill, the most sophisticated and special one possessed by human beings, can apparently be trained only by experimental action" (Venkula 1987, 8).

Modern psychology of thought (e.g. Saariluoma 1990) also sees thinking as a cognitive skill. A skill is a learned form of behaviour and it is achieved through purposeful and methodical training. Differences in skill attainment between individuals result from this aspect, not so much from permanent, inherent characteristics (Saariluoma 1990, 16–18). Thinking and mental development always take place within the framework of a culture. Thinking is always dialogic. Duffy & Cunningham (1996, 177) argue that thinking "is always connected to another, either directly as in some communicative action or indirectly via some form of semiotic mediation: signs and/or tools appropriated from the sociocultural context". Different ways of life promote different skills and the concept systems underlying them (Saariluoma 1990, 185–186). According to Hakkarainen (1997, 14), current knowledge of thinking and learning leads to the well-founded claim that the skills required for survival in an information-based society can be achieved by the majority of the population.

Skills of thought develop on the very fringes of human skills, in an area Vygotsky calls *the zone of proximal develop-*

ment, as a result of dialogue and communal action. Vygotsky's zone of proximal development is closely connected with Bakhtin's dialogism. For this reason it was not possible to ignore the zone of proximal development in our analysis of the relationship between dialogism and technology included in "Media Education Publications 7" (Tella & Mononen-Aaltonen 1998) of the Media Education Centre.

The way children learn is commonly used as an example when discussing the zone of proximal development. Griffin & Cole (1984) also use it to illustrate their interpretation of the Vygotskyan concept. If the zone of proximal development is included in teaching, it must be planned so as "to support the dialogue between the child and his or her future; not a dialogue between the child and the adult's history" (Griffin & Cole 1984; cited in Duffy & Cunningham 1996, 170). However, the developmental potential of an individual, i.e. the zone of proximal development, does not wither away with age. It plays a crucial role in an individual's development throughout his/her life. Goals, aspirations, and ideals are part of this potential (Kitajgorodskaja 1992, 43). The idea of life-long learning is also evident in the view presented by the Russian psychologist S. L. Rubinstein of a human being whose "personality is not described only by what he/she is, but also by what he/she wants to become, what he/she actively strives for. In other words, we are not characterised only by what has already been shaped and what functions in our personality, but also by what forms the area of developmental possibilities" (Rubinstein, cited in Kitajgorodskaja 1992, 43). In knowledge strategic thinking, the development of the skill of thought is at least as important as the mastering of tools and media used in knowledge-based work.

4.5 Expertise as Subjective Knowledge

Our post-modern world relies heavily on technology, which is why reality is considered to have become more complicated (Etzioni 1968; Lash 1995; cited in Räsänen & Erola 1998, 34). Many researchers find that in such a world the good life is achieved through expertise and special skills (Kaivo-oja, Malaska & Rubin 1997, 26).

As we understand it, the subjective knowledge inhabiting Popper's second world represents the said expertise needed in the information and communication society. Expertise is the in-depth knowledge of an individual, his/her knowing. The expertise possessed by the Media Education Centre depends on the individuals who conduct research, teach, and act in our community. Our ideal objective can be compared to the objective of the players of *The Glass Bead Game*, the famous futuristic novel by Herman Hesse, which objective the main character Josef Knecht describes as follows:

> "Jedes kastalische Institut und jeder Kastalier sollte nur zwei Ziele und Ideale kennen: in seinem Fache das möglichst Vollkommene zu leisten und sein Fach und sich selbst dadurch lebendig und elastisch zu verhalten, daß er es beständig mit allen anderen Disziplinen verbunden und allen innig befreundet weiß." (Hesse 1967/1943, 255)

Human abilities and knowing are also an excellent source for our community, since, as Kaivo-oja (1995, 26) points out, in the information society they provide a link between work, capital, and natural resources. Expertise is associated with in-depth knowledge in one or more areas, virtuosity, top-class abilities. The necessary prerequisite for acquiring top-class abilities is, as Hakkarainen argues (1997, 13), contact with a specialist culture, since the emergence of top-class abilities depends on the accumulation of cultural knowledge in the area where top-class achievements are made, the nature of the abilities, technologies, and how they are taught.

Thanks to communalism, our expertise becomes the possession of the entire Media Education Centre. Shared expertise, which forms our common knowledge resources and *power* in the sense used by the 17th-century thinker Thomas Hobbes. Hobbes defines *power* as human beings' current means for acquiring a future good. The Finnish language cannot express the connotations of the word 'power' with a single word. *Power* is strength and power, but also prestige, persuasion, and various resources (Thomas Hobbes 1651/1985, 150–151; cited in Pursiainen 1997, 14).

Our resources and persuasive power naturally include the ability to use the tools and media related to information and communication technologies, but above all of in-depth processing and communication skills, the ability to coordinate different viewpoints, and reciprocal understanding.

Again, we refer to Bakhtin and his concept of *ventriloquation*: as individuals, we speak with the language or voice of our social community. Duffy & Cunningham (1996, 181) give a concrete example: "... [t]he way in which a student comes to manifest the effective behaviour of a community (e.g., the community of scientists) is to speak with the voice of that community (e.g., to talk like a scientist)."

Nevertheless, *ventriloquation* does not mean that the speakers of one language should say the same things, that in our community we should all agree exactly on every issue related to media education or our Centre. For us, the existence of different viewpoints is "a cause of celebration and optimism, not a fear that we will sink into some kind of utter subjectivism" (Duffy & Cunningham 1996, 179). This is why we must emulate Rorty and express the matter the other way round: "Knowledge is not a matter of getting it right but rather acquiring habits of action for coping with reality" (Rorty 1991, 1; cited in Duffy & Cunningham 1996, 172). Duffy & Cunningham develop Rorty's idea further:

> "We are always seeking to increase the viability of our understanding, both by improving our account of specific events or experiences and by interweaving our explanations, thus weaving a web of understanding [...] viability is established through obtaining unforced agreement within the community" (Duffy & Cunninham 1996, 172).

What is important is a dialogue which continuously aspires to improve our understanding. Our resources are founded on objective knowledge of media education in the Popperian sense.

4.6 The Third World of Media Education

Popper's scientific knowledge does not conform to the classical concept of knowledge, in other words, knowledge is not "... [j]ustifiable belief, such as belief based upon perception" (Popper 1979, 122). And Popper continues:

> "As a consequence, this kind of belief philosophy cannot explain (and does not even try to explain) the decisive phenomenon that scientists criticize their theories and so kill them. Scientists try to eliminate their false theories, they try to let them die in their stead. The believer—whether animal or man—perishes with his false beliefs." (Popper 1972/1979, 122)

What is accepted as true knowledge changes with the times. This is why Pihlström (1997) has also proposed the classical definition of knowledge be left 'on the yellowing pages of history', but for different reasons: we cannot talk about knowledge, but only about "theories accepted at some stage of the development of science and how these theories analyse the world. The expression 'scientific knowledge' has no other meaning" (Pihlström 1997, 7).

The objective knowledge of media education differs from the knowledge in other pedagogical disciplines, in that it is essentially and inherently interdisciplinary. Through interdisciplinary dialogue we might acquire a better understanding of the current reality of school, teaching, learning, and teacher education and the range of their potential futures: "Future is made through different choices of future options and through adaptation" (Kaivo-oja 1995, 22). Since media education is discussed elsewhere in this publication in greater detail (Tella 1998), we bring up here only one idea: as an interdisciplinary field, media education is an integrating and unifying science. Again, we quote Hermann Hesse's *The Glass Bead Game* and Josef Knecht:

> "Mag vielleicht für den Physiker oder Musikhistoriker oder irgendeinen anderen Gelehrten ein strenges und asketisches Beharren bei seinem Fache zuzeiten geboten und ein Verzicht auf den Gedanken der Universalbildung der momentanen, speziellen Höchstleistung förderlich sein – wir jedenfals, wir Glasperlenspieler, dürfen diese Beschränkung und Selbstgenügsamkeit niemals gutheißen und üben [...]" (Hesse 1967/1943, 255)

Media education does not integrate knowledge from different branches of science only. Increasingly oriented towards knowledge and utilising modern information and communication technologies, our world and work have acquired characteristics typical of the arts. We are all expected to express "a new artistic quality, a flexible, interactive, and improvising jazz mentality" (Koski 1997, 42). Koski refers to Peter Druckner, who sees any future organisation, even tomorrow's organisation, as a "jazz band who write music while playing it" and continues: "And a good jazz band must not be too big, since when improvising jazz the entire group must be able to adapt to the continuously changing conditions" (Koski 1997, 42).

We return to Popper's definition of his third world where scientific thinking is accompanied by "poetic thoughts and ... works of art" (Popper 1979, 106). The world of media is largely a world of signs and symbols, naturally a world of language in the first place, but in addition it is also the world of images, sound, and movement. The knowledge of media education emerges through a dialogue between science and art; however, technology is also included. Thus it realises the idea of the integration of scientific knowledge, art, and technology expressed in Robert Pirsig's *Zen and the Art of Motorcycle Maintenance*, a cult novel of the 1980s. According to Pirsig this should have happened a long time ago (Pirsig 1988, 320).

When creating a knowledge strategy for media education it is necessary to include levels other than technology alone. Natural and synergetic levels are presented by crossovers of art, science, and technology, and of cultural, social, and human sciences. In this manner, media education can best utilise the integrating dimension based on its interdisciplinary basis.

4.7 The Power of the Knowledge Metaphor

In our discussions on knowledge strategies we have sought empowering metaphors to describe the basis of media education created through dialogue between sciences, arts, and technology. Hermann Hesse's *The Glass Bead Game* seems to structure our thinking to a certain extent and to help us create a world of media education. We are of the opinion that the task of media education and the researchers and teacher educators at the Media Education Centre was aptly expressed by Josef Knecht::

> "Und wie können wir den Archäologen, den Pädagogen, den Astronomen und so weiter zwingen, auf ein selbstgenügsames Fachgelehrtentum zu verzichten und immer wieder ihre Fenster gegen alle anderen Disziplinen zu öffen? Wir können es nicht durch Zwangsvorschriften, indem wir etwa das Glasperlenspiel schon in den Schulen zum offiziellen Lehrfach machen, und wir können es auch nicht durch die bloße Erinnerung an das, was unsere Vorgänger mit diesem Spiel gemeint haben. Wir können unser Spiel und uns selbst nur dadurch als unentbehrlich ausweisen, daß wir es stets auf der Höhe des gesamten geistigen Lebens halten, daß wir jede neue Errungenschaft, jede neue Blickrichtung und Fragenstellung der Wissenschaften uns wachsam aneignen und daß wir unsre Universalität, unser edles und auch gefährliches Spiel mit dem Gedanken der Einheit immer neu und immer wieder so hold, so überzeugend, so verlockend und reizvoll gestalten und betreiben, daß auch der ernsteste Forscher und fleißigste Fachmann immer wieder seinen Mahnruf, seine Verführung und Lockung empfinden muß." (Hesse 1967/1943, 255–256)

We also feel we need a metaphor for knowledge to help us better determine our deep, long-term objectives and knowledge strategy. The familiar tree of knowledge does not correspond to our current view of the emergence of knowledge or knowledge as a changing concept divided into social, cultural, historical, and institutional contexts. Tella (1995) has previously demonstrated the network-oriented nature of the information society with *a net metaphor*:

> "The network adapts to the needs of the user as a flexible texture, which is a counterpart image to the constructivist view of learning. There are no clear starting or ending points in a network. Everyone can start in their own net node and progress in whatever direction, as far as they please. In the infinite nodes of the net surface the information potential they contain is multiplied. The form of the net, its nodes, are not, however, as important as the content that net users offer to each other. The individual, the human being, the learner is more often than not in a situation where he is part of many social nets, which give him, a user of telematics, a possibility to make more and more connections to support his learning and studies" (Tella 1995, 5–6).

Here we shall advance a step and describe the basic characteristics of the human mind and the knowledge it produces, the fragmented nature of knowledge and knowing and a human being's inseparability from other people "individually but also collectively" with *the rhizome metaphor* based on constructivism:

> "A rhizome is a root crop, a prostrate or underground system of stems, roots, and fibers whose fruits are tibers, bulbs, and leaves. A tulip is a rhizome as is rice grass, even the familiar crab grass. The metaphor specifically rejects the inevitability of such notions as hierarchy, order, node, kernel, or structure." (Duffy & Cunningham 1996, 177)

The rhizome metaphor was probably introduced by Deleuze and Guattar (1980; cf. also Eco 1984). These French philosophers' presentation of the concept of rhizome is rhizomatic to such an extent that the reader becomes convinced of the accuracy of the metaphor: the rhizome metaphor is as difficult to visualise as the object it describes. i.e. the human mind, its structure, or the knowledge it generates. What this metaphor expresses about our time and mankind is deeply dialogic. Indeed, referring to Vygotskyan and Bakhtinian thinking through Wertsch (1991) Duffy & Cunningham state that:

> "We are connected to the sociocultural milieu in which we operate, a milieu characterized by the tools (computers, cars, television, and so forth) and signs (language, mathematics, drawing, etc.), which we may appropriate for our thinking. Thus thinking is not an action that takes place within a mind within a body, but rather at the connections, in the iteractions. But it is worth saying again that this thinking is always 'local', always a limited subset of the potential (unlimited) rhizomous connections." (Duffy & Cunningham 1996, 177)

The *leitmotiv* or 'big idea' of media education is that instead of reagarding science as fragmented it aims at integration and unification through dialogue (cf. Figure 7). *The development of a dialogic communication culture through the integration of dialogism and technology into a rhizomatic whole would seem to lie at the heart of media education and the knowledge strategy of the Media Education Centre.* We emphasise dialogism as the *raison d'être* of our community. Basically, dialogism is the way to be, but it also provides us with empowering tools for research and teaching.

This is why we have described dialogism as a cloud whose refreshing rainfall fosters our discipline and makes it grow like a mushroom whose colour is the yellow colour of hope. A mushroom whose rhizomes are deeply embedded in global changes which are also relevant to Finnish society, and in international communication. Growth is preceded by birth. Thus it is understandable that our forefathers respected seers, those who knew the origin of knowledge. Knowledge emerges and grows, as Popper (1978, 258) says, "from old problems to new problems"; this is why it has both roots and wings. The tools for the growth of knowledge are "conjectures and refutations" (Popper 1978, 258), which is why dialogue is the tool of the growth of knowledge in media education.

One of the goals of teacher education is to educate teachers capable of critical thought and reflection. However, it must be realised that reflection alone is not enough. Action is also needed, a level of performance. This idea again links knowledge strategies with pragmatism and its view of human action and experience as a key source of knowledge. At its moment of emergence, knowledge promotes human action. Venkula is probably right claiming that (1989, 22) "the only knowledge is what people accept as instruction for their actions in a real situation, for-problem-solving". The criterion for knowledge is action, and knowledge strategy is the target-oriented initiator of this action.

5. Knowledge Strategy as a Mode of Practice, or How is Knowledge Strategy Made?

The outlining of knowledge strategy requires continuous evaluation of both the contents and form of the strategy and the directions and tactical methods it requires. We are aware here of the difficulties related to the validation of the evaluation of knowledge strategic thinking. Actually, the most important validation criteria must be time. The validity of the strategic and tactical decisions we make now is only visible when their concrete effects are observable, which in some cases may take years. On the other hand, this brings a long-term dimension to the action both vertically and horizontally. For this reason, the evaluation of strategic thinking is connected with the effectiveness of the action and its analysis.

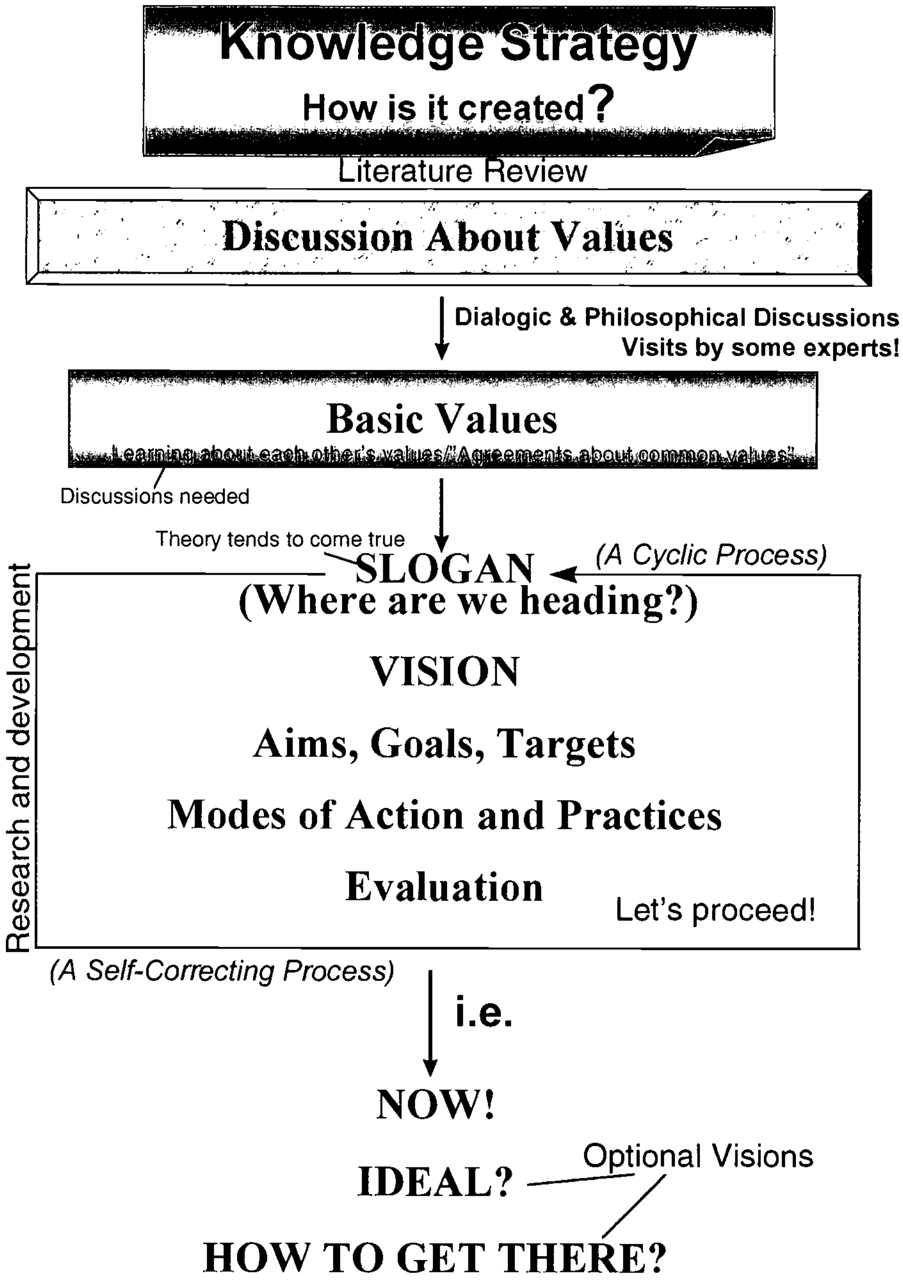

FIGURE 3. KNOWLEDGE STRATEGY AS A MODE OF ACTION.

This chapter contains a preliminary discussion on the phases needed when a school or another community sets out to establish its own knowledge strategy. At the same time the chapter reflects the mode of analysis the writers of this article used in particular in spring 1998 when knowledge strategy was analysed together as an object of joint thinking and co-authoring.

Knowledge strategy may be developed as follows:

5.1 Literature Review

Knowledge strategic thinking can be seen to arise from the knowledge of existing literature. In this respect, literature includes a variety of sources, for example the national strategic documents commissioned by the Government, European Union documents and action plans, and other more general literature connected with strategic thinking. The viewpoints of the learning organisation and life-long learning should also be borne in mind. A fairly new yet important source are the digital strategic documents found on the World Wide Web. (Cf. References II at the end of this article)

5.2 Discussion About Values

Knowledge strategic thinking is in reality a discussion about values between the various members of the work community on what kind of future should be valued and which direction taken. We must start from the fact that the future can be influenced and future solutions be considered. Various think tanks and modes of synectic ideation are also needed in discussion about values. It can also be enlivened by inviting 'outside' experts to the community to add zest to the thinking. Accordingly, it is possible to study the future scenarios presented by various experts concerning their own fields of expertise (for instance, the articles *Top Ten Futures II* in the Futura magazine, issue 4/1997).

One of the key requirements of successful discussion about values is adherence to the principles of dialogism, in particular, attention to and respect of other people's opinions (Tella & Mononen-Aaltonen 1998). The discussion must never turn into a debate or aggressive arguing about what should be condemned or called into question. A genuine dialogue involves listening skills, addressivity, and recognition of the fact that dialogic discussion about values requires time. Knowledge strategic thinking is a topic particularly suited to a discussion about values, since on a conceptual level it already involves the contents of two complicated constructs and the claims they give rise to. At the Media Education Centre, a discussion was initiated in December 1997, which evaluated the work done during the past autumn and considered the plan for spring 1998. This is when the first versions of many of the ideas included in our articles first saw light. An organised discussion began towards the beginning of the spring term 1998 and has continued unabated. From the beginning, it was clear that this is a challenging topic which cannot and must not be limited in advance. On the contrary, we found it important that the discussion could be conducted in the constructive spirit of communalism and that the existing modes of thinking could be modified further.

5.3 Basic Values

Discussion about values can, at its best, lead to common basic values (*arvopohja*), which the members of the community can commit themselves to. Basic values constitute a kind of 'agreement' on the key values future action is directed towards. Indirectly, it also implies limitations placed on the values which the community as a whole is not committed to. However, it is not a question of denying or condemning individual values. It is more a question of raising implicit, possibly unconscious values as a subject of conscious thought. Values are always linked with choices and subjectivity. A search for common basic values may actually reinforce the collective subject in the community; at the very least it helps to reinforce a sense of communalism.

5.4 Developmental Aspects

Naturally, knowledge strategic thinking must find concrete expression as action and not remain solely a theoretical structure. By way of comparison it can be noted that the phases defined above from the discussion about values to determining basic values are largely constructivist in nature. Both individuals and the community they comprise construct their own views and organise their own knowledge of the concept 'knowledge strategy'. Another point of comparison would be provided by reflective action which studies the justification of the action.

Nevertheless, just like constructivism or reflection face the danger of remaining "without spirit" unless made concrete or taken to the level of performance or constructionism (e.g. Papert's comparison of the differences between constructivism and constructionism; also Tella 1994a, 33), knowledge strategic thinking and discussion about values and the basic values themselves as parts of the strategy require a concrete expression. Indeed, it is part of our strategy to see this phase as dynamic research, development and experimental action which can be characterised as a cyclic, self-correcting process mode. This phase can include slogans, visions, consolidation of goals, forms of action, working methods, as well as the planning and implementation of evaluation.

To summarise, there are three questions, the answers to which make the mode concrete. The key questions are:

1) What is the current situation?
2) What is the ideal?
3) How can the ideal be reached?

The first question is connected with the analysis of the current situation, the *status quo*. The second question is connected with a *state-of-the-art* kind of approach, which outlines the future ideal situation. Usually it is natural to consider several alternative visions. The third question requires thinking about how this new ideal can be reached or how we should move towards it. The questions are simple, yet recurrent. They must be asked time and again as the action continues.

One aspect of the consolidation of action is initiated through the central research and operational principles of the Media Education Centre[3]. Plans and strategies are based on the analysis of the semantic fields of the different components of the operational principles, and the ideas for development and research derived therefrom.

- On a strategic level, planning is based on the synergy and multidimensional benefits acquired through both national and international projects and research co-operation. The planning is based on a pedagogically and didactically meaningful and appropriate development of national and international knowledge resources, based mainly on telematics and telematic solutions, systematic research, and evaluation of its achievements.

- On a tactical level the planning is based on projects carried out both within the Department of Teacher Education and the Faculty of Education and between different faculties and

[3] Ks. http://www.helsinki.fi/kasv/media/

disciplines. The starting point is the synergetic, interdisciplinary research project planning. In the Department of Teacher Education, long-term and medium-term planning arises from the continuous development of virtual-pedagogical ideas which have been under development for years or are currently researched.

As mentioned earlier, this article describes the current phase of our knowledge strategic thinking, mostly theoretical reflection thereon. In the next phase the aim is to find new concrete modes of action, experimentation with which is also part of the implementation of the strategic thinking.

6. Criteria for a Good Community

5.5 Starting Points

The writers of this article had two main objectives which complement each other. The first objective concerned media education as a discipline. It was understood that strategic visions could clarify the theoretical basis of media education. The second objective was more concretely connected with the development of the Media Education Centre—or, more generally, any community—into an 'ideal working unit'. This chapter provides an analysis of the latter viewpoint in particular.

Such thinking starts from the post-modern concept of learning organisations which are characterised by the existence of a collectively accepted vision, extensive goals, and a conscious attempt to facilitate co-ordination and action within the organisation. They are further characterised by a distributed but empowered staff, tailor-made products, and targeted services. Post-modern learning organisations network with their clients and react quickly to their needs.

They also actively seek strategic alliances with different organisation systems, for example with business enterprises and trade. The Media Education Centre has perceived that its work and actions, both research and development, help to create favourable conditions for the transformation of the entire Department of Teacher Education into a post-modern learning organisation.

There are several definitions of *high-quality learning*. De Corte (1995) and Jonassen (1995) present paralleling classifications of high-quality and meaningful learning. Both start from the constructivist view of learning: the learner is not a passive recipient of knowledge but he/she actively acquires and modifies knowledge and generates new meanings on the basis of the existing information. De Corte emphasises the importance of accumulation for constructivist learning. Both researchers introduce an element of intentionality and context-dependence. Learning is interaction in a social and cultural context. According to Jonassen, situations can also be simulated by establishing problem-centred learning environments. Jonassen's classification emphasises the importance of the group: knowledge is constructed by the learners together. Learning also includes reflection on the learning process and the joint solutions made during the process. De Corte also mentions cooperation and underlines that the social processes are emphasised in context-dependent learning and constructivism in general. He also includes in the definition of efficient learning the concept of self-directedness. Since learning is individual, seen from a metacognitive viewpoint it becomes more efficient when it can be controlled by the learner him/herself.

6.2 An Analysis of the Knowledge Strategy Models of the Media Education Centre

In the development of the Media Education Centre the focus is on the highest possible quality of research, teaching, and development. If the goal and direction of the action is shared by the members of the community, the work community, as a working environment, develops. However, the aim is rather extensive and it contains a range of very different sectors and projects, which may mean that the workers have different practices, yet strive for a common goal. Research, teaching, and development and their successful evaluation give rise to a co-operative work community which can also be seen as a learning organisation.

6.3 The Ideal Media Education Centre—Three Visions

In the following we present three models which emerged during the knowledge strategy work at the Media Education Centre during spring 1998. The first model, 'Developing Work Community' (Figure 4), presents a model of retrospective vision on how the staff at the Centre have seen the development and key aspects of their work community. The second model, 'Success' (Figure 5) models the elements which lead to an ideal Media Education Centre producing high-quality research and development. The third model, 'Ideal Media Education Centre' (Figure 6), depicts the visions of the staff members of the Media Education Centre as an ideal working environment.

6.3.1 Vision 1: Developing Work Community

During its two-year existence the Media Education Centre has found its place as part of the Department of Teacher

Education and the scientific community of education. In a rapidly developing field of interest for the entire society there have been plenty of opportunities for participating in various projects and for reviewing co-operation opportunities with schools and enterprises interested in media education and information and communication technologies. There has also been co-operation with corresponding units at the University of Helsinki and other universities, both in Finland and abroad. At the moment we are approaching a situation where we can see what opportunities such actions have for supporting and promoting the research, development and teaching carried out at the Centre.

We have first experiences of initial and in-service education. The contents of various education programmes have become more clear and natural models of action have been found for their implementation. Publications, seminars, and research projects introduce aspects of an established scientific community to the operations of the Centre. It has been possible to increase the number of staff at the Centre, and we have established a work community where teamwork thinking has been initiated through various projects. The Media Education Centre as a young work community and media education as a young discipline have a number of characteristics in common. As the Media Education Centre finds its place as part of the Department of Teacher Education and the University, media education as a discipline seeks its own place among communication, pedagogy, psychology, sociology, philosophy, and cultural research (cf. Tella 1998, in this publication).

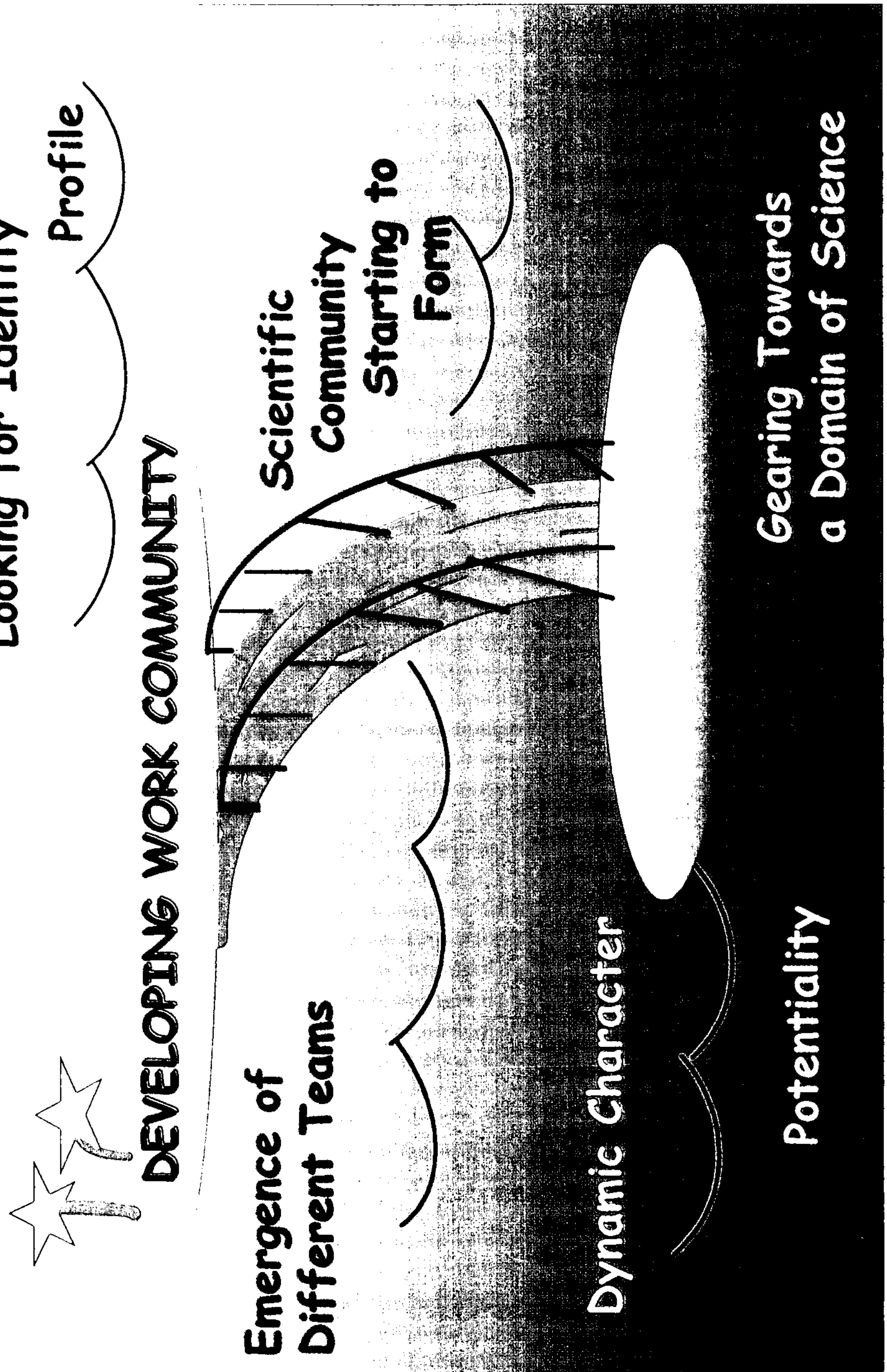

FIGURE 4. DEVELOPING WORK COMMUNITY.

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6.3.2 Vision 2: Success

FIGURE 5. SUCCESS.

In the second vision the main goal of the Media Education Centre is *success*, which means the production of research, development, and teaching of the highest quality possible. The achievement of this goal is based on the construction of the work community and its operation around flexible teams of experts.

As the teams are formed, the first phase consists of a survey of the strengths of the members of the work community. Once the individual strengths, skills, and professional and research interests are known, it is possible to create for each task 'the best possible' team comprising specialists who have expertise in various fields. The formation and work of the teams should be open. This vision emphasises two aspects of openness. First, it is a question of psychological openness or the shared experience of the team members of being able, following jointly accepted directions, to genuinely decide on how they are to fulfil their task. On the other hand, openness can mean openness towards those outside the team, for instance, informing people on the work of the team, receiving feedback, and subjecting the work to evaluation within the work community and, if necessary, outside it. The key tool of high-quality research, teaching, and development is a consistent and methodical evaluation of the operations of the work community. Basic joint objectives are used to select the criteria and measurements for the evaluation of teaching and research. Evaluation must also be continuous. It is important to create methods for the efficient processing of information provided by the evaluation. Feedback systems are also needed for obtaining the relevant knowledge and using it to support the development of the work community. One way of establishing such a system is to invest in the development of a digital, network-based evaluation system.

No work community is capable of operating and developing only on the professional skills and knowledge of its own staff. Success requires national and international networking, collaboration with other units operating in a corresponding field. Networking is particularly important in a rapidly developing, interdisciplinary field such as media education. In practice it has not been too difficult to find potential partners for collaboration. However, the establishment of genuine, functioning and mutually satisfying relationship requires time, continuous contacts, and providing information on one's own actions, and, above all, flexibility and the ability to integrate different practices and operational cultures.

6.3.3 Vision 3: An Ideal Media Education Centre

The third vision outlines a process which could lead to the Media Education Centre's development into an ideal work community. In our opinion the ideal is an unambiguous operational strategy, since as with the first two visions, the ideal is to achieve the highest possible quality of research, teaching, and development.

We want to develop our work community into a good working unit. A good working unit is characterised by the healthy self-awareness of the staff and a feeling that the individual skills, abilities, and expertise of each member of the community are given the best possible use.

The key characteristic of an ideal Media Education Centre is openness, which in this vision is connected with change and evaluation. Since our starting-point is the ideal we aspire to, change and development are a norm. Social skills are emphasised in an open, multimedia-based working environment, since interaction and discussion are the only ways of changing and developing the work. Openness includes a progressive approach and the feeling of being able to influence common issues. Information flow is efficient, focusing on important messages. Openness is supported by a technologically flexible and easily modifiable physical working environment, and above all by versatile, functional tools of knowledge-oriented work and communication. Technological support ensures that the everyday routines are performed smoothly.

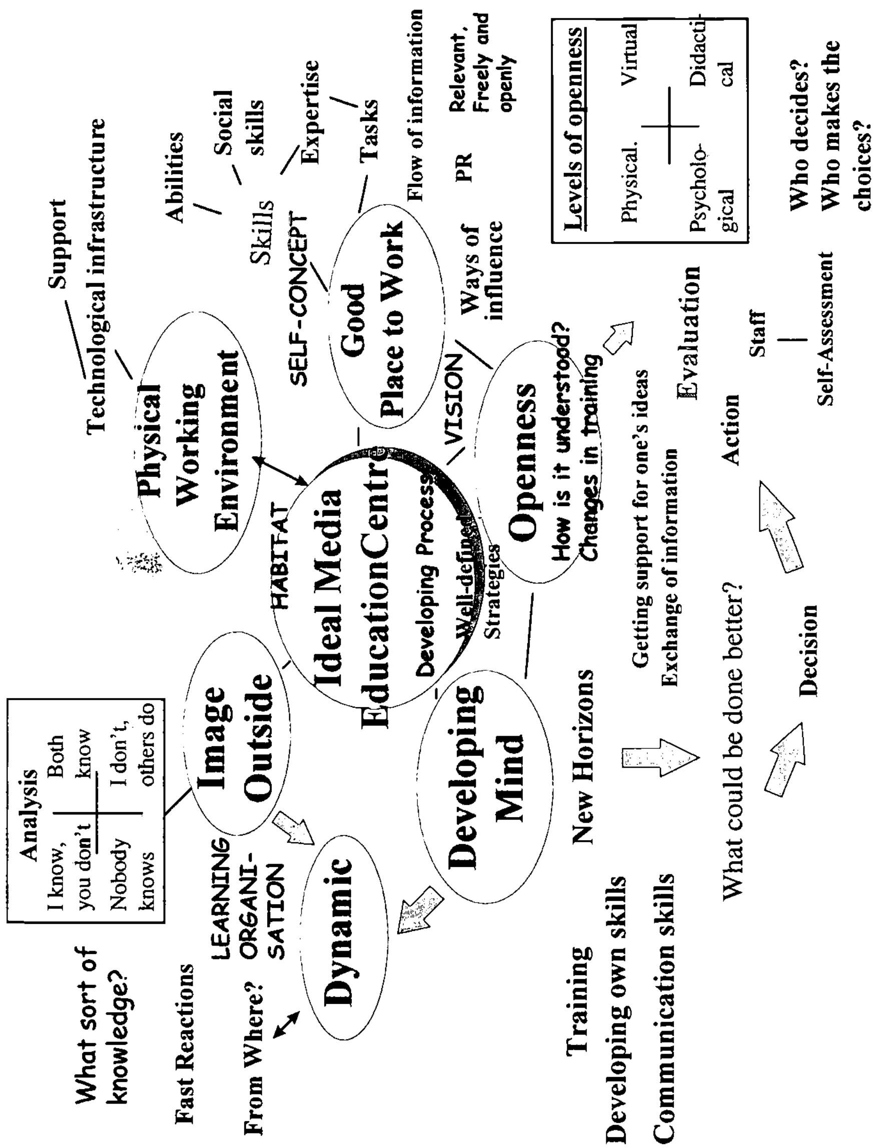

FIGURE 6. *AN IDEAL MEDIA EDUCATION CENTRE.*

An open work community equals a learning community which gives both the community and its members the possibility to make choices. The important questions are: Who in reality makes the decision? Who makes the choices? What could be done better? How can I support the thinking of my community and my colleagues? Does the community support my ideas? These questions are important because we can only reach the goals we have set by working together as a community where each person feels responsible for the achievement of the goals.

A progressive viewpoint and evaluation go together. The achievement of quality requires continuous assessment on all levels: a dynamic work community evaluates its actions in the direction of the goals and also understands the importance of outside evaluation for the development of its action. This is why it is capable of reformation, of creating a variety of methods and practices, and of reacting with speed to the educational needs of its members. Life-long learning has established itself in our thinking as an opportunity—seen from the outside, the Media Education Centre is the very image of a learning organisation.

7. CONCLUSION: KEY ASPECTS OF THE KNOWLEDGE STRATEGY OF THE MEDIA EDUCATION CENTRE

The three visions described above aim to outline the opportunities available for establishing a unit's own knowledge strategy. The establishment of a knowledge strategy is based on a reflection on values, for example, asking what kind of skills will be needed in the future, how these skills are to be developed, and how the development of the skills is evaluated. Based on a theoretical background, communalism and collaboration find a concrete expression in the know-how of the work community, but also in caring and sharing. *The learning unit of the organisation is no longer an individual but a team and eventually the entire organisation.* Such an approach to the establishment of a knowledge strategy also makes it the strategy of learning and know-how in the work community.

As many Finnish schools and universities are currently establishing corresponding knowledge strategies, we hope that these descriptions provide the reader with an opportunity for reflecting on his/her own thinking, basic values, and image of a future work community. Educational and research organisations obtain a model which they can use to develop new strategies based on the needs of the organisations themselves.

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Next, we aim to present an overall picture of those aspects of the knowledge strategy of our work community which emerged on the basis of the concepts described in this article.

1) The central concept, work, is understood as a learning environment and situation. As noted by Sarala & Sarala (1997), "on-the-job learning refers to learning based on the worker's own experiences and the tradition of the organisation, the promotion of multiple skills through job rotation, exchange of tasks, and participation in research and experimental projects, with a focus on learning". For this reason it is important to consider how on-the-job learning can be ideally carried out.

2) The authors of the strategy must be aware of their own concept of learning. Our concept is based on the socio-constructivist view in which the strategy is based on the utili-

sation of interaction in research, teaching, and learning. Communalism is one of our central concepts.

3) Our main objective is a high quality of research, teaching, and development. These objectives require for each member of the organisation to continuously develop his/her own work and to learn new things.

4) Learning takes place by interaction in particular. This can be regarded from four viewpoints: co-operation, an open and flexible learning environment, networking, and shared expertise.

The key principles of co-operative learning are positive mutual dependence between learners, interactive communication, individual responsibility, emphasis on social skills, evaluation of one's own learning, and target-oriented working (e.g. Sahlberg & Leppilampi 1994; Vähäpassi 1998). From the point of view of the knowledge strategy of the Media Education Centre, co-operation is seen as a means of reinforcing target-oriented action in the community. Through co-operation, the staff aims at a clear awareness of the shared goals and objectives of its actions.

In accordance with the principles of co-operative learning, the learning community builds up its expertise in an open and flexible learning environment. Openness and flexibility are divided into several sectors, for example physical, didactical, psychological, and virtual openness (see e.g. Sariola 1997, 76; Sariola 1998, 34–35).

- Physical openness refers to the flexible use of various spaces, the opportunity for versatile spatial solutions, and the mobility of various resources, information and communication equipment, and furniture.
- Didactical openness refers to choices made in the working situations. Students, teachers, and researchers can make different choices concerning their own teaching and learning,

which support the learning process. Making choices is closely connected with evaluation. Openness expresses itself as the selection and evaluation of the speed of work, objectives, contents, and evaluation methods.

- Psychological openness refers to the feeling the members of the work community have of being genuinely able to influence the decisions and operations of the work community. They participate in the planning of various developmental and research projects as equals.
- Virtual openness refers to the utilisation of a variety of applications of the information and communication technologies in learning situations. The key concept of virtual openness is the situation-based media selection where the staff attempt to analyse the nature of each medium and how the selected media support target-oriented working and learning. With respect to the know-how of the staff, the crucial issue is the simultaneous management of a range of media and communication channels, and also critical evaluation of which information is important to the learner.

The Media Education Centre aims to utilise networking and communication to support teaching and learning. Networking takes place both on a local and global level. Part of it is based on close and contact communication, and part on telematic communication. In this context telematic communication is interpreted as virtual networking in particular. The different forms of networking are seen as different levels of communication. Local networking is based on physical communication between small groups and takes the form of co-operation, an emphasis on communalism and teamwork. As for telematic networking, it is based on teleteam—communication where researchers, teachers, and students form a joint information network based on small groups. The third form of networking is the global networking between the Centre and society, where the Centre aspires to use its expertise on media education outside the

Centre as part of various learning situations. Thus the Media Education Centre reinforces its interaction with the various functions and participators in society. Virtual networking is made possible in particular through the modern information and communication technologies.

In accordance with the idea of shared expertise (e.g. Tella 1994), each member of the Centre is regarded as an expert. Thus the Centre constitutes a close scientific community of learners, of experts. Helped by consultants, the staff find information in a variety of physical and virtual sources. Expertise is developed through versatile teaching and learning methods with a focus on an investigating and problem-centred teaching and learning process.

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This article represents the views held by a number of writers on the strategic planning and discussion conducted within the Media Education Centre. It is not possible to discuss all the issues exhaustively. One of the aims of the article is to serve as an "interim account" for further ideation and planning. At the same time it reflects strategic knowledge as indicated by the title and contains initial ideas of the emergence of the knowledge of media education, as partially expressed by Figure 7.

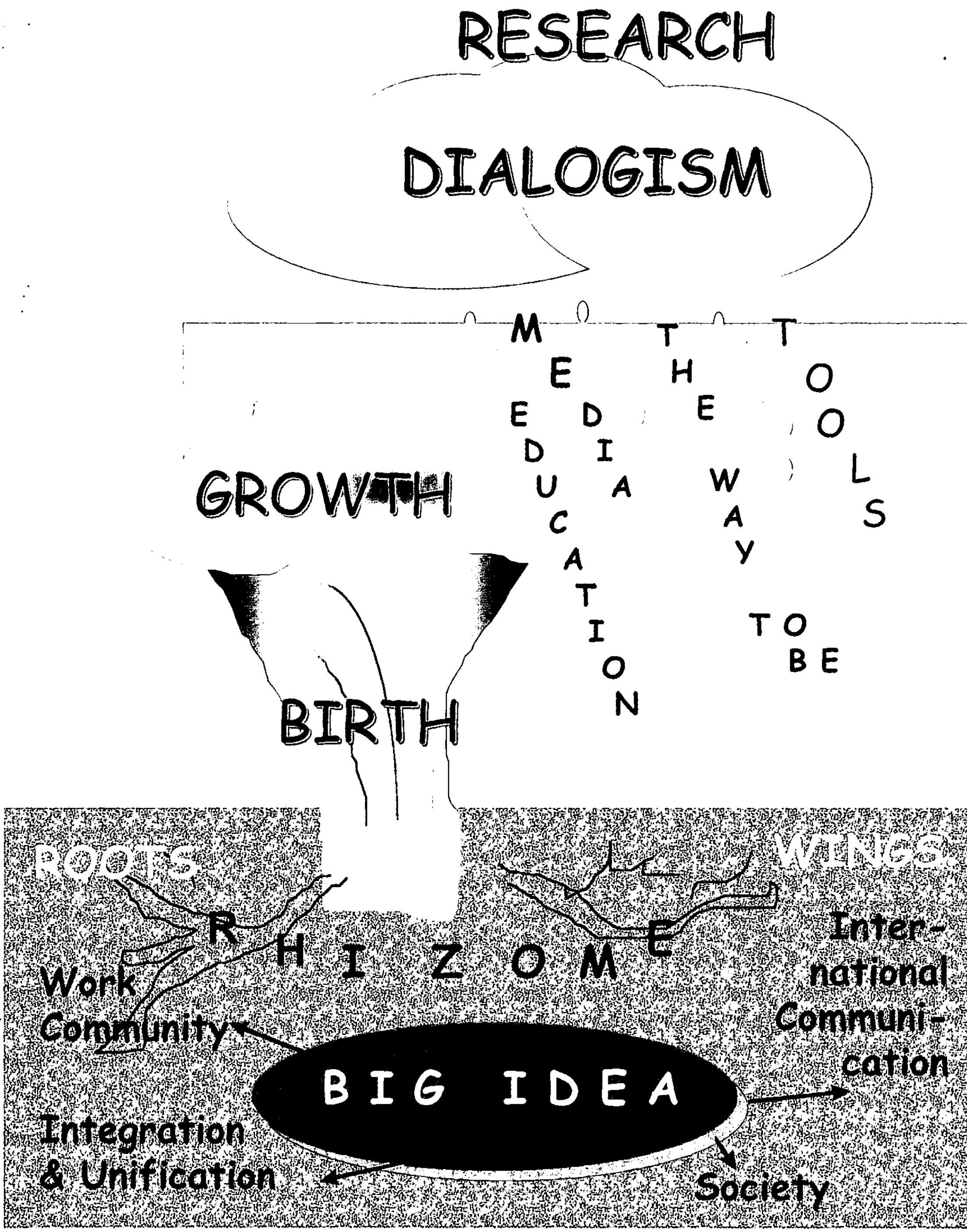

FIGURE 7. THE "BIG IDEA" AND THE EMERGING KNOWLEDGE OF MEDIA EDUCATION.

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The Concept of Media Education Revisited:

From a Classificatory Analysis to a Rhizomatic Overview

Seppo Tella

"The best learning comes from passion, passion instilled by teachers, passion felt by students." (Tapscott 1996, 204).

Abstract

The purpose of this article is to analyse the concept of media education. The analysis is first based on some preliminary ideas already presented in Tella (1997c). In addition, this article aims to shed some light on the relationships between different domains of knowledge and disciplines on the one hand, and media education on the other. The intrinsic purpose thus is to create a classification or a general overview that can then be commented upon by all people concerned. This classification is later changed into a rhizomatic overview.

One of the main findings in this analysis is the fact that the conceptual domain of media education has widened to include a wide variety of concepts from other disciplines and domains of knowledge. At the same time, a couple of megatrends have come into light, viz. communication and mediation.

Keywords: Media Education; Communication; Mediation; Teacher Education; Virtual Pedagogy; Didactics; Cognitive Education; Cognitive Science; Cognitive Psychology; Learning Psychology; Sociology; Philosophy; Culture; Educational Technology; Information and Communication Society.

1. Ideas and Rationalisation About Theories and Classifications

Over the years, it has become clear to the writer of this article that more analysis is needed to fully understand the present scope and domain of media education. An earlier attempt to define media education was made 18 months ago (Tella 1997c). At this point, however, the general picture of media education is much more multifaceted, because so many relevant areas of knowledge and science have turned up and now have an impact on the development of media education. The general purpose of this article is an attempt to classify these recent developments in an overview. These findings will then be presented as a graph (Figure 3), which should naturally still be taken as an interim analysis of the *status quo* of media education.

Even if Figure 3 does not represent a theory, some of the criteria usually applied to evaluate a theory can be used, albeit cautiously. Seels (1997, 13) argues that two relevant criteria for evaluation of a theory are *significance* and *usefulness*. She continues to argue that a concept is significant only when it is related to other concepts (Seels 1997, 13). This criterion can perhaps be applied to the present interim analysis, as a number of various kinds of links can be seen between the different components to be presented. The usefulness of the ideas to be introduced below can only be validated with time. Presenting ideas to be recognised by one's peers as significant or to be rejected by one's peers is one of the criteria used in scientific communities.

Frankfort-Nachmias & Nachmias (1992; cited in Seels 1997, 14) distinguish four types of theories that can be constructed (Table 1).

In taxonomic structures, there are several classifications possible (cf. Seels 1997, 15). *Phenetic classification*, for example, is based on observable similarities and differences between different organisms. As a conceptual extension, media education could be regarded as an organism, to be analysed by contrasting its natural relationship with adjacent disciplines. *Phylogenic* (or *phyletic*) *classification*, on the other hand, reflects the evolutionary history of an organism. This kind of approach would spontaneously lend itself to a historical analysis of media education.

TABLE 1. *FOUR TYPES OF THEORIES (FRANKFORT-NACHMIAS & NACHMIAS 1992; CITED IN SEELS 1997, 14).*

	Name	Explanation
(a)	*ad hoc* classificatory systems	arbitrary divisions into categories
(b)	taxonomies	categories based on empirical observation
(c)	conceptual frameworks	broad structures specifying relationships
(d)	theoretical systems	combining taxonomies and conceptual frameworks

A third classification, called *teleological* (or *purposive*) *classification*, is based on that of Ridley (1986, 5; cited in Seels 1997, 15). This classification originally referred to biology but it serves my purpose well: "Teleological classification seeks to group species according to their purpose in life, which in modern Darwinian terms means the function they are adapted to perform" (Ridley 1986, 5). In the following conceptual analysis of media education—and in the three conceptual frameworks based on them (cf. Figure 1, Figure 2 and Figure 3)—some features of all three classifications (phenetic, phylogenic and teleological) will be used, as my intention is first to compare media education and certain adjacent disciplines; second, to very briefly sketch some historical changes in the concept of media education, and, third, to analyse some of the basic functions of the components included in the three main figures of this presentation.

Taxonomies can also be used in my opinion to summarise the existing knowledge about a phenomenon even if the categorisation is not derived directly from empirical observation. This is very much the case regarding the present analysis of media education. In fact, the relationship between observation and theory is intriguing. Does theory precede observation or is it the other way round? In his seminal book on Objective Knowledge (1972/1979), Popper discusses this question by arguing that

> "theory—at least some rudimentary theory or expectation—always comes first; that it always precedes observation; and that the fundamental role of observations and experimental tests is to show that some of our theories are false, and so to stimulate us to produce better ones." (Popper 1972/1979, 258)

Popper (1972/1979, 258) further argues that we always start from problems, and once we are faced with a problem, we should start to work on it. Popper concludes very firmly by stating that *"the growth of knowledge proceeds from old problems to new problems, by means of conjectures and refutations* [italics in original]" (Popper 1972/1979, 258). I feel this is very much the case here. Analysing the concept of media education is an old conceptual problem to me (and to most of my peers). Figure 1 and Figure 2 will present some rudimentary answers to this problem. Yet they only provide us with a partially valid explanatory "theory" of what media education is all about. Consequently, it is only natural to proceed further. In fact, between the emergence of Figures 1 and 2 on the one hand, and Figure 3 on the other, a lot of conjectures and refutations have taken place, in a period of some 18 months. In that sense, all three Figures in this article represent different stages of theorising. Yet, in the final analysis, even the latest figure, Figure 3, is just one step towards a better comprehension of the intrinsic nature of the fast developing notion of media education. Popper's (1972/1979) ideas also help in this respect. He argues that

> "the growth of our knowledge is the result of a process closely resembling what Darwin called 'natural selection'; that is, *the natural selection of hypotheses* [italics in original]: our knowledge consists, at every moment, of those hypotheses which have shown their (comparative) fitness by surviving so far in their struggle for existence; a competitive struggle which eliminates those hypotheses which are unfit." (Popper 1972/1979, 261)

Popper's train of thought reminds me of some of the ideas presented elsewhere in this publication (Tella et al. 1998), especially ideas connected to the communal character of a working community. This kind of community is bound to raise topics and interests of various kinds, some of which arouse more interest than others. One could argue that this emergence of new ideas later to be shared by others represents the natural selection of ideas that gradually prove more fit than others and may become rooted in the thinking of the community.

Chance steps in, certainly, but is it a negative thing, after all, in human cultural sciences, such as media education? If an interest is shared by many, it is most likely to survive in the harsh competition of ideas. This kind of chain of events may well explain some of the components in Figure 2 and especially in Figure 3 in this article. Yet it would be nonsensical to argue that these components represent some haphazard taxonomic or classificatory elements; no, they clearly and firmly belong to the holistic concept of media education, and even more if they are shared by several experts in the field and found significant and useful by the peers of the writer of this article.

The next question, inevitably, is concerned with the problem whether these figures represent scientific knowledge or whether they are arbitrary classifications. In my thinking, the primary criterion for scientific knowledge is that it is open to public discussion by the scientific community, that it is "written up" by using sufficiently precise terminology accepted and understood by others, and that it is based on something other experts in the field can share. In this sense, I believe this initiative can be interpreted to be geared towards scientific knowledge. It is apposite to finish by citing Popper once more about his idea of the emergence and growth of knowledge:

> "[t]he growth of knowledge is always the same: we try to solve our problems, and to obtain, by a process of elimination, something approaching adequacy in our tentative solutions." (Popper 1972/1979, 261)

The final rationale behind my figures, especially behind Figure 3, is the effort to try to answer the fundamental questions:

- What is media education?
- How does it relate to adjacent disciplines?
- What are its key concepts and main areas of interest at the moment?

My analysis is subjective beyond reasonable doubt. However, I have decided to include it in the present publication, as it aims to contribute to the general discussion of strategic planning in media education (cf. Tella et al. 1998). I have also been inspired by Seel's (1997, 20) words: "Theory building using taxonomic classification is important because without taxonomic structures it will be impossible to progress towards theoretical systems."

Based on the above, I argue that the following three classifications (Figure 1, Figure 2 and Figure 3) represent rudimentary theories of media education, and, at the same time, a conscious effort at scientific knowledge. The three figures include a lot of theoretical elements that help understand the intrinsic nature of media education in a telelogically defined fashion, as explained below. On the whole, it should be borne in mind that in the systemic study of education (in educational sciences) there are very few theories that are universally valid and applicable all over the world.

2. Initial Interpretations of Media Education

In the following, some differences will be described between the traditional ("mainstream") media education and the telelogically defined media education (for a more detailed description, cf. Tella 1997c). The former focuses on mass media communication; the latter lays more emphasis on the educational applications of modern information and communication technologies (MICT), open and distance learning (ODL) and virtual pedagogy. At present, media education is experiencing a period of transition with a lot of its emphases being restructured.

"Mainstream" media education used to consist of mass media based communication and pedagogy (Figure 1). Pedagogy referred to educational sciences. The major role of media education in this framework was to provide citizens with adequate media literacy (the ability to read, analyse, assess and produce communication in a variety of media forms, such as television, print, radio, computers) and to give guidelines of how to cope with the information the mass media provide to the general public.

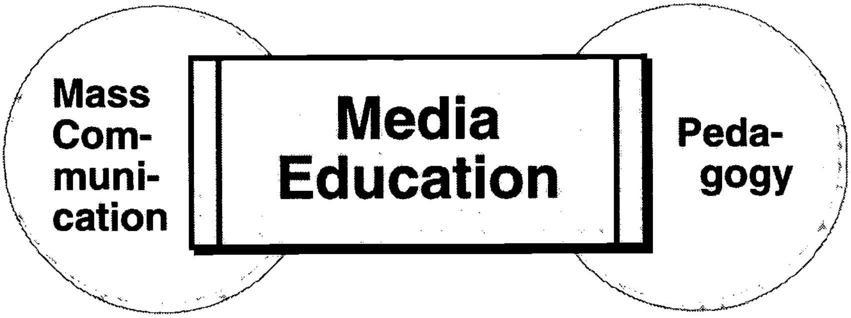

FIGURE 1. A CLASSICAL REPRESENTATION OF MEDIA EDUCATION (BASED ON MACHADO 1996, 70).

In media education, a shift has gradually taken place from traditional mass media towards modern information and communication technologies (MICT), distance education and open and distance learning (ODL) tools and techniques. This kind of media education is usually characterised by a telelogic point of view (Tella & Mononen-Aaltonen 1998a, 10–12). Video, TV, and radio are not neglected as such, but the main emphasis is on modern digitised or digital media, such as e-mail, multimedia conferencing, network-based learning software, groupware. Telelogically emphasised media education is interested in the analysis of the tools and strategies facilitated by MICT as well as in pedagogical applications of these tools and software.

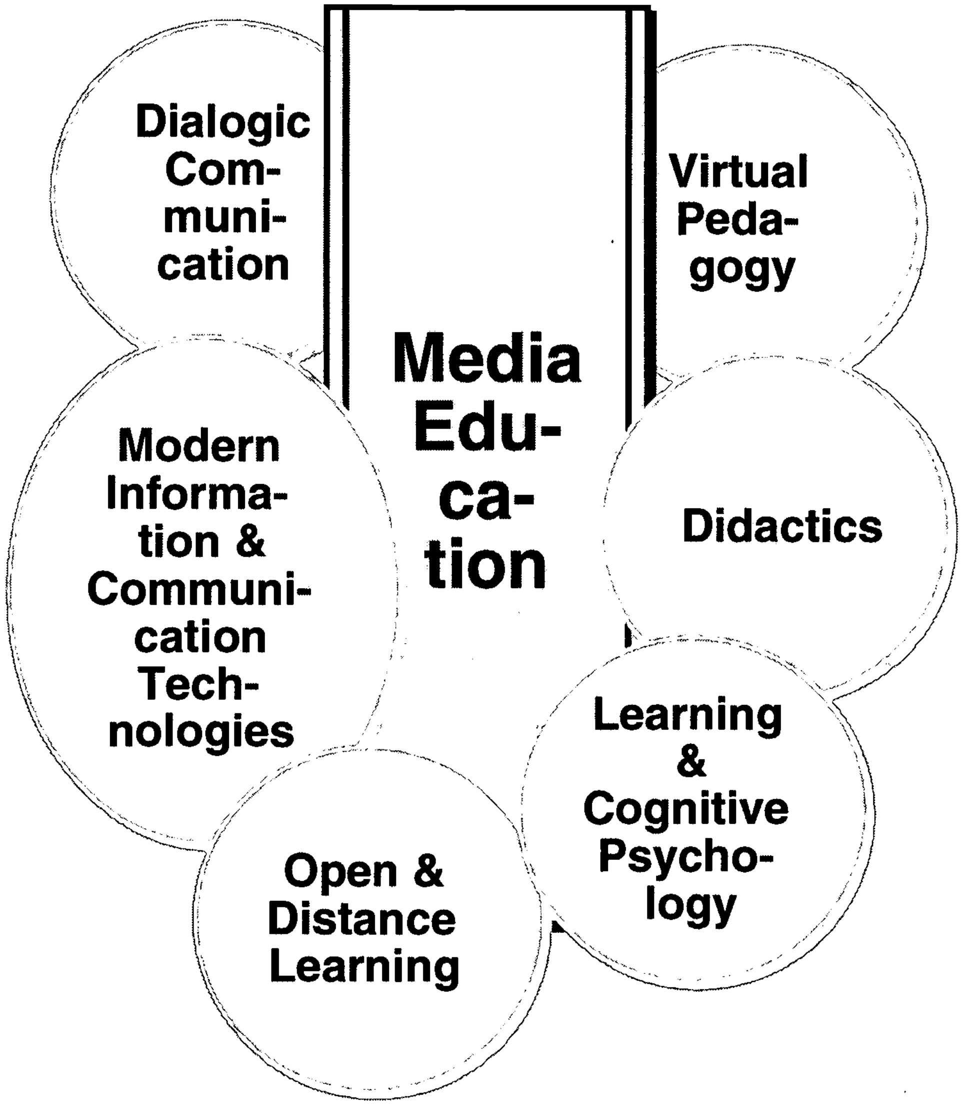

FIGURE 2. A TELELOGIC VIEW ON THE RELATIONS OF MEDIA EDUCATION BETWEEN THEORETICAL AND PRACTICAL CONTEXTS (BASED ON TELLA 1997C, 18, BUT SLIGHTLY MODIFIED).

The telelogic interpretation of media education arises from several scientific, pragmatic and theoretical backgrounds as presented in Figure 2. Among other things, virtual pedagogy analyses the various virtual applications and "smart" products that technology has brought with it. Didactics, as a science of teaching, looks into various ways of developing teaching. Dialogic communication points to a fundamental basis for all communication, whether based on mass media or target or small group communication. MICT and ODL are two major components in this telelogic interpretation.

Media education also profits from learning and cognitive psychology. A well balanced interaction between media education and the two domains of psychology is most beneficial. At the same time, the autonomous role of media education is gaining ground, as its importance is being recognised in more and more areas of society, economy and science. Besides, an increasingly growing role of dialogic communication is also an asset in modern media education. All in all, media education opens new opportunities to teachers comfortable enough with a student-centred, open-ended learning environment.

3. An Updated Analysis of the Concept of Media Education

In this chapter, a more global analysis will be attempted, with a special view to seeing media education from a number of different yet converging perspectives (see Figure 3). The analysis is based on the following three main structures: first, media education is seen in the framework of an information and communication society. Second, the backbone of the analysis is grounded on teacher education, i.e., many of the observations are made through principles and ideas relevant to teacher education. Third, six major disciplines or areas of science have been chosen to support the analysis of media education. These six areas are education (or educational sciences, the systemic study of education), psychology, sociology, philosophy, culture, and technology. The choice of these six areas is not completely eclectic; rather, they have been chosen because of their relevance and significance to telelogically defined media education. From a communal point of view, these six areas have also been at the centre of much discussion in the Media Education Centre during the academic year 1997–1998. A number of other disciplines have been topical, such as anthropology, semiotics, linguistics, art and design, but their impact has not yet been empowering enough in my thinking, though it is easy to admit that all these, and several others, offer empowering horizons and would undoubtedly be worth pondering. Still, it is worth remembering what Hooper (1981) wrote about perceptual differences:

> "One of the simplest and yet most difficult ideas to internalize is the concept of perceptual difference—the idea that everyone perceives the world differently and that members of one culture group share basic sets of perceptions which differ from the sets of perceptions shared by members of other culture groups. It is not that the idea is difficult to understand, it is that it is hard to impose upon ourselves, to internalize so that it affects our behavior." (Hooper 1981, 13)

At the moment, the chosen domains of science are the basic set of perceptions that will be used to analyse the notion of media education. Despite the limited number of domains of science I have chosen, whole universes of knowledge open up with them. It is more than difficult to pinpoint the most important components embedded in them. The categories chosen for my analysis do not necessarily try to cover all relevant areas or concepts in that particular area; rather, they are important to media education, and they will be observed from the perspective of media education. The main concepts to be introduced below will be provided with some references for the reader to follow up the discussion.

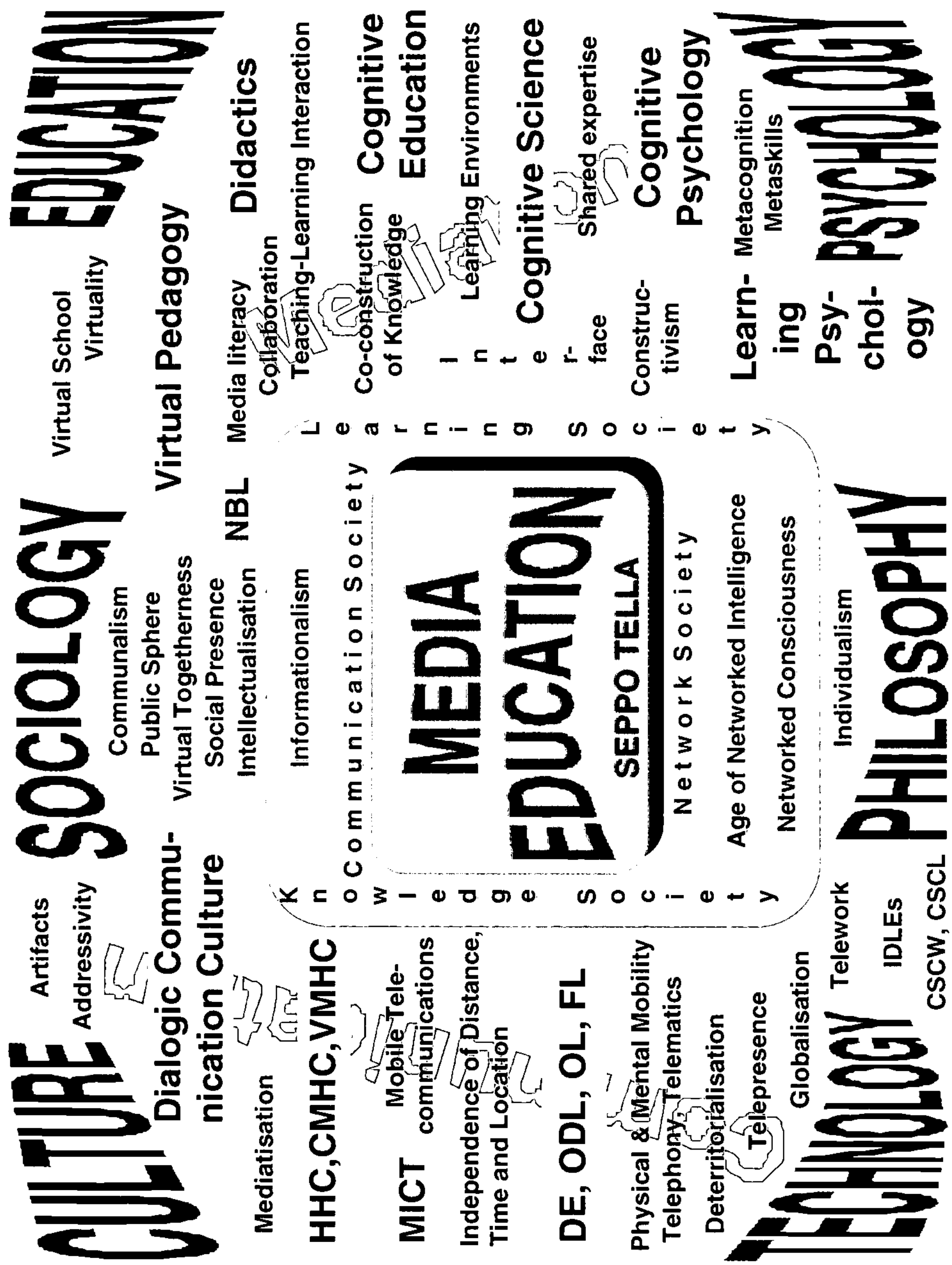

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FIGURE 3. AN OVERVIEW OF MEDIA EDUCATION WITH SOME OF THE ADJACENT DISCIPLINES AND DOMAINS OF KNOWLEDGE.

3.1 An Information and Communication Society

The development of media education is closely related to the changes in the basic structures of our society. The present developmental stage of our society has been described and named in different ways. Many researchers and theorists talk about an information society (e.g., High Level Group of Experts on the Social and Societal Aspects of the Information Society s.a.; Tella 1997b). This concept was originally related to Yonedi Masuda's (1980) ideas of the development of Japanese society in the 1970s (cf. also Tella et al. 1998, in this publication). Lievrouw (1998) has summarised the situation in a very apposite fashion as follows:

> "In recent decades the term 'information society' has become a widely used shorthand for complex social, economic, and institutional changes related to the proliferation of information and communication technologies. Researchers continue to debate whether the term stands for fundamental social change or merely the extension of the principles of industrial capitalism into new areas of society..." (Lievrouw 1998, 83)

Other researchers refer to a knowledge society or a knowledge-based society (e.g., Bereiter al. 1997, 329), an interaction society, a cognitive society (e.g., Valkoinen kirja: Opettaminen ja oppiminen – Kohti kognitiivista yhteiskuntaa 1995), a network society (Castells 1996), a service society, a digital society, a learning society (e.g., White Paper on Education and Training: Teaching and Learning 1995), a virtual society (The Information Society: An International Journal 1998), etc.

Tapscott (1996) speaks of the age of networked intelligence, comparable to networked consciousness. He does not refer in the first place to information but to knowledge. To him, an information-based society is a prerequisite for the next step that is characterised by the use of knowledge. Collaboration becomes a crucial issue in a knowledge-based society.

Other terms exist as well. Castells (1998), for instance, launches the concept of informationalism, by which he means "a mode of development in which the main source of productivity is the qualitative capacity to optimize the combination and use of factors of production on the basis of knowledge and information" (Castells 1998, 7). In Castells' analysis (1998, 7–8), the rise of informationalism belongs to a new social structure, the network society, which follows after the industrial society, in the same way, as informationalism follows industrialism. — I prefer the notion of an information and communication society, as it combines two major components of an information age, i.e., information and communication. It also gives a perfect parallel to modern information and communication technologies (MICT) that I consider as one of the basic concepts.

It has to be added, though, that terminology in the field of telecommunications and computing technologies continues to be bewildering and there is no real consensus about which terms should be used and in which contexts. Another aspect, alas, is that some terms, such as the information society, globalisation, the global village, have been adopted and are being used uncritically and indiscriminately, as they have caught on in the popular imagination and then stuck in public consciousness (cf. e.g., Hannerz 1996, 6; Lievrouw 1998, 83)

3.2 Education and Psychology

Education and Psychology will be dealt with together in this presentation, as they both concern media education very deeply indeed. A few words will be said about cognitive education and cognitive science as well.

3.2.1 Virtual Pedagogy, Didactics and Cognitive Education

As mentioned in connection with Figure 2, virtual pedagogy is an area that was born together with the emerging information and communication technologies. It belongs to the systemic study of education (educational sciences; *kasvatustiede*), but specialises in the possibilities enabled by the virtual school or virtual class and virtual university in a telematic, multimedia-based and networked learning environment (e.g., Tella 1995; Tiffin & Rajasingham 1995; Husu 1997; Kynäslahti 1997; Porter, L. R. 1997; Kynäslahti 1998b, 74–77). Kynäslahti (1998b, 78–81) has also spoken about a "cyborg" school, combining physical and virtual components in its essence, as a way to think of the futuristic virtual high-tech school. Without reiterating the discussion regarding the different meanings of "virtual", just one comment will be made here. Grenier & Metes (1995; cited in Agres, Edberg & Igbaria 1998, 72) have namely extended the meaning of "virtual" to include "significant enhanced effects or actions, physical behavior or non-physical entities, and the supporting use of telecommunications and computing technologies".

The main task of virtual pedagogy is to study and develop teaching and learning strategies and practices as well as to help understand the various functions (the salient features) of various media (cf. e.g., Tella & Mononen-Aaltonen 1998a, Chapter 5). Together with didactics (= the science of teaching), virtual pedagogy is concerned with issues related to virtuality (cf. e.g., Kynäslahti 1998b, 80), immersion, possible worlds and virtual or imagined communities (e.g., Jones 1997a; Jones 1997b; Tella & Mononen-Aaltonen 1998a, 94, 96). In its largest form, the question is of virtual societies, defined by Agres, Edberg & Igbaria (1998, 72) as "all the components that are part of *cultures based on the logical rather than on the physical*" [emphasis added].

Both concepts—pedagogy and didactics—are closely connected to communication and mediation (= a relation between two things or two people; cf. e.g., Tella & Mononen-Aaltonen 1998a, 112–118), the two megatrends in the background of my conceptual framework. Schrum & Berenfeld (1997), for instance, contend that

> "[c]ommunication is an essential component of any community because members must mediate common values, interests, and goals. A group of people who live in the same geographical area but do not communicate would hardly constitute a community. Indeed, the words 'community' and 'communicate' are both derivatives of the same Latin word, *communis*, meaning 'common'. CMC, an amalgam of traditional communication media, has spawned what are called virtual communities. These share the general characteristics of traditional communities, but the locality their members share is cyberspace." (Schrum & Berenfeld 1997, 64–65)

Some central concepts in the area of education are network-based learning (NBL), media literacy, collaboration, and the teaching–learning interaction. The first two are directly linked to media education, while the latter two are of a more general character, though crucial in media education as well. Network-based learning is used here as a new paradigm, as "the present state of the art" which marks a milestone in the history of teaching with technology, now firmly rooted in the telematic applications of the Internet and the World Wide Web (Tella 1997a, 12–13; Tella 1997f).

Media literacy is one of the terms that media educators have to face in its various forms. One of the latest forms is 'digital literacy' coined by Paul Gilster (Pool 1997), by which is meant the ability to understand information and—more importantly—to evaluate and integrate information in multiple formats that the computer can deliver. Some earlier terms, such as 'second literacy', 'computer literacy', and 'tri-literacy', are still being used (cf. e.g., Tella 1991), but perhaps less frequently nowadays.

In the 1980s and even at the beginning of the 1990s, literacy was talked about on a regular basis in the research literature, with somewhat diverging emphases, though. A few examples might illustrate this point. The focus varied from computer literacy or information literacy as cultural capital (Emihovich 1990; Hancock 1993), to a basic skill for teachers (Besag & Levine 1984), contrasted with writing with pen and paper (Collis & Green 1984; Clark 1985; Rousseau & Tam 1989), to a general impact of computer literacy on lifelong learning, especially at the adult level (Turner 1988). Braden (1996, 505) presents a logical reason for the fact that literacy as a topic now is less frequently discussed: "A natural outgrowth of the 'literacy' metaphor has been the level of interest by teachers of reading and researchers in the field of reading in the relationship of visual literacy to the teaching of reading."

The basic meaning of literacy—the skill to read and write—is, however, crucial and appears regularly in the literature (cf. Lanham 1993 as an example of a seminal paper on this topic), with more and more examples of issues related to literacy as part of the comprehension of the WWW and the Internet, gradually leading to media literacy. Lemke (1998, 287) is of the opinion that multimedia authoring skills, multimedia critical analysis, cyberspace exploration strategies and cyberspace navigation skills will be the generic literacies in the information age. The work done at Vanderbilt University is of utmost interest in this respect (The Cognition and Technology Group at Vanderbilt, CTGV [in print]) as well as the research done by Bereiter & Scardamalia (1987) on the so-called high literacy. The book by Reinking et al. (1998) represents the current state of the art regarding media literacy and technology.

Collaboration and co-operation have become central concepts in didactics. Although mostly used as near synonyms, some researchers tend to distinguish between them. Co-operation may be seen to emphasise some agreements reached by the participants, although they can proceed individually towards goals they have defined themselves; in collaboration, mutual benefits are gained by all participants working together on all phases of a project (e.g., Oja & Smulyan 1989). Sometimes the concept of co-operation is preferred when teachers and students are concerned, while collaboration also refers to the relations between teachers and researchers. An exchange of ideas between researchers on a mailing list (CL versus CL a definition 1996) points to some other relevant differences. First, the Latin roots of these two words differ to some extent; collaboration stresses the process of working together, while co-operation focuses on the product of such work. Second,

> "co-operative learning has largely American roots from the philosophical writings of John Dewey stressing the social nature of learning and the work on group dynamics by Kurt Lewin. Collaborative learning has British roots, based on the work of English teachers exploring ways to help students re-

> spond to literature by taking a more active role in their own learning. The co-operative learning tradition tends to use quantitative methods which look at achievement: i.e., the product of learning. The collaborative tradition takes a more qualitative approach, analyzing student talk in response to a piece of literature or a primary source in history." (CL versus CL a definition 1996)

One more difference is explicated by Rocky Rockwood on the same mailing list:

> "The major difference lies in the fact that co-operative deals exclusively with traditional (canonical) knowledge while collaborative ties into the social constructivist movement, asserting that both knowledge and authority of knowledge have changed dramatically in the last century. [Rockwood then argues in line with Brufee as follows:] The result has been a transition from 'foundational (cognitive) understanding of knowledge', to a nonfoundational ground where 'we understand knowledge to be a social construct and learning a social process'." (CL versus CL a definition 1996)

In its orientation towards knowledge and learning, collaborative learning approaches what I call later in this article 'communalism' (*yhteisöllisyys*) and 'communal learning'. This is the sense of collaborative learning (*yhteisöllinen oppiminen*) also in Lipponen's (1997) argument.

Co-operative learning is an umbrella term for a variety of approaches, methods and techniques that capitalise on the principles of co-operation and group dynamics (Johnson & Johnson 1996; cf. Vähäpassi 1998 for an analysis of four such approaches, viz. Learning Together; Structural Approach to Co-operative Learning; Complex Instruction, and Group Investigation). At the Media Education Centre, we have also started to compare co-operative learning with a more generic concept of communalism (*yhteisöllisyys*) (cf.

e.g., Passi & Vahtivuori 1998 in this publication). A subtle distinction, perhaps, can also be mentioned, i.e., while co-operative learning clearly belongs to education, communalism includes more sociological implications, which is why I have put it under the title of Sociology in Figure 3.

The teaching–learning interaction is in the very core of the didactic process. This point would necessarily include things like the changing roles of the teacher (cf. e.g., Tella 1997d; Niemi 1998), the teaching–studying–learning (TSL) paradigm (e.g., Uljens 1997), and changes taking place in classroom teaching because of the increasing use of modern technology (e.g., Tella 1997f, 55–58).

This question is directly linked to the issue of learning environments (*opiskeluympäristöt* or *oppimisympäristöt*), a theme widely discussed during the past few years (cf. e.g., Tella 1997f, 50–55; Mononen-Aaltonen 1998 in this publication; Tella & Mononen-Aaltonen 1998a, 99–103). Ashman & Conway (1997), two representatives of a new emerging domain of science, i.e., cognitive education, define a learning environment as follows:

> "Every setting in which learning takes place involves a learner, a teacher, a setting, and information to be learned. ... Learning, therefore, occurs in an ecosystem [Doyle & Ponder 1975] in which there is a series of inputs, a series of teaching and learning processes, and a series of outputs." (Ashman & Conway 1997, 2)

Tella has argued on several occasions (e.g., Tella & Mononen-Aaltonen 1998a, 99–100) that in Finnish a distinction should be made between *opiskeluympäristö* (literally: a studying environment) and *oppimisympäristö* (a learning environment). Uljens' (1997) model of school didactics is also based on the teaching–studying–learning process (TSL), in which studying refers to the active study process of the learner.

In Loarer's opinion (1998, 121), cognitive education is probably the most important attempt of pedagogical development during the past few years ("...probablement la plus importante tentative de renouvellement pédagogique de ces dernières années"). In her view, the central task of cognitive education is an attempt to ameliorate the intellectual functionality of people through training and education (par la mise en œuvre d'une démarche de formation), so that their learning capacity and their adaptation skills are augmented. One of the targets should be cognitive educability. (Loarer 1998)

Both didactics and educational psychology deal with conceptions of learning. A rather extensively adopted conception at the moment is constructivism (as opposed to a more traditional behaviourism or objectivism). Modern constructivism underlines the learner's role in constructing his or her own knowledge. In addition to constructivism, I refer to co-construction or appropriation of knowledge, which underlines the importance of constructing one's knowledge in social interaction through collaborative efforts, not only between the adult and the learner but also between the learners themselves (Tella & Mononen-Aaltonen 1998a, 62). The process of co-construction may lead to a beneficial enculturation if we take adequately into account the fact that we always belong to a certain culture and to a certain time and space with its specific value systems and that information is processed between different persons by using the tools and artifacts created and provided by that particular culture (e.g., Mowlana 1997, 241).

3.2.2 Cognitive Science, and Cognitive, Educational and Learning Psychology

Learning psychology has always given a lot to education and to teaching. Educational sciences have traditionally focused on an individual and his or her learning abilities, very much in the same way as in psychology the focus has been on the individual. Recent educational psychology is also likely to build new bridges between psychology and education. (In this chapter, no special distinctions will be made between various brands of psychology, even if three of them, viz. cognitive, learning and educational, are mentioned.)

Recently, cognitive psychology and cognitive science (cf. Winn & Snyder 1996) have moved towards centre stage, bringing with them new concepts and new focuses. Cognitive science is particularly interested in issues of the human/machine interface and in building theoretical models of cognitive activity and theories around computational mechanisms (Winn & Snyder 1996, 116). In Finland, Saariluoma (1990) has researched thinking as a cognitive skill and expert knowledge as evidenced in expert chess players. Cognition ("knowing"), one of the key words, is no longer thought to exist solely in a person's head but rather distributed among different people. Distributed cognitions, distributed expertise, conceptual change, situated learning, situated cognition, anchored learning, cultivating different domains of expertise, etc. are some of the key concepts that have influenced media education as well (for a deeper discussion of these terms, see e.g., Eisner 1985; Chi, Glaser & Farr 1988; Nix & Spiro 1990; Brown et al. 1993; Pea 1993; Salomon 1993; Bereiter et al. 1997; The Cognition and Technology Group at Vanderbilt [in print]; also see Ramberg &

Karlgren 1998, 126–128 for a summary of the anchored instruction model principles).

Very much thanks to cognitive psychology, educators and educationalists too have become better cognisant of metacognition (= awareness of one's own thinking; knowledge about knowledge; second-order cognitions; thoughts about thoughts; the ability to monitor, evaluate and make plans for one's learning) and metaskills (or metacognitive knowledge, i.e., knowledge of when and how to use, co-ordinate and monitor various skills in problem solving) (cf. e.g., Hartman 1998). On the whole, educational technology has for some time been influenced by developments in cognitive psychology, as Winn & Snyder (1996, 131) also argue (cf. also Jonassen & Reeves 1996). Perhaps the biggest impact learning and cognitive psychologies have had on teaching and learning is the shift in emphasis from objectivist theories of learning to constructivist theories (e.g., Rauste-von Wright & von Wright 1995; Lehtinen 1997, 13–21; Rauste-von Wright 1997). Likewise, psychologists, often together with instructional designers (e.g., Duffy & Jonassen 1992; de Corte 1995; Jonassen 1995) have designed criteria for good learning, while, in education and in didactics, the focus used to be on criteria for good teaching.

Constructivism is an area that is shared by several disciplines. In this context I will not deal with the initial problem whether, *ab initio*, constructivism is derived from philosophy or from cognitivism and cognitive psychology. Suffice it to say that its importance to media education—as well as to education in general—has been, and still continues to be, exceedingly powerful. And as Duffy & Cunningham (1996, 173) argue, "[p]hilosophy is only one discipline that has relevance to constructivism in its application to instruction. There are views from a wide range of other disciplines that reflect the epistemological and methodological stances that are compatible with constructivism ... e.g., semiotics ..., biology ..., structuralism ..., and postmodernism...". (For some technologically focused viewpoints of constructivism, cf. e.g., Bagley & Hunter 1992; Cole 1992; Duffy & Jonassen 1992; Cooper 1993; Marra & Jonassen 1993; Dede 1995; Jonassen et al. 1995; Morrison & Collins 1995; Duffy & Cunningham 1996).

Constructivism is, again, an umbrella term, which embraces a wide variety of emphases and approaches. These will not be dealt with here (cf., however, Duffy & Cunningham 1996, 175 about differences between *cognitive constructivism* and *sociocultural constructivism*); only one comment will be made on *social constructivism,* which Burton, Moore & Magliaro (1996, 48) call a more current view of constructivism. Social constructivism, in Burton, Moore & Magliaro's (1996, 48) definition, focuses on the making of meaning through social interaction. It seems that at least in the practical activities of the Media Education Centre, the principles of social constructivism have been followed to some extent. In practice it means, among other things, that the community plays an important role in an individual's life and work as well. Sariola writes about this kind of focus as follows:

> "At the same time, attempts have been made to activate students in their learning and study activities to ensure the high quality of learning. The Department of Teacher Education at the University of Helsinki has during recent years carried out applications based on co-operative learning in, for instance, teaching practice and media education studies. Forms of study have thus included pair practice and team work, for example. For the teacher this kind of socio-constructivist approach increases communality and the integration of the whole learning environment in the planning of teaching. For the learner the construction of knowledge becomes part of

social interaction and the surrounding reality. This can also be seen as tending to bring the school and society closer to each other, as the school attempts to create social networks between itself and the surrounding reality." (Sariola 1998, 24)

As media education belongs to educational sciences, some of its terminology follows that of educational sciences, whereas in the area of psychology, slightly differing terms might be used. For example, in media education, purposeful or purposive studying (*tavoitteellinen opiskelu*) is one of the key concepts, while intentional learning (*intentionaalinen oppiminen*) is more common in psychology. Differences in terminology are of secondary importance, although it is important to recognise that different sciences employ special terminologies of their own.

3.3 Sociology and Philosophy

In the following, a few concepts related to sociology and philosophy will be introduced. Once again it is necessary to mention that these concepts are of interest to educators and to media educators in particular and do not necessarily reflect the main emphases in these disciplines. The following concepts will be referred to: communalism; public sphere; virtual togetherness; social presence, and intellectualisation. (Informationalism was mentioned earlier.) As for philosophy, individualism as a megatrend will be brought up. Another central topic in philosophy, that of knowledge, will be discussed in more detail in Tella et al. (1998, in this publication).

One primary assertion in sociology is that social phenomena cannot be adequately explained if only individuals are looked at (Kerr 1996, 143). Kerr (1996, 144–145) also points out one sociological difference between the United States and Europe. In his opinion, writing about education in the US has had a distinctly psychological tone, while in Europe and, especially in the UK, education has also been considered as a general social phenomenon.

The shift of co-operation (*yhteistoiminta*) to communalism (*yhteisöllisyys*) reflects, in my opinion, an approach, in which these kinds of social factors are inherently embedded. As communalism—or rather, communal learning—is analysed elsewhere in this publication (Passi & Vahtivuori 1998), only a few references will be made. First, communalism is not intrinsically opposite to individualism; rather, it implies that individual (or even individualistic) features coexist with community-focused features. Castells (1997), in fact, speaks about "the culture of communal hyper-individualism", and, referring to his thesis of an identity becoming one of the crucial sociological entities in the network society, goes on to contend that "[c]ommunalism ... to be socialized as value ... needs a milieu of appreciation and reciprocal support: a commune ..." (Castells 1997, 64). In my interpretation, communalism and dialogism clearly support each other, as each of them helps create an empowering working environment. If they coexist, the synergetic effect will be even more tangible. In addition to this, individualism and communalism are interrelated. If a human being has gained that level of autonomous existence that could be called 'individualism', he or she is then fully capable of creating networks and relations with other people. The step to communalism is then very short indeed. (Cf. also Tella et al. 1998, Chapter 2.3)

Communalism does not mean that sociological threats, viz. habitualisation, institutionalisation and reification should necessarily come true. These three represent different degrees of objectification of knowledge, its meaning and constitutive rules (cf. Nurminen 1986, 15–16). When action becomes habit, it changes into habitualisation ('There we go again!'). From the viewpoint of teaching, this stage is related to socially negotiated knowledge and could subsequently be discussed in teacher education in connection with objectivism rather than constructivism. Collective habitualisation is institutionalisation ('This is how these things are done'), which gives the members of the work community a feeling of knowing how things should be done. The threat embedded in institutionalisation lies in the fact that it may result in routine-like action, with no real aim at innovative action. Reification is institutionalisation that has gone very far and in which the human element (the human "touch") is jeopardised or even vitiated, as the representation of reality by the institution has been thoroughly objectified. This stage is harmful to the principles of communalism and constructivist ideas, as the structures are too rigid to be changed.

The concept of a public sphere (or public space) works in favour of communalism. This concept is based on Habermas' (1962/1989) idea of the *public sphere* as a realm in which rational public debate helps to shape participatory democracy. In an information and communication society, the Internet, the World Wide Web and computer-mediated communication (CMC), for instance, can serve as a public sphere. (For a more detailed analysis, cf. Fernback 1997; Tella & Mononen-Aaltonen 1998a, 94–96)

In my thinking, communalism, public sphere and virtual togetherness belong together. Virtual togetherness is a novel notion constructed on Bauman's (1995, 44–49) original concept of togetherness. Bauman's categories of togetherness include *mobile, stationary, tempered, manifest, postulated and meta-togetherness. Mobile togetherness* as a Baumanian metaphor refers, among other things, to human encounters in a busy street or in a shopping centre; people are *aside* each other, usually trying not to be *with* each other. *Stationary togetherness* is related to spaces like a railway carriage, an aircraft cabin or a waiting room. This kind of togetherness is in Bauman's words "totally fortuitous, accidental and redundant" (Bauman 1995, 45). *Tempered togetherness*, taking place in an office building or on a factory floor, is more purposeful, but the "continuity which the office-type togetherness can hardly do without tends also to transform the matrix intended for structured encounters only into a matrix for unintended, spontaneously and 'rhyzomically' growing solidarities" (Bauman 1995, 46). *Manifest togetherness* is illustrated by a protest march, which embraces the idea of being together in large numbers. *Postulated togetherness*, on the other hand, consists of the brotherhoods and sisterhoods of nations, races, classes, genders and other communities. *Meta-togetherness* is a scene for encounters, such as a pub, a holiday beach, a dance-hall, a land of endless experiments, of trials and errors. (Bauman 1995, 46–49)

Virtual togetherness is used in this article to refer to the shared feeling of belonging to the same virtual community and being able to fully capitalise on its resources. Virtual togetherness illustrates the feeling of being "present" on the Web, despite time and space distanciation. In Figure 3, the construct of presence is divided into social presence and telepresence. Telepresence is associated with distance education and educational technology, though it could be presented under Sociology as well. Tammelin (1998) argues that telepresence first referred to industrial remote control systems but that it now also implies virtual reality and interaction among geographically separated members of a group. Tiffin & Rajasingham's telepresence (1995) is also connected to televirtual realities, i.e., to teleconferencing systems that use virtual reality. They also refer to persons present in a conference only via telecommunications: "[A prototype of virtual reality teleconference] allows a person to sit at a table in front of a curved screen, put on a glove and a pair of glasses and find themselves in a virtual conference situation with other people with whom they can talk, shake hands and interact. The other people are not physically present any more than they would be if they were in a conventional teleconference. They are telepresences." (Tiffin & Rajasingham 1995, 139) Schrum & Berenfeld (1997, 46) define telepresence as the ability to use telecommunications technologies to interactively explore and experience events at a remote site. In their view, CMC is powerful enough to give its users the sensation of telepresence. Some synonyms for telepresence are also being used. Balle (1991), for instance, speaks of "remote presence"; Terashima of "telesensation" (1993, 455; cited in Tiffin & Rajasingham 1995, 139). — Social presence, in Tammelin's analysis (1998), is concerned with a larger social context, including motivation and social interaction.

Intellectualisation and individualism are two phenomena that seem to belong together at conceptual level. I have argued elsewhere (Tella 1997a; 1997e; Tella & Mononen-Aaltonen 1998a, 78) that the shift from computer-based education (CBE) to network-based learning (NBL) has brought about the emergence of groupware, theoretically grounded in shared expertise, which aims to cultivate different kinds of expert knowledge, helping individuals get more empowered in the spirit of growing individualism. Eraut (1991) predicted a certain kind of intellectualisation process, which affects individuals especially because of the quantity and rate of distribution of information by all the media with the emphasis on its diffuseness and rapid obsolescence:

> "In a more intellectual milieu, the concept of information society ... implies an awareness that there is a *process of intellectualization* in modern societies which requires increasing numbers of persons to possess a stock of knowledge enabling them to make creative use of the enormous potential of information. This is being made possible by computing being introduced into all walks of life and by the media playing an ever greater role in the social and cultural environment." (Eraut 1991, 4)

The process of intellectualisation is concerned with the fact that information is becoming more and more abstract, losing its roots in shared experiences. In earlier times, when something was experienced together, the information embedded in that event was concrete and shared between the persons involved. Now, information is often digital and transferred by an electronic or telematic medium, which compels the end user to decipher the message in a different way from a concrete experience. Another factor that makes information more abstract is the fact, mentioned by Eraut (1991, 4) that information is classified, used and analysed more and more frequently by the new computer technologies, with the emphasis on the theoretical potential of the information and the need for making it more accessible.

Communalism and individualism are two sides of the same coin. One cannot exist without the other. Individualism has for some time been a megatrend in education. Communalism is a newer phenomenon. Both will be needed in technology-enhanced learning environments, which are geared towards social-constructivistically understood co-construction of knowledge. The age of networked intelligence (Tapscott 1996) is *le mot juste* to describe this synergy.

3.4 Culture and Technology

The last big group of disciplines consists of culture and technology. Both are concerned with communication and mediation and will be considered here from the perspective of media education. These two concepts are intertwined in many ways, some of which will be referred to in this chapter. I have already argued that media education belongs not only to educational sciences but also to cultural sciences. Undoubtedly, media education is also related to technology, especially to educational technology. The concept of technology, admittedly, is enigmatic and would necessarily call for further analysis. In this context, I will only refer to Paul Goodman's cryptic words from his *New Reformation*: "Whether or not it draws on new scientific research, technology is a branch of moral philosophy, not of science" (cited in Postman 1993 as the motto of the book).

It is also imperative to remember the relations between culture, learning and education. Mowlana (1997, 239) has defined these relations in a most elegant way by saying that "education is the mainstay of culture, for how one learns is culturally determined, but flexibility and creativity are the keys to positive change and growth".

Another key to a culturally and educationally valuable change is offered by dialogic communication culture. It is based on dialogic communication, or dialogism, and on the concept and comprehension of culture. As these concepts, including artifacts and addressivity, have been discussed widely elsewhere (Tella & Mononen-Aaltonen 1997; Tella & Mononen-Aaltonen 1998a), only a few additional comments will be made here. An important point is suggested by Arnett (1992, 6) when he contends that "[d]ialogic education ... assumes that the development of human character and commitment to lifelong learning needs to be part of a *quality education* [emphasis added]." Indeed, dialogism might be one humanistic way to increase quality in education.

Arnett (1992, 4) also stresses that dialogue is an invitation, not a demand, nourished by patience, and that it is a form of character education, shaped by, among other things, the *ethos* of an institution. He contrasts home and ethos in an interesting and altruistic way:

> "The entire sense of home, is greater than the sum of the individual parts. ... The notion of home may be one of the most important characteristics for dialogic education. Dialogue begins with our having a ground or home to begin a conversation. An academic home offers an ethos suggesting reasons for keeping an institution strong for the next generation of users and workers. In a transient world, it is no small educational gift to witness commitment and loyalty to a philosophical and practical home." (Arnett 1992, 47)

Interestingly, Simola (1998, 17) also pinpoints the significance of ethos as one of the most influential factors as far as effective school reforms are concerned. — In the activities of the Media Education Centre, it has been our intention to ameliorate the ethos of the Centre especially by means of commonly shared communalism. Dialogism, I argue, appears to have a mental potential for achieving this challenging aim. In order to do so, the principles of dialogism need to be accepted by the members of the work community.

Arnett (1992) argues that we need three basic attitudes to promote dialogic education. First, we need a willingness to enter conversation about ideas, taking a position in openness that can still be altered given additional information. Second, we need a commitment to keep relationships affirming, even as disagreements over theory occur. "[T]he true test of dialogue is in disagreement, not in mutual understanding" (Arnett 1992, 27). And third, we need a willingness to ask value questions about information application. (Arnett 1992, 10) These attitudes enable us to respect the seven ingredients needed for human dialogue (Table 2).

TABLE 2. THE SEVEN INGREDIENTS NEEDED FOR HUMAN DIALOGUE (ARNETT 1992, 11; BASED ON ANDERSON, R. 1991).

1	**Presence**	Dialogue requires willingness to follow the conversation as it leads in "unrehearsed" directions.
2	**Unanticipated consequences**	Dialogue cannot be predicted to assure an outcome known a priori to an exchange.
3	**Otherness**	The mystery and uniqueness of the other is accepted.
4	**Vulnerability**	Willingness to engage in some risk when knowing the outcome of an exchange is not apparent at the outset of a conversation.
5	**Mutual implication**	We discover in message interpretation something about our communicative partner and much about ourselves in the unique way we hear the message.
6	**Temporal flow**	Dialogue presumes some historical continuity of communicative partners and a sensitivity to the time of the address—past, present, and future anticipations enter the conversation.
7	**Authenticity**	A presumption of honesty, until proven otherwise, is offered to the other.

Huttunen (1995) summarises three different perspectives around dialogism (Table 3) and recommends that teaching situations should always be geared towards the "I—you" relationship, toward the dialogic dimension and towards communicative action. In this effort, both teachers and students should strive for the same goal, because if only teachers try to initiate the "I—you" relationship, it will most surely turn into an "I—it" relationship.

TABLE 3. THREE PERSPECTIVES AROUND DIALOGISM (BASED ON HUTTUNEN 1995).

I — you	I — it	Martin Buber
Dialogic	Monologic	Mikhail Bakhtin
Communicative action (= action aiming at shared comprehension)	Strategic action (= instrumental action)	Jürgen Habermas

Huttunen (1995) gives five rules about how to proceed towards the "I—you" relation(Table 4).

TABLE 4. FIVE RULES ABOUT PROCEEDING TOWARDS THE "I—YOU" RELATION (HUTTUNEN 1995; CF. ALSO MONONEN-AALTONEN 1998, 206).

(1)	The Rule of Participation: participation based on voluntary action; everybody can participate
(2)	The Rule of Involvement
(3)	The Rule of Reciprocity
(4)	The Rule of Sincerity and Honesty
(5)	The Rule of Reflexivity

Huttunen also argues that "in the future, nobody can talk about the theory of teaching or the philosophy of teaching without the notion of dialogue" (Huttunen 1995, 5). It is obvious that dialogism always embraces profound dimensions of human-to-human communication and that it should never be understood as a didactic gimmick only. McKendree et al. (1998, 113) stress the possibilities of dialogue being supported effectively by asynchronous discussions on bulletin boards or synchronous video conferencing for distance learners.

Dialogism is conceptually associated with the notion of psychologically beneficial learning environments. Walberg (1987), for instance, speaks about three components that have been found to be consistently associated with student learning: affect, task, and organisation. L. W. Anderson (1991, 39) concludes that "effective teachers are able to create classrooms that students perceive to be inviting, task-oriented, and well organised. Inviting classrooms are those in which students perceive there is mutual respect between teachers and students, positive and co-operative relationships among students, and a sense of satisfaction experienced by the students." This kind of learning situation is undoubtedly dialogic as well.

Mediation (cf. e.g., Tella & Mononen-Aaltonen 1998a, 112–118) is one of the two megatrends, or flows of ideas, which form the background of this article. Mediatisation, on the other hand, is used to refer to the effect different media have on the message they transfer. It is a current belief that all media (or mediational tools) have an influence on the message and therefore the "enlightened consumer" should be aware of the threats included in using media and modern technology. This is obviously a task for media education as well (cf. Tella 1994). Basically, the question is of how language changes owing to the impact of the media. Mediatisation implies that each medium has a language of its own; the medium shapes the messages into its own idealised format of language. Broms (1993, 19) warns us about the dangers connected to language "mediatised" by TV, i.e., one-liners become the model and, especially on US television, people often have no more than 30 seconds to express themselves, no matter how extensively they would like to answer. Noam Chomsky is reported to have stopped giving interviews on TV, as he never felt he was given enough time to reflect upon the questions asked by the reporters. Pierre Bourdieu has also expressed views of not wanting to be a "fast thinker", i.e., a person who has a ready-made opinion of everything and who is always willing to say it aloud on TV (Bener 1998).

A few more examples of the influence of the media might illustrate the notion of mediatisation. In email communication, messages are interpreted either too negatively or too positively. Neutral messages often look slightly impolite or rude, for example. Even if most email users know this, they still interpret messages wrongly, often leading to flaming or hurt feelings. In videoconferencing, subtle nuances in non-verbal communication are lost. Slight nods or any twinkles of an eye are not transmitted at all electronically, as the screen is usually updated only after major changes in the incoming picture. If this is the situation in high-quality ISDN-based videoconferences, it is easy to imagine how much information is lost in technically less advanced desk-top videoconferencing. Short messages, one of the services accessible through the GSM telephony, again, have an impact on the way people write. The present limitation in the length of the messages (only 160 characters) has started to train people to be brief. Many have noticed, however, that quite a lot can be expressed with 160 characters! The real communicative purpose of short messages is probably in their affiliative function; short messages can be delivered to dozens of countries in only a few seconds' time, so they help keep people in contact despite the distances (the phatic function of technology). It is probable that while email communication created a new kind of style between spoken and written language, an emulated spoken language in writing, short messages are likely to meet other rationales for fast human-to-human communication. Technically, short messages are turning into a smart messagerie, which will form the gateway between telephony and the Internet.

The latest world championships in football offer a good example of one kind of vitiated mediatisation of reality caused by TV. Most people think that what is seen on TV during a football match, for instance, is what happens in real life, in other words that TV reflects reality to a high degree. This, alas, is not the case. In a match on June 23, 1998, in Norway's unexpected win against Brazil, American referee Esfandiar Baharmast whistled for an "imaginary" penalty two minutes from time when Norwegian forward Tore Andre Flo was sent sprawling by what seemed the slightest nudge from Brazil's Junior Baiano. Millions of people, who were watching the match, could have sworn that Flo fell all on his own, without anybody even touching him. The referee was harshly criticised for his decision. However, it turned out to be quite correct when two days later a tape from a camera shooting from behind the Brazil net caught Baiano clearly grabbing Flo's jersey and pulling him to the ground. The Norwegians put the photo on the web (www.nrk.no/vm98), increasing the volume of the clamour for videotape replays to help decide controversial calls. (Ref's Eyes and Videotape 1998). The Finnish daily "Helsingin Sanomat" analysed the situation (June 26, 1998) with a title "Amerikkalainen erotuomari lahjoitti palan todellisuutta [The American Referee Donated a Piece of Reality]".

Conclusion? Media educators as well as teachers and teacher educators should be fully aware of the threats hidden in new media and technologies. This is even more important in cross-cultural communication, which is made more complicated by different concepts of time, politeness, etc. (cf. e.g., Heinonen 1998; Tella & Mononen-Aaltonen 1998a, Chapter 5.6).

The previous paragraph already touched on the delicate question of human-to-human communication (HHC). From the point of view of media education, computer-mediated human communication (CMHC) and video-mediated human communication (VMHC) are equally important areas for research. (For an analysis of HHC and CMHC, cf. Tella & Mononen-Aaltonen 1998a, Chapter 5.7.1.)

Modern information and communication technologies (MICT; also called ICT or NICT, new information and communication technologies) are a major component in telelogically defined media education. As the area has already been analysed and researched fairly extensively, only a few references are given here to help the reader locate some of the main contents. See Tella & Mononen-Aaltonen 1998a for general discussion (e.g., p. 7) and for a more elaborate analysis (p. 70); also Tella & Mononen-Aaltonen 1998b. Tella (1996a; 1996b; 1996c) and Rönkä (1998) give an overview of MICT in Finnish teacher education and in Finnish foreign language education (cf. also Tella 1996d for the situation in all Finnish departments of teacher education). Tella (1997a) classifies some technological levels of media education, with the intention to provide teachers with a categorisation they can use to compare their schools. In Tella (1997d), MICT is connected to the changing roles of the teacher.

One of the assets of MICT is undoubtedly its asynchronous character (e.g., email, computer conferencing, newsgroups), which supposedly makes people independent of distance, time and location (e.g., Giddens 1991, 20; Negroponte 1995; Gell & Cochrane 1996; cf. also Kynäslahti 1998a for a discussion about time and space distanciation and deterritorialisation). Tella & Mononen-Aaltonen (1998a, 64–65), however, point out that human beings are still physically tied to time and place, even though communication becomes more independent of temporal limitations.

The area of mobile telecommunications may serve as an example of latest developments in synchronous technology. In the LIVE project, for instance, (Nummi 1998; Nummi, Rönkä & Sariola 1998; Ristola & Rönkä 1998), a wide variety of mobile communication technologies are used, e.g., ISDN-based videoconferencing, GMS-based telephony with the aid of portable communicators. The motivation to use different technologies lies in the idea of creating mobile, flexible learning situations in which students have more chances to choose between the school and other places where they study with the help of MICT. The LIVE model of work expands a local learning network to close interaction with the reality outside school. Isaacs' idea (1996, 27) of *iconoclasticity* ("a continuous invitation to people to live from present experience, not from memory"), usually related to dialogism, also holds true regarding mobile telecommunications, which help students integrate real life events in the present tense to their learning experiences.

One of the major areas of media education is distance education (DE), distance teaching (DT), distance learning (DL), open and distance learning (ODL), open learning (OL), flexible learning (FL), and fleximode learning. See e.g., Tella (1998) for an analysis of these terms and their use; Husu et al. (1994), Meisalo (1996), Falck et al. (1997), Kynäslahti (1997), Kynäslahti & Tella (1997), Salminen (1997), Tella & Kynäslahti (1997) and Tella & Kynäslahti (1998) for an analysis of school nets as concrete implementations of distance education, and Sariola (1997) for connections to teacher education. See e.g., Bates (1995), Edwards (1995), Evans (1995), Jonassen et al. (1995), Marshen (1996), Stevens (1996), Stevens (1997), Rowan, Bartlett & Evans (1997) for a more general discussion of distance education.

The notion of mobility is one of the key concepts in the field of technology. Some researchers, like Jones (1997a), argue that the Internet represents social mobility as a cyberspatial frontier. Portable telecommunicators can be seen as enabling physical mobility as well. What is important in the use of these tools is the notion of mental mobility, i.e., the added value of technologies in enhancing and amplifying the capabilities of humans (Tella 1997a, 62–63). At the same time, the words of Craig O. McCaw, chairman of McCaw Cellular Communications, may prove prophetic: "Man started out as nomadic, it may be the most natural state for human beings" (cited in Naisbitt 1994, 62).

Telephony is old technology, yet most of the current technologies of telecommunications are based on it. In addition to telephony, telematics is another term used in Europe in particular. According to Balle (1991, 93–94), telematics (télématique) was coined by French researchers Alain Minc and Simon Nora in 1978, referring to that part of teleinformatics which concerns uses for private individuals rather than organisations. Telematics and the corresponding adjective "telematic" are currently used by European educators and educational technologists, though the use of these terms is less common in the UK and in the United States.

Deterritorialisation (Appadurai 1992) is one of the concepts that media education has borrowed from anthropology. Deterritorialisation refers to people's migration and moving from one place to another. At the same time, it is also concerned with financial flows and the trade of various commodities between transnational corporations, irrespective of national boundaries. Figuratively speaking, deterritorialisation is in perfect harmony with cross-cultural communication, transnational exchanges of experiences on the Internet, and channels and types of international flow of information (Mowlana 1997, 24; Tella & Mononen-Aaltonen 1998a, 8). (For a more detailed analysis of deterritorialisation, cf. Kynäslahti 1998a in this publication.)

Deterritorialisation is directly linked to the issue of globalisation, which Wallerstein (1996; cited in Axford 1998, 3) so aptly describes as just one more iteration of a world-historical process that now wraps the entire world within its geography. Axford (1998), basing his definition on Hannerz (1996, 6), suggests that *transnational networks*, designating all sorts of connections between individuals, groups, business enterprises, formal organisations and movements across national borders, should now be seen as "part of a restructuration of space and as at least a metaphor for new, though often incipient kinds of social organisation and identities" (Axford 1998, 2). Two of Axford's main arguments (1998, 4) are that "transnational networks increasingly populate a global cultural and political economy where territoriality as the most powerful constitutive rule is in retreat" and that "at the very least [transnational] networks are contributing to a process of growing interconnection and exchange between individuals, groups, businesses and movements across the borders".

Tapscott (1996) compares globalisation with both the chicken and the egg. It is driven by and driving the new technology that enables global action. Globalisation has a lot to do with international commerce, competition and production. Naisbitt's (1994) prophecies have become well-known. One of them states that the world's trends point overwhelmingly toward political independence and self-rule on the one hand, and the formation of economic alliances on the other (Naisbitt 1994, 11). Surprisingly perhaps, subsidiarity also belongs to the discussion of globalisation, as it illustrates the exact opposite, i.e., the principle that power should belong to the lowest possible point in the organisation.

What is interesting educationally, is the tension between globalisation and localisation, between global and local levels (cf. e.g., Robertson 1992; Rowan, Bartlett & Evans 1997;

Väyrynen 1998; see also Kynäslahti 1998a in this publication). Naisbitt (1994) speaks of the desire for a balance between the tribal and the universal. He argues that "democracy and the revolution in telecommunication (which spreads word about democracy and gives it urgency) have brought this need for a balance between tribal and universal to a new level" (Naisbitt 1994, 22). To Naisbitt, email communication is a tribe-maker, because, paradoxically, electronics makes people more tribal, but at the same time it globalises them as it gives them access to enormous amounts of information. Axford's (1998, 5) argument is that "globalization has relativized the world and identities in it by penetrating and dissolving the boundaries of previously closed systems, sometimes of a communal or ethnic variety, creating inter-societal and supra-territorial discursive spaces and networks of relationships along the time-space edges of existence".

Globalisation also means a different concept of work. In Tapscott's terms (1996), the office is no longer a place, it is a global system. Technology is eliminating the 'place' in workplace. Home may be where the heart is, but increasingly the office is anywhere the head can be connected. (Tapscott 1996, 65) From standalone computers people have moved to networked computers and global albeit ubiquitous computing. A renewed paradigm of work also stands for groupware and special software to be used by the members of a team. Some speak of intellectual teamwork (e.g., Egido 1990; Galegher & Kraut 1990) as a form of cooperative work. Globalisation also includes ample opportunity for telework, as global telecommunications systems allow people to work in their homes, in their cars or in remote cottages in the middle of nowhere (cf. e.g., Sproull & Kiesler 1991; Mikulecky & Kirkley 1998). But as Agres, Edberg & Igbaria (1998, 80) say, telework is not a panacea and there are indications of marital and family tensions emanating from merging home and office.

Some of the most intriguing forms of groupware are the so-called IDLEs, i.e., Integrated Distributed Learning Environments. McGreal (1998, 25) analyses IDLEs as follows: "They are primarily based on a collaborative learning instructional paradigm rather than the self-instructional model of multimedia authoring systems. As such, they make extensive use of the asynchronous and synchronous collaborative tools available via the Internet." McGreal (1998) enumerates eight IDLEs (FORUM, Virtual-U, LearningSpace, Learning Server, Symposium, Web-CT, First Class/Learn Link and TopClass) but also mentions 15 others and admits that new integrated distributed learning environments appear regularly. McGreal (1998) also gives web addresses of both the IDLEs themselves and some institutions that have done comparison studies about these environments. — In Finland, research has also been done, for instance, on CSILE (Computer-Supported Intentional Learning Environments; e.g., Hakkarainen 1997a; 1997b).

Two other concepts connected to both IDLEs and groupware-based work are CSCW (Computer-supported Collaborative Working) and CSCL. (Computer-supported Cooperative Learning). CSCW relates to those whose prime goal is work undertaken in a community with *shared goals*. CSCL relates to those for whom learning is a prime intention, usually in a formal institution but at least with a specific curriculum of study, with individual *personal goals*" (Lewis 1997, 210).

4. Conclusions

This article has had four main objectives. First, a very important task has been to create a classification or a general overview of the areas currently covered by media education. Second, it has been my intention to highlight some of the key terms and concepts that appear regularly in the research literature. Third, references to Finnish and foreign research publications have been given, in order to help the readers locate some of the literature in the field. The fourth objective has been to reflect upon the concept of media education, by analysing some disciplines and domains of knowledge that are more or less directly related to the emerging interpretation of the concept of media education. For this purpose, six major areas, viz. Education, Psychology, Sociology, Philosophy, Culture and Technology, were chosen as cornerstones for this analysis. These reflections will help, hopefully, elaborate on the interpretation of media education and see some of the links and relations between the phenomena discussed. Likewise, these reflections may facilitate the identification of new areas which might provide replicable models from which media educators can learn and benefit.

Some of the conclusions drawn from the reflections and observations in this article and from the reflections as analysed in Tella et al. (1998). include the following points of view:

1) Media education is grounded in the theoretical basis of the systemic study of education (educational sciences) and didactics. Therefore, those who work with media education should also know and be interested in knowing what teaching, studying and learning are. Media education is expected to study the global flows of education and to ponder upon

their relevance and influence on the Finnish educational system.

2) Media education is directly linked to initial and in-service teacher education. It should also try to promote the ideals of continuing education and lifelong learning. Media education is concerned with teachers' changing roles, status, and professional image, especially in an information and communication society.
3) Media education represents educational sciences as well as new cultural sciences. Educational technology—but not technological determinism—plays a major role in the implementation of media education.
4) Media education has lately been conceptually reoriented towards modern technology, especially MICT and ODL. A fair command of digital tools and software is needed to incorporate media education adequately into curricula at different levels.
5) Media education is concerned with a wide variety of disciplines and domains of knowledge, therefore its character is, from the very outset, multidisciplinary. Cognisance of some of their salient qualities greatly helps integrate these disciplines and media education. A concrete task for media education is thus to decrease fragmentation in science and to create more harmony between different disciplines.
6) The emergence of knowledge of media education is related to the synergy between science, culture, art and technology.
7) Media education has every possibility to combine media and education, communication and mediation. To achieve this goal, media education needs elements that help bridge these different areas of human action.
8) Media education is likely to greatly benefit from the principles of dialogism and dialogic communication culture, if they can be applied to all its activities in the spirit of true communalism.

These viewpoints serve as aims and goals that media education should try to achieve if they are to be regarded significant and useful enough by the working community of media educators. If they generate further discussion, then their usefulness will be tested, and their focus will become more appropriate.

5. A Rhizomatic Afterthought ...

Telelogically defined media education has a lot to do with rapidly evolving modern technology. It would seem appropriate to try to integrate education, media and technology in a network that would benefit from the various elements as depicted in this article. Several metaphors come to mind in this respect.

Figure 3 could be seen as a *net*, extending in several dimensions and directions but yet making up a whole. Instead of a net, however, I would like to refer to a *rhizome* and argue that it can be thought of as a basis of all activities of media education. A rhizome (for a more specific description, cf. Duffy & Cunningham 1996, 177; Tella et al. 1998) is more appropriate as a metaphor, as it then suggests a learning organisation around it.

Furthermore, a rhizome is more open than a net, which, if thought of as a ball or a globe, is restricted. The world of media education, as depicted in Figure 3, consists of an innumerable number of rhizomatic connections. A rhizome as a metaphor strongly rejects all ideas of good order, perfect hierarchy or splendid structure. Learning in the rhizome represents "an inconceivable globality" (Duffy & Cunningham 1996, 194), which makes you assume a lot of responsibility for organising your own learning environment in a very constructivist spirit. Duffy & Cunningham's example (1996, 194) of a rhizome is the library in Umberto Eco's famous novel "The Name of the Rose", in which Brother William gropes his way through the library and thus constructs connections for himself, in order, as Duffy & Cunningham argue (1996, 194), "to move from legitimate peripheral to centripetal participation".

If the world of media education is thought of as a rhizome, as a library *à la* Eco, then we need to construct our own connections through this space in order to appropriate it. However, instead of that solitary groping made by Brother William, we see as our goal the co-construction of those secret connections as a collaborative effort. In this effort, teachers and adults can help younger people, in the very spirit of Vygotsky's Zone of Proximal Development (ZPD) (cf. Tella & Mononen-Aaltonen 1998a, Chapter 3.4.1).

Deleuze & Guattari (1987, 7), the creators of the notion of rhizome, write that according to its first and second principles, viz., connection and heterogeneity, any point of a rhizome can and must be connected to anything other. In my analysis of media education, these kinds of connections are abundantly made. It would still be misleading to suppose that these connections are arbitrary and without any internal logic. On the contrary, the different concepts presented in Figure 3 are clearly, and sometimes surprisingly strongly, interlinked, interconnected and intertwined. For example, social presence is obviously connected to telepresence, both enabled in virtual learning environments by modern information and communication technologies, profiting from independence of distance, time and location, at once strengthened by and facilitating the feeling of shared expertise and virtual togetherness, gearing up towards communalism on the one hand and individualism on the other, all, perhaps, merging into deterritorialised telework by means of telephony, telematics and mobile telecommunications, building up our culture in a dialogic way! A rhizome is not arbitrary, though it is difficult to predict the path an individual would take if given full freedom to choose. This is probably also the inner strength of the metaphor of a rhizome. It transmits the idea of something growing, something developing, yet it gives ample scope for individual action and decision-making. Deleuze & Guattari (1987, 7) suggest that a rhizome "ceaselessly establishes connections between semiotic chains, organizations of power, and circumstances relative to the arts, sciences, and social struggles". To me, this also suggests that media educators should actively try to identify new domains and sources of knowledge that are not yet in Figure 3.

To me, a rhizome is a personal thing, it is a subjective perspective to something that is, but which cannot—and perhaps should not—be defined, categorised and classified once and for all. Yet it does not reject a shared effort, it does not prevent many from acting at the same time, even for the common good. Once again, the metaphor of a library is illustrative. It enables many people to take advantage of its resources. The "library" of media education is a digitised one, with full connectivity to the information and knowledge databases all over the world. Some of its connections are rooted in the traditions of different subjects, disciplines and domains of knowledge.

Importantly, my analysis started with an idea of finding a good starting point for a taxonomy or classification which would neatly accommodate the different categories of media education. Yet I ended up with a less systematic and more creative analysis that would seem to serve my purpose better. Therefore, a rhizome is a rhizome is a rhizome...

6. Some Acronyms and Abbreviations

The following list of some acronyms and abbreviations is neither exhaustive nor is it intended to be normative. It only attempts to give a brief *résumé* of the somewhat "cryptic" abbreviations that occur in the research literature. The Finnish language equivalents are not necessarily the only ones one could use. In most cases, learning has been translated into Finnish as 'opiskelu', instead of 'oppiminen'.

Table 5. Some Acronyms and Abbreviations Related to Media Education.

CAI	Computer-Assisted Instruction, cf. CAL	Tietokoneavusteinen opetus (TAO)
CAL	Computer-Assisted Learning, cf. CAI	Tietokoneavusteinen opiskelu (oppiminen)
CALL	Computer-Assisted Language Learning	Tietokoneavusteinen kielten-opiskelu (TAKO)
CBE	Computer-Based Education	Tietokoneperustainen opetus
CL	Collaborative Learning; Co-operative Learning	Yhteisöllinen opiskelu; yhteis-toiminnallinen opiskelu (oppimi-nen)
CMC	Computer-Mediated Communi-cation, cf. CMHC	Tietokonevälitteinen viestintä
CMHC	Computer-Mediated Human Communication, cf. CMC	Tietokonevälitteinen, ihmisten-keskeinen viestintä
CSCL	Computer-Supported Collabora-tive Learning	Tietokoneavusteinen yhteisölli-nen opiskelu
CSCW	Computer-Supported Collabora-tive Working	Tietokoneavusteinen yhteisölli-nen työ
CSILE	Computer-Supported Intentional Learning Environments	Tietokoneavusteiset intentio-naaliset oppimisympäristöt (tie-tokoneohjelman nimi)
CTGV	The Cognition and Technology Group at Vanderbilt	Vanderbiltin yliopiston kognitio-tieteen ja tekniikan tutkimus-ryhmän lyhenne
DE	Distance Education	Etäopetus
DL	Distance Learning	Etäopiskelu
DT	Distance Teaching	Etäopetus
FL	Flexible Learning	Joustava opiskelu
HHC	Human-to-Human Communica-tion	Ihmisten välinen viestintä

ICT	Information and Communication Technologies, cf. MICT, NICT	Tieto- ja viestintätekniikka
IDLE	Integrated Distributed Learning Environments	Integroidut hajautetut opiskeluympäristöt
ISDN	Integrated Service Digital Network	Integroitu digitaalinen verkkopalvelu (videoneuvottelu)
MICT	Modern Information and Communication Technologies, cf. NICT, ICT	Moderni tieto- ja viestintätekniikka
NBL	Network-Based Learning	Verkostopohjainen opiskelu
NICT	New Information and Communication Technologies, cf. MICT, ICT	Uusi tieto- ja viestintätekniikka
ODL	Open and Distance Learning	Avoin ja etäopiskelu
OL	Open Learning	Avoin opiskelu
TSL Paradigm	Teaching–Studying–Learning Paradigm	Opetus-, opiskelu- ja oppimisparadigma
VMHC	Video-Mediated Human Communication	Videovälitteinen ihmistenkeskeinen viestintä
VR	Virtual Reality	Virtuaalitodellisuus
WWW	World Wide Web	Maailmanverkko
ZPD	Zone of Proximal Development	Lähikehityksen vyöhyke (Vygotsky)

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Considerations on Eduscape

Heikki Kynäslahti

Abstract

In this article I discuss some issues which are relevant to the present research in media education. My main emphasis is to outline a theoretical framework with which we can approach new educational space. The phrase 'new educational space' refers to considerations of the impact of information and communication technologies on the field of education. I argue that we need new concepts when we investigate educational flows which are divorced, more or less, from their physical, social and cultural context. We already have such concepts as virtual classroom, virtual school, on-line education, school without walls, etc. In my research of the virtual classroom (Kynäslahti 1997) I have attempted to find out where these phenomena are, whether we imagine any 'place' for them, and how we can locate them when we, for instance, try to outline them as ethnographic fields. In this article I would like to present answers to these questions. Unfortunately, I do not have much empirical evidence to support my considerations, so far. The *raison d'être* of this article is the need to develop a conceptual elaboration of this kind. The research and development projects that have been undertaken in the Media Education Centre (including LIVE, APPLAUD, and IMPACT) will, obviously, guide this conceptual work towards a better theorisation of this new educational space in future.

The concepts I will investigate here come from various fields. One of them is transnational culture. In the research of transnational culture, as discussed for example in the journal *Public Culture*, the idea of world wide

'scapes' has been discussed. I will continue this discussion in relation to media education. The theory of the networked society suggests that there is a space of flows and I wish to make use of this notion in the context of media education. Deterritorialisation is another concept which helps us to investigate the phenomena of media education. All three of these topics relate to the tricky relationship between time and place. Furthermore, they all deal, more or less, with the big umbrella of globalisation.

Time and Space

I begin with the time-place nexus. This relationship has been widely discussed and there is no need to repeat the numerous turns of that discussion. I pick up some points which are relevant here.

One strand of this nexus comes from sociology. Giddens speaks of time-space distanciation. In so doing he refers to a process "which tears space away from place by fostering relations between 'absent' others, locationally distant from any given situation of face-to-face interaction" (Giddens 1990, 18). He speaks also about the "lifting out of social relationships from local contexts of interaction and their restructuring across time and space" (Giddens 1990, 21). In other words, time and space become more abstract and the relationships between them diminish. Further, through the process of distanciation people and things become disembedded, i.e. lifted out, from concrete space and time. Following the logic of time–space distanciation, simultaneity divorces from place. The same things happen simultaneously in diverse locations and are experienced at the same time. Thus, simultaneity is not bound to place, but it is associated with a space without place, so to say.

Distanciation releases us from territory. We are divorced from terra. Time-space distanciation does not, of course, refer only to geographical place but to social space as well. However, I use here vocabulary which refers to physical context: land, ground, place etc. Now that we are distanciated, what happens next?

I take another strand of the time–space nexus from Harvey (1989). In his view of the postmodern geography of capitalism Harvey speaks about time–space compression, which points to experienced time in relation to diverse sites in space. I take an example from Waters. He states that if people in Tokyo and Helsinki experience the same thing at the same time, they in effect live in the same place. Hence, space has been annihilated by time compression (Waters 1995, 55). Harvey associates this kind of compression and annihilation to the increasing speed with which spatial barriers can be overcome, which creates the feeling that the world is collapsing inwards upon us. Harvey illuminates this compression with shrinking maps of the world, noting the shortened time needed to travel from place to another which in turn annihilates space through time. "[T]ime horizons shorten to the point where the present is all there is", Harvey (1989, 240) claims. According to this view of time–space compression, we can speak of simultaneity in a global context. Here we have a global present as Harvey suggests.

The role of information and communication technologies is crucial for both of these two views. The intensity and speed made possible by these technologies create a space where global simultaneity is possible.

'SCAPES'

Above we departed from *terra firma* and entered into a space which is not bound to the givenness of geographical things and physical reality. In the following I will discuss this space in the terms of 'landscapes' which cover the world with different kinds of flows.

The idea of global 'scapes' provides a fruitful perspective to investigate a variety of phenomena which link people from different localities, cultures and nations together. Arjun Appadurai argues that the global cultural flow can be explored by looking at five dimensions: *ethnoscapes, mediascapes, technoscapes, finanscapes*, and *ideascapes*. Appadurai sees these 'scapes' as "deeply perspectival constructs" of different kinds of actors: "nations-states, multinationals, diasporic communities, as well as sub-national groupings and movements (whether religious, political or economic), and even intimate face-to-face groups, such as villages, neighbourhoods and families" (Appadurai 1990, 296). *Ethnoscapes* concern the changing group identity of moving people, including immigrants, guestworkers, refugees, exiles etc. They are landscapes of group identity that belong to groups which are deterritorialised, i.e. transcended regarding their specific territorial boundaries and identities. Ethnoscapes can be substituted for earlier 'wholes', such as villages, communities, and localities. *Mediascapes* deal with the distribution of information, which is facilitated with information and communication technologies, and with the images of the world that these media create. *Ideascapes* are "composed of elements of the Enlightenment world-view, which consists of a concenation of ideas, term and images, including 'freedom', 'welfare', 'rights' ... and master-term 'democracy'" (Appadurai 1990, 299). Why not also 'education'? *Technoscapes* and *finanscapes* refer both to economical interests across national boundaries and to the flow of money and technology at the global level. (Appadurai 1990; 1991). I present the idea of this kind of 'scapes' here as a background for the discussions of the global flow of education. I propose that we can imagine a horizontal integrative landscape in the field of education which have the characteristics of these five dimensions of global flows.

DETERRITORIALISATION

I continue with Appadurai's words: "There is an urgent need to focus on the cultural dynamics of what is now called deterritorialisation. This term applies not only to obvious examples such as transnational corporations and money markets, but also to ethnic groups, secretarian movements, and political formations, which increasingly operate in ways that transcend specific territorial boundaries and identities." (Appadurai 1992, 192; italics original). For Appadurai deterritorialisation means people's moving and travelling from place to place. It deals also with financial flows and the trade of commodities which occur independent of national boundaries. Accordingly, the various 'scapes' he mentions are examples of deterritorialised processes functioning more or less independent of physical realities. In Appadurai's view, as we can see, the transcendence of territorial boundaries is a crucial part of deterritorialisation.

We can, however, trace a more profound basis for this concept. In doing so, we come to Deleuze and Guattari. I approach the fascinating world of Deleuzeguattarian philosophy with an entry that may be identified with Appadurai's definition of deterritorialisation. Arnason shows of how Deleuze uses this concept to describe the schizophrenic system of capitalism. In serving the interests of the individual, capitalism "deterritorialize[s] all territorial groupings such as the church, the family, the group, indeed any social arrangement. But at the same time, since capitalism requires social groupings in order to function, it must allow for reterritorializations, new social groupings, new forms of the state, the family, or the group." (Arnason)

The texts of Deleuze and Guattari are difficult to follow as their ideas are expressed in a complicated fashion. However, they give us a definition of deterritorialisation which is elegant in its simplicity: "Deterritorialization is the movement by which 'one' leaves the territory" (Deleuze and Guattari 1987, 508). This movement is the operation of flight which is obstructed by reterritorialisation. Thus, in Arnason's example "new social groupings", "new forms of the state" etc. obstruct deterritorialisation and "'stand for' the lost territory", as Deleuze and Guattari put it. The enchantment of deterritorialisation for the research of new educational phenomena (like the virtual classroom) in media education is apparent. Their charm is by no means lessened by the fact that such concepts as nomad and rhizome (Deleuze & Guattari 1987; Deleuze 1992; see also Tella 1998 in this volume and Nummi et al. 1998) originate from these two philosophers.

SPACE OF FLOWS

The term flow is worth further consideration. Castells (1996) uses it to outline the interaction between society, space and technology. He speaks of the network society, where he finds tendencies toward a new spatial logic of space of flows, instead of the space of places. Flows are "purposeful, repetitive, programmable sequences of exchange and interaction between physically disjointed positions" (Castells 1996, 412). We can find a continuity between Castells' space of flows and Appadurai's scapes: "... our society is constructed around flows: flows of capital, flows of information, flows of technology, flows of organizational interaction, flows of images, sounds, and symbols" (Castells 1996, 411-412). The circuit of electronic impulses is a fundamental supporting layer for the space of flows. In other words, it is a question of the use of information and communication technologies. Castells presents an interesting hierarchy of nodes and hubs.

The space of flows is not placeless, although its structural logic is. It is based on an electronic network, but this network links up specific places, with well-defined social, cultural, physical, and functional characteristics. some places are exchangers, communication hubs playing a role of coordinator for the smooth interaction of all the elements integrated in the network. Other places are the nodes of the network, that is the location of strategically important functions that build a series of locality-based activities and organisations around a key function in the network. Location in the node links up the locality with the whole network. (Castells 1996, 413)

The idea of global dynamics of flows and the idea of space where these flows occur, is interesting regarding to the focus of this article. Further, we should note the stand Castell takes on the micro-macro nexus: "I propose a hypothesis that the space of flows is made up of personal micro-networks that project their interests in functional macro-networks throughout the global set of interactions in the space of flows" (Castells 1996, 416). This is in accordance with the perspective of globalisation which I will present in the following: the micro-perspective of individuals and groups interacting with the macro-perspective of the processes of globalisation.

GLOBALISATION

Similar to the question of time in relation to space, the issue of globalisation is broad. (Raimo Väyrynen's 'Globalisaatio' [1998] provides a good and fresh general view of this topic.) It is neither possible nor sensible to discuss the topic in depth here. On the other hand, I cannot ignore the global character of all those issues I have discussed in this article. Time–space compression, 'scapes', space of flows—all these point to global interconnections and, thus, to globalisation.

The perspective from which I investigate the processes of globalisation is based on individuals and on people in their local context. The usual way to discuss globalisation concentrates on the tension between nation states and the world as a whole. In other words, globalisation concerns the developments which have made national borders more permeable than before. What interests me here is the intentions of individuals and groups of people in their local contexts to establish educational connections regardless of geographical, cultural or other similar borders. I am interested in situations where people are eager to benefit from the processes of globalisation for their own profit and want to use the benefits that the information society provides. As early as 1972 Burton suggested a shift from investigations of international relations to a focus on networks and systems relationships between individuals and collectives (for example regarding ethnicity, religion, communications links, etc.) transcending state boundaries. Later Rosenau (1980) emphasised the importance of relations between non-governmental individuals and groups which operate at the global level. Robertson is among other leading figures in this field who pay attention to the individual perspective in the processes of globalisation.

As the reader surely has noticed, what fascinates me in these global relations is their character as meeting 'places' or as spaces which no longer have a particular geographical reference, in the other words, spaces which do not follow physical and geographical realities. In these spaces individuals meet each other in the context of some institutional performance (for example distance education) which answers their personal needs, virtual communities (for example newsgroups), etc. It is people, individuals or groups, that constitute these global spaces. I agree with Robertson when he declares "I insist that individuals are as much a part of the globalization process as any other basic category of social-theoretical discourse" (Robertson 1992, 104). He disagrees with statements that globalisation necessarily refers to very large-scale matters. In the background of Robertson's emphasis on individuals in the processes of globalisation, is individualism. He refers to education, among other things, pointing to the role of international organisations in promoting individualism in the area of education (Robertson 1992, 105). This is in accordance with the development of terminology in media education. Seppo Tella (1998) has emphasised the shift from institution-centred thinking towards a student-centred one in the field of open and distance learning.

EDUSCAPE

Finally, I want to bring together the diverse issues I have discussed in this article and to link them with media education. First, time and space have moved away from each other. Simultaneity has abandoned place and is now allied with information and communication technologies, creating a global present, a single 'place'. On the other hand, Appadurai suggests that there are world-wide flows which flourish in global 'scapes' and Castells, in turn, proposes that there is even a space for this kind of flows. All these issues point to deterritorialisation. Phenomena are divorced from their context, rearranged and finally replaced.

The aim of this article, as I mentioned in the beginning, has been to search for a new educational space—a space which is created with the help of the intensive use of information and communication technologies. Putting together the strands of this article I discover the eduscape. The eduscape is a world-wide 'scape' of educational flows which people can reach regardless of their location and regardless of the physical reality they live in. It is a space of education which has been divorced from its context, flowing through technologies, to be taken in use by people within their own context. Here we have deterritorialisation as well as reterritorialisation. Finally, it is a space where we can imagine a home, a 'place' for, among others, virtual classrooms.

This is my first real attempt to define eduscape. Thus, it is a modest one. The previous lines are speculative and I have not presented any empirical evidence in support of my theoretical construction. Certainly, I am very aware of the weaknesses of my formulation of eduscape. However, I argue that this is one possible path for media education to explore. We need research which operates with broad theoretical frameworks as Tella's definition of media education (Tella 1997; cf. also Tella 1998 in this publication) suggests. Similarly, the discussion which has taken place in the journal *Aikuiskasvatus* (Suoranta 1997) calls for a wider perspective of research which pays attention to social and cultural aspects of media education. I have tried to do my part here, so far.

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A Learning Environment— A Euphemism for Instruction or a Potential for Dialogue?

Marja Mononen-Aaltonen

"According to quantum theory, light can behave like a particle or a wave *depending on how you set up the experiment*. What you perceive, in other words, is not determined by independent external properties of 'parts' of reality, but as a function of the ways in which you try to perceive that reality." (Isaacs 1996, 20–21)

Abstract

The notion of a learning environment frequently appears in the discourse of educational research and theory as well as in national education policy documents. However, there is no mutual agreement among researchers and educators on what a learning environment is. It is closely related to the constructivist movement and the development of modern information and communication technologies. There are multiple views of a learning environment, each eliciting in our minds different images about teaching, learning and studying. This article explores three metaphors for learning environments: learning environments as ecosystems, learning environments as places, and learning environments as space. It concludes that instead of looking for ecosystems, places, or spaces as alternatives to classrooms and existing educational, pedagogical or didactic practice, we should rather define a learning environment as *dialogue*. This would contribute to our understanding of the potential value of the learning environment and its role in the planning of teaching and studying in our information-rich and knowledge-intensive society where the most important feature most probably consists of theoretical knowledge. In the framework of dialogism, the article argues for dialogic learning environments and dialogic pedagogy.

Keywords: Learning environment; dialogic learning environment; dialogue; dialogic pedagogy.

INTRODUCTION

The notion of *learning environment* entered educational discourse in close relation to the emerging use of information and communication technologies for educational purposes, on the one hand, and to the constructivist concept of knowledge and learning, on the other. According to the constructivist view, learning is an active process of constructing rather than acquiring knowledge, and instruction is a process of supporting that construction rather than communicating knowledge (Duffy & Cunningham 1997, 171). The current Finnish national curriculum has also adopted the notion. It claims that the teacher's role is changing "in the direction of his being one who directs the studies and *plans learning environments*" (emphasis added) (Framework Curriculum for the Comprehensive School 1994, 11). As the notion of "learning environment" frequently appears not only in the national education policy documents, but in the discourse of educational research and theory as well, one might expect that there is a mutual agreement among researchers and educators on what a learning environment is. But this is not the case: the very idea of a learning environment is intrinsically vague and fuzzy. It is worth noticing, though, that Maija-Liisa Rauste-von Wright and Johan von Wright, the two key figures in the Finnish contructivist movement, refer to "learning environment" in quotation marks (e. g., Rauste-von Wright & Wright 1994, 15; 158), which signals that the notion is somewhat problematic for a constructivist, too.

In this article, based on my unpublished master's thesis, slightly modified, I aim at increasing our understanding of how to usefully characterise learning environments, and invite all those struggling with the same problem into a dialogue to achieve better understanding.

My main argument is that we need to know the potential value of the notion of "learning environment" for designing and planning teaching and studying, and that involves knowing about relevant ways in which the learning environments differ from one another. Along with Allwright (1991, 166–167), I claim that the characterisation of learning environments "is something that must *emerge from* research, rather than something that can be *imposed upon* research as a framework of independent value". We need research precisely for the purpose of eliminating unfit explanations and interpretations.

My article is divided into five sections. In Section 1, I provide the framework for the discussion following in Section 2, where I discuss three common metaphors for learning environments: learning environments as ecosystems, learning environments as places, and learning environments as space. I conclude the discussion by suggesting an alternative view—learning environments as *atopos*, which allows us to introduce the idea of learning environments as dialogue. I elaborate on this idea in the framework of dialogism in Section 3, and this section forms the basis for my arguing for dialogic learning environments. Section 4 aims to provide the reader with an overview of dialogic learning environments, as well as a preliminary definition of a learning environment. In Section 5, I want to discuss some characteristics of dialogic pedagogy. The discussion does not pretend to be exhaustive, as I do not have all the answers. However, it focuses on those issues that imply the beginning of the next stage in the discussion, and my article remains open-ended, uncompleted.

1. LANGUAGE CREATES REALITY

> "Everything we do in the classroom is underpinned by beliefs about the nature of language and about language learning." (Nunan 1989, 12)

The notion of "environment" originated in ecology; and "via computer sciences" (Kramsch 1991, 177) entered educational discourse and instructional design, mainly because the attention in the teaching-learning process, as Hellgren (1993, 24) says "shifted from the efforts and activity of the teacher to those of the learner, be they internal or external in nature". This shift resulted in the current interest in the learner's interaction with the environment and marks a significant departure from traditional pedagogical approaches and teaching practices, challenging us to rethink our conventional ideas about instruction as something that happens in schools and "goes on in classrooms during 45-minute intervals" (Wilson 1995, 25). The reason why we hear less about "instructional" environments and more about "learning" environments is that instruction connotes more to control and directiveness, and therefore, as a reaction against a traditional classroom metaphor, we tend to replace it with a more flexible focus on learning. (Wilson 1995, 27)

Here the English language begins to interfere with our thinking and research. For a native speaker of English, it is essential to consider the distinction between teaching and instruction, and the non-native researcher whose language does not make this distinction, is compelled to ponder on the problems of others from another reality. Finnish is such a language: for us, both teaching and instruction is *opetus*.

As Anderson & Burns (1989, 9) observe, some researchers define instruction "as a subset of teaching (that is, one of several teaching acts) or as inclusive of teaching (that is, teaching is one aspect or component of instruction)". Stern (1983/1996, 20) favours the first definition, but points out that "language teaching" is more widely interpreted than "instructing a language class". "Formal instruction or methods of training are included; but so is individualized instruction, self-study, computer-assisted instruction, and the use of media, such as radio or television. Likewise, the supporting activities, such as the preparation of teaching materials, teaching grammars, or dictionaries, or the training of teachers, as well as making necessary administrative provision inside or outside an educational system—they all fall under the concept of teaching." (Stern 1983/ 1996, 20) As we see, Stern's interpretation of teaching is not compatible with that of Anderson & Burns (1989), who prefer the latter definition and claims that "most teacher behaviors, student behaviors, and teacher-student interactions occur within the larger context of instruction". Stated simply, they say, "instruction 'contextualizes' teaching". (Anderson & Burns 1989, 9) This short discussion seems to explain the use of "instruction" instead of "teaching" in the vivid discourse on designing instructional learning environments. Nevertheless, the definition of "instruction" as a subset of teaching also prevails, and therefore Duffy & Cunningham (1996) emphasise that instructional environments as social contexts "differ from what we normally describe as instruction simply because we typically conceive of instruction as the formalized delivery or transmission of information" (Duffy & Cunningham 1996, 183). I will use teaching and instruction interchangeable for *opetus*.

"Learning" combined with "environment", does not cause problems for an English speaker; but for the Finnish researcher it is just as problematic as "teaching" and "instruction" for his/her English colleague. Is learning environment *oppimisympäristö* (a learning environment) or is it *opiskeluympäristö* (a studying environment)?

Tella (1998b in this publication) argues that in Finnish this distinction should be made, and favours the studying environment (*opiskeluympäristö*). Referring to Uljens (1997), he bases his argumentation on the Teaching–Studying–Learning Paradigm (the TSL Paradigm) from didactic theory. In Tella's view, *oppimisympäristö* (a learning environment) refers to the learner's mind, but "as teachers we are able to influence the learner's studying environment" (Tella 1998c). If we accept his view, then *opiskeluympäristö* (a studying environment) is consistent with what Duffy & Cunningham (1996, 183) call "instructional environments": "the social contexts that are designed to promote learning of particular goals are instructional environments", with reference to Heinich, Molenda & Russel (1993; cited in Duffy & Cunningham 1996, 183) who define instruction "as particular context for learning in which we purposefully organize the environment to achieve particular learning objectives". Would this mean that we should translate *opiskeluympäristö* as "an instructional environment" and leave "a learning environment" for *oppimisympäristö*? I do not take "sides" in the discussion on that particular distinction, and will use "learning environment".

As we have seen, language creates reality. The language of education is full of metaphors. These metaphors not only structure the way we think about education, they also help create the world of education. In many cases, though, the metaphors are so deeply embedded in the educational language that they are used automatically rather than consciously (Leino & Drakenberg 1993, 36). But as our basic assumptions, they influence our conceptions of education, school and instruction. Duffy and Cunningham (1996) argue that in the debates surrounding the constructivist movement, the fundamental difference in the world view, i.e., "the fundamental assumptions underlying our conception of the teaching-learning process", is "scarcely acknowledged". However, it is these assumptions that "lead to demonstrably different goals, strategies, and embodiments of instruction, even when there are some superficial similarities to instruction derived from different assumptions" (Duffy & Cunningham 1996, 171).

Viewing instruction as a classroom or viewing it as a learning environment elicits in our minds different images. What about learning environments? Compare, for instance, the images that a learning environment as "coral gardens" and a learning environment "an open marketplace" call to mind. Therefore, one tends to join Wilson (1995, 26) and claim that "our choice of metaphor for instruction is not a neutral decision".

The metaphor, Leino & Drakenberg (1993, 61) conclude in their analysis of educational metaphors, holds considerable potential for introducing new terminology and concepts, as they "invite a search for analogies" and "organize reflections and explanations. They can open up fresh possibilities of thought and action—and equally well limit such possibilities".

2. Metaphors for Learning Environments

In this section, I explore three metaphors for learning environments: learning environments as ecosystems, learning environments as places, and learning environments as space, and conclude that instead of looking for ecosystems, places, or spaces as alternatives to classrooms and existing educational, pedagogical or didactic practice, we should rather look into how thinking of a learning environment as *atopos* would contribute to fresh thought.

I do not aim at an exhaustive analysis. The choice of definitions I have used as examples is based on the assumption that the reader recognises them, as they frequently appear in literature. Also, I have chosen to draw my examples from the existing reality and practice rather than from speculations for the future, and as the reader will notice I give preference to Finnish writers, experiments and projects.

2.1 Learning environments as ecosystems

> "Every setting in which learning takes place involves a learner, a teacher, a setting, and information to be learned. ... Learning, therefore, occurs in an ecosystem [Doyle & Ponder 1975] in which there is a series of inputs, a series of teaching and learning processes, and a series of outputs." (Ashman & Conway 1997, 2)

Viewing schools, classrooms, and now learning environments as ecosystems has resulted in several large-scale national and international survey studies, such as *Peruskoulun arviointi 90* (Evaluating the Comprehensive School 90) in our country. The study was conducted by the Institute of Educational Research at the University of Jyväskylä in the beginning of the 90s. It was mainly a national level evaluation of the effectiveness of the Finnish Comprehensive School, but regarding mother- tongue instruction, it was also part of an international study of achievement in reading literacy (IEA Study of Reading Literacy). A number of the research reports focused on the comprehensive school as an educational environment. Kankaanranta & Linnakylä (1993) reported on their investigation into third formers' perceptions of their school day, using Bronfenbrenner's ecology of learning (Figure 1) as their theoretical framework. In this view, there are several environments with and within which the learner interacts, with the learner as an active creator and regulator of the learning process. The researchers' task is to describe the learner's ecosystem, that is, the factors that influence his/her growth, learning, knowing and attitudes. I will use the study of Kankaanranta & Linnakylä and their findings (Figure 2) as an example of how a learning environment is transformed in the hands of the researchers and what the implications of this transformation are.

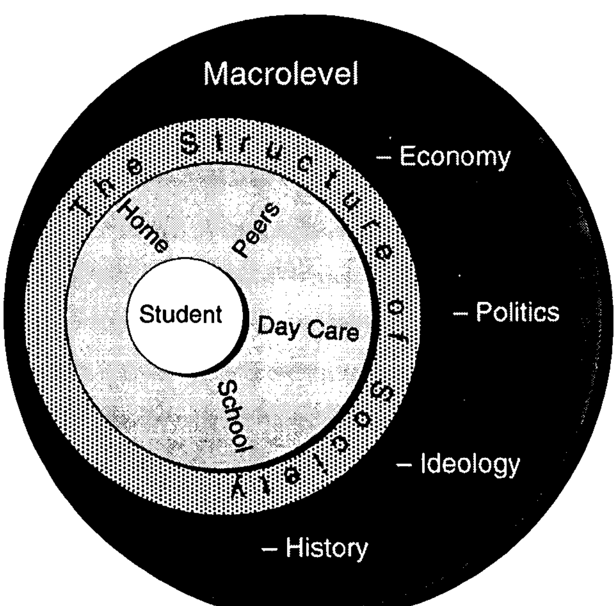

FIGURE 1
ECOLOGY OF LEARNING (BASED ON BRUNELL & KUPARI 1993, 1).

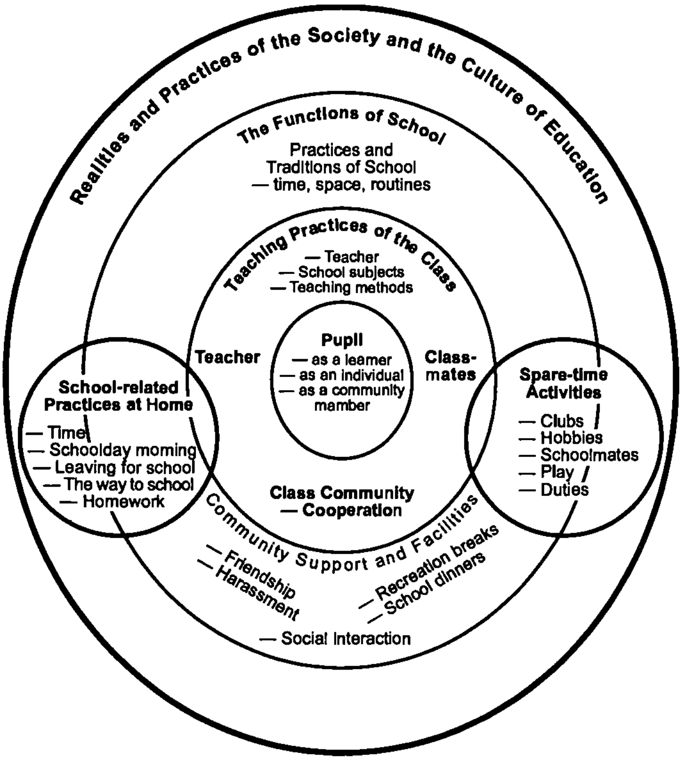

FIGURE 2.
THE LEARNING ENVIRONMENTS OF THE THIRD FORMERS' SCHOOL DAY (BASED ON KANKAANRANTA & LINNAKYLÄ 1993, 9).

In their report, Kankaanranta & Linnakylä (1993) make an interesting point which shows that they are aware of the problems of their findings. They write: "Although the point of view of the writings is that of the pupils, the interpretations are those of the researchers'" (Kankaanranta & Linnakylä 1993, 10). My point here is that instead of making the third formers' learning environment visible, an object of discourse and reshaping, a source of inventing, the researchers produced another metaphor, a map very similar to the original, only on a finer scale with more factors. But this map, I argue, is insignificant both for learners and educators. The description of a learning environment that started as an ecosystem has been transformed into a useless map of "a hall of mirrors".

The problem with the approach is that the researcher can take in an endless number of variables if s/he simultaneously tries to account for social, environmental, and individual cognitive factors. Of course, s/he could specify independent variables and examine their simple and interactive effects if s/he is interested "in prediction or weighing the effects of different factors" (Bereiter 1990, 606). But, as Bereiter continues, "if one's goal is understanding and explanation, then it is necessary to take account of interactions—with the possibility that the effect of any one variable depends on the state of the other variables". According to Cronbach (1975, 119; cited in Bereiter 1990, 606), "Once we attend to interactions we enter a hall of mirrors that extends to infinity. However far we carry our analysis—to third or fifth order or any other—untested interactions of a still higher order can be envisioned."

> "I had undertaken to help the cantor and, on holy days, the whole synagogue and I could hear the strains of my sonorous soprano distinctly.
>
> I saw smiles, attention, on the faces of the faithful, and I dreamt:
>
> 'I'll be a singer, a cantor, I'll go to the Conservatory.'
>
> In our courtyard there also lived a violinist. I did not know where he came from.
>
> During the day, he was an ironmonger's clerk; in the evenings, he taught the violin.
>
> I scraped out a tune of some kind.
>
> And no matter what or how I played, he always said, 'Admirable!', beating time with his foot.
>
> And I thought: 'I'll be a violinist, I'll go to the Conservatory.'
>
> At Lyozno, in every house, relatives, neighbours, encouraged me to dance with my sister. I was charming, with my curly hair.
>
> I thought: 'I'll be a dancer, I'll go to...' I didn't know where.
>
> Night and day I wrote verses.
>
> People spoke well of them.
>
> I thought: 'I'll be a poet. I'll go to...'
>
> I no longer knew where to let myself go."

He did not become any of those. He went to St. Petersburg and to Paris and became Marc Chagall. Was it his native aptitude, his talent, that made him a world famous artist? What about the time, the place, the culture he was born into? Would it ever be possible to trace all the variables that had an effect on his becoming Chagall?

2.2 Learning environments as places

> "One definition of a constructivist learning environment then would be:
> a place where learners may work together and support each other as they use a variety of tools and information resources in their pursuit of learning goals and problem-solving activities." (Wilson 1995, 27)

Wilson's definition calls to mind probably the most common metaphor for school as a workplace (cf. Leino & Drakenberg 1993, 44–46; Duffy & Cunningham 1996, 176). An implication of this view is that school and education is work. I cite Takala (1992, 65): "Education ought to be a plain everyday activity: nothing extra, but doing daily schoolwork." In this part, I first discuss a work-related metaphor for learning environments: an office. Our workplaces have began to change into spaces, due to ample use of new communication and information technologies. Therefore, I do not find the distinction between a place and a space feasible in our discussion. After the working place/space, I pass on to the metaphor of a marketplace. The metaphor comprises a traditional neighbourhood marketplace, as well as open, nationwide and global markets.

2.2.1 An office

Viewing instruction as an environment gives emphasis to the "place" or "space" where learning occurs (Wilson 1995).

According to Wilson, at minimum, a learning environment contains:

—the learner
—a setting or "space" wherin the learner acts—using tools and devices, collecting and interpreting information, perhaps interacting with others. (Wilson 1995, 26)

In Wilson's model, the elements of a learning environment are similar to those of one's workplace: a worker and his/her office which, as all offices today, offers a lot of tools and devices, such as telephones, fax machines, computers, desktop videos and access to the Internet. For working to be effective, "an individual's tool-using and information-using activities need to be complemented by the powerful resources presented by other people and by the surrounding culture". As a knowledge worker, one collects and interprets information; we work on agendas and projects, and we cooperate or collaborate with our colleagues to reach the goals set for the quarter of the year. A workplace hardly ever functions without a management. Wilson (1995, 27) continues:

> "In any learning environment, a function of control and supervision exists. Task managers are those elements of the environment that set tasks and provide guidance, feedback, and changes in direction. Task management is often assumed by the teacher, but in constructivist environments, students themselves assume much of this role."

A learning environment, then, is a place where learning is fostered and supported. It implies a degree of student initiative and choice; students are given room to explore, and to determine goals and learning activities. They are given generous access to information resources—books, print and video materials—and tools—word-processing programs, e-mail, search tools, and the learners are believed to be "likely to learn something if they are also given proper support and guidance. Under this conception, learning is fostered and supported, but not controlled or dictated in any strict fashion". (Wilson 1995, 27)

The learning environment as an office reflects constructivist views and values. Although constructivism has been the central issue in educational discourse in Finland, too, it has been more like a slogan or cliché than something that has radically changed the traditional teaching/learning practice. The working/learning conditions have changed, not the metaphor for learning: the constructivist learning environment continues to consider learning as work.

2.2.2 A marketplace

Lavonen, Meisalo & Lähdeniemi's (1995, 387) model originates from the design model for teaching programs in a computer-centred learning environment created by the *Dataprogramgruppen* of the Nordic Council of Ministers. In this marketplace model, learning with the teaching program is compared to an open marketplace with market stalls, that is different tools and environments, to facilitate learning (Minken et al. 1987, 3; cited in Lavonen, Meisalo & Lähdeniemi 1995, 387). The marketplace has common features with the constructivist learning environments we discussed in the previous part. I quote Wilson (1995, 27), regarding the outcomes of learning environments, to show what kind of learning can be brought about at the marketplace:

> "Perkins (1996) reflects on our childhood intimacy with our local neighborhoods, and draws the analogy to learning environment. Growing up in our neighborhood, we 'knew our way around'—where to find things, who to ask, what to expect, where to go. Working and solving problems within a learning environment results in similar knowledge."

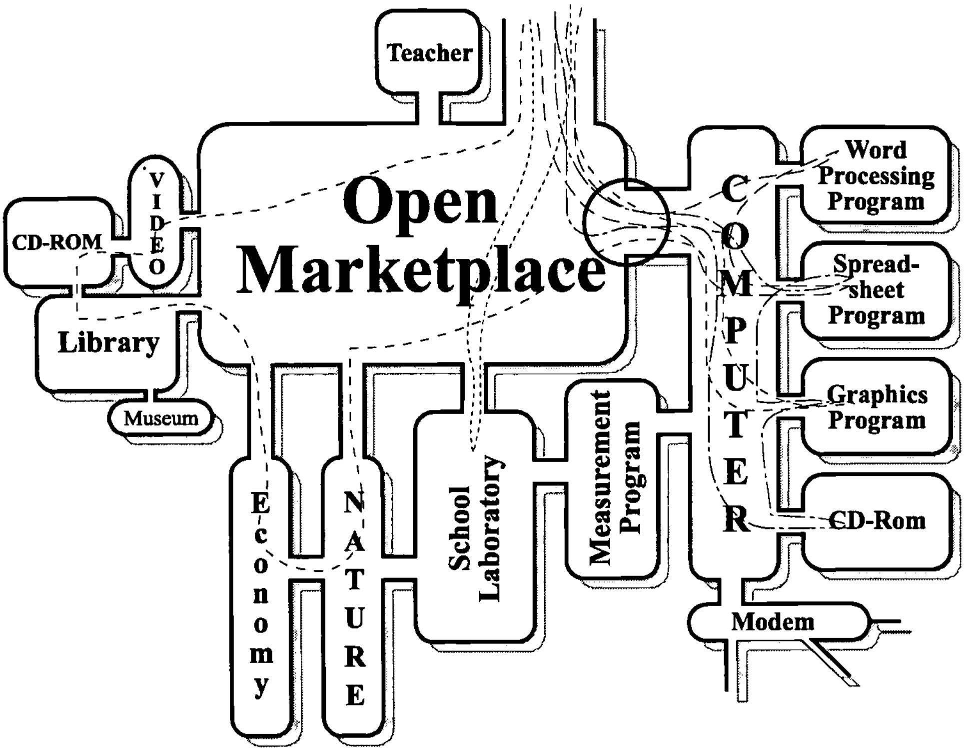

FIGURE 3. New Information and Communication Technologies in an Open Learning Environment (Based on Lavonen, Meisalo & Lähdeniemi 1995, 387; Cf. also Meisalo 1994, 213–224; Tella 1994, 54)

After studying a while at the marketplace the learner must know his/her way around, though s/he has several paths s/he can choose from. The map of the marketplace reveals interesting facts about the learner's actions. Each individual student can choose differently from the others. They might, however, meet in the market, on their way to find the things they are looking for, or when going to the person they want to ask a question. It is worth noticing, though, that there are no traces in the figure that go to the teacher who stands alone by the entrance to the market. S/he is in his/her office waiting for consultancy, ready to guide and support the learner in an environment that has not been planned by him/her, but brought to school from outside (Lavonen, Meisalo & Lähdeniemi 1995, 390).

The activities the learner performs in the marketplace suit the postmodern view of life. I refer to Bauman and his essay *Broken Lives, Broken Strategies*, where he explores the modern man, the pilgrim, and his postmodern successors, the stroller, the vagabond, the tourist, and the player (Bauman 1995, 72–104). The learner in the marketplace resembles the Baumanian stroller in the shopping mall. Bauman writes:

> "Malls in their original meaning refer to the tract for strolling. Now most of the malls are shopping malls, tracts to stroll while you shop and shop while you stroll. ... The sites of mismeetings, of encounters guaranteed to be episodic." (Bauman 1995, 92–93)

But the marketplace learner has some of the Baumanian tourist's features, too. The tourist moves on purpose or this is how s/he thinks. This is how Bauman describes him/her: "His/her movements are first of all 'in order to', and only secondly (if at all) 'because of'. ..." (Bauman 1995, 95). The image of the teacher as a tourist guide fits this picture perfectly.

The marketplace model is referred to as an *open, multimedia-based learning environment* by Lavonen, Meisalo & Lähdeniemi, as well as by Tella (1994, 53–55). The technology-rich environments are also characterised as *new, open and flexible*. The "simple" open marketplace model in Figure 3 seems to be meant for a young learner; new, open and flexible learning environments aim at larger markets with larger numbers of adult customers. This is how Pohjonen defines such a learning environment:

> "A new learning environment is a holistic and integrated environment with the goal of promoting opportunities for lifelong learning and individual study. Its characteristics include openness and flexibility in terms of time, place, method and

right to study. It is an environment which is not yet fully established and contains many new elements which are still being experimented with. Typical features also include new forms of action and student group, made possible by novel approaches and educational policy, together with the possibilities offered by new technology." (Pohjonen 1997)

As I argue in the opening section, the notion of a learning environment is closely related to the development of modern information and communication technologies. Within the technology-driven framework, the notion is often provided with attributes that direct our thoughts to something new, modern, and powerful compared to old, outdated, and inefficient, something that promotes *"fundamentally different kinds of learning"*, as Hannafin, Hall, Land & Hill (1994, 52) claim. "Open", "open-ended" and "flexible" are probably the most frequently used (cf. Goodrum, Dorsey & Schwen 1993; Hannafin, Hall, Land & Hill 1994; Manninen & Pesonen 1997; Pulkkinen 1997; Sariola 1998; Tella 1998a), but their vagueness is a significant problem. Consider these three definitions with the comments following:

1 "Open-ended learning refers to processes wherein the intents and purposes of the individual are uniquely established and pursued. It involves the individual determination of what is to be learned, how it is to be learned, when (or if) learning goals have been met, and what (if any) subsequent steps might be taken. Any number of things might be candidates for individual learning; the intents and goals of different learners would likely vary substantially. In effect, the fundamental difference between directed and open-ended learning is in who determines what is to be learned and what steps are taken to promote learning." (Hannafin, Hall, Land & Hill 1994, 48)

2 "A learning environment consists of the physical, mental, and learning material framework and prerequisites for goal-oriented learning. These can be provided by the organiser of

the education or selected by the learner him/herself." (Pantzar 1995, 86)

3 "A learning environment is a place, a space, a community, or a form of action, with the view to enhancing learning. An open learning environment is a learning environment aiming at optimal flexibility as to time, place, methods, practices and learning contexts." (Manninen & Pesonen 1997, 268; 269 with reference to Lewis 1992, Rowntree 1992, Pantzar & Väliharju 1996).

These learning environments are larger versions of the neighbourhood marketplace, offering educational services both in nationwide and global markets, via new information and communication technologies. As the markets are just opening, and the large-scale production of services is not yet fully established (cf. Pohjonen), educational institutions trade with a variety of customer-driven (cf. Hannafin, Hall, Land & Hill, Definition 1) optional models of study (cf. Pantzar, Definition 2), often for a solo lifelong learner (cf. Pohjonen). These services if looked into more closely may be, in fact, only slightly modified or expanded versions of rather conventional education, for instance distance teaching or self study (cf. Manninen & Pesonen, Definition 3).

These "new" learning environments assume human understanding to be individually mediated, and learning as a highly individualised process and the responsibility of the learner (Hannafin, Hall, Land & Hill 1994, 49). They use technology to offer opportunities for action in which users realise their intentions. Their designers aim at creating more efficient systems for supporting individual learning and performance, often in authentic everyday circumstances. Technology satisfies the learner's needs: if the learner believes that a foreign language is best learnt by reading a dictionary, s/he can access one via the Internet and read it—any time, any place (cf. Pohjonen; Manninen & Pesonen, Definition 3).

These new, open, flexible, multimedia-based learning environments are extensions of the marketplace model, but the point of view is that of the enterprise. The neighbourhood marketplace is clearly planned from the learner's point of view. Here the stakes are higher, competition harder. The producers of educational services know that the customers are adults, who are willing to invest in their lifelong effort to keep up with the development. Technology is produced to gain profit, and technology producers are willing to cooperate with educational institutions and experts on learning—and teaching. The learning environments are open for new markets.

Neither the metaphor of an office nor the metaphor of a marketplace offers us *"fundamentally different kinds of learning"*, but as Pohjonen writes a new learning environment "is not yet fully established and contains many new elements which are still being experimented with" (cf. Pohjonen 1997 above). Therefore, I conclude the discussion on marketplaces with two quotations from Brockenbrough & Otto (1996):

> "The means by which users carry out such activities in a GUI (graphical user interface—my addition, MMA) are often partially or completely removed from language-based communication: Pointing, dragging, and pushing allow the user to perceive and to continuously adjust virtual tools or other devices without using propositions or commands such as 'erase selected file'. Ecological psychologists recognise that, in spite of their apparent modernity, such activities represent very ancient modes of unified action-perception that are shared by many organisms: Every predator worthy of the name must

be able to locate, track, identify, grasp, move, and modify objects. The cognitive faculties used by an artist who cuts objects from a complex computer-based drawing and saves them in her electronic library have much in common with the faculties employed by a wolf who snatches white rabbits from a snowfield and buries them until spring." (Brockenbrough & Otto 1996, 205)

"Thus, whether emergent media technologies serve human beings well depends on the extent to which they honor ancient human capabilities for perceiving and acting, capabilities that are grounded in the fundamental ecological necessities of long ago." (Brockenbrough & Otto 1996, 220)

The message of these quotations may be insignificant to a marketplace consultant or a tourist guide, but it is of utmost importance to an educator.

2.3 Virtual learning environments

"She went on olden-day sailing ships with Joseph Conrad. She went to Africa with Ernest Hemingway and to India with Ruyard Kipling. She travelled all over the world while sitting in her little room in an English village." (Dahl 1988/1989, 21)

Inspired by Brockenbrough & Otto (1996, 221), I would like to start this part by referring to Plato's famous "Allegory of the Cave", where the chained prisoners perceive the shadows cast on the walls by firelight as real beings rather than phantasms, and ask the reader to compare the prisoners' situation to that of ours with the virtual environments on the screens of our television set, home cinema, and on our personal computer's display.

As Brockenbrough & Otto (1996, 199) say, we are rapidly moving towards an era in which most everyday activities in developed countries will be shaped by environments that are not only *artificial,* but also *mediated* by television, radio, telephone, and computer networks. (Brockenbrough & Otto 1996, 199)

Rheingold (Rheingold 1995, 10; cited in Kynäslahti 1997, 51) gives a convincing statement on this particular point: "My virtual communities also inhabit my life." He says he carries around their conversations in his head and begins to mix them up in real life. One would like to ask him if he ever read an interesting novel, a great story. A person whose childhood and youth were full of fairy tales, stories, great stories—the great stories had not yet died at that time—still carries them and their heroes with him/her and still feels that the greatness of a story is in its power to take one away from this world into all those possible worlds that one could never inhabit, never experience. Today what once happened with the plain text of a novel is called immersion. Through books, one lived more lives than the one s/he was living, shared more destinies than s/he could ever have time to go through in his/her own novel—life. S/he knows the beginning of his/her novel, whose last pages s/he might be writing at this very moment, but s/he will never know the ending of his/her story. The virtual experiences have been documented in fiction:

> "I wish I could talk to the girl in the blue dress or anyone about the books but I'm afraid the Kerry nurse or Sister Rita might find out and they'd move me to a bigger ward upstairs with fifty empty beds and Famine ghosts galore with green mouths and bony fingers pointing. At night I lie in bed thinking about Tom Brown and his adventures at Rugby School and about all the characters in P.G. Wodehouse. I can dream about the red-lipped landlord's daughter and the highwayman, and the nurses and nuns can do nothing about it. It's lovely to know the world can't interfere with the inside of your head." (McCourt 1997)

Because of the wonderful memories of the moments in virtual worlds, which at that time were just called books, it is distressing to read reports of virtual classrooms, such as Kilpisjärvi. Kynäslahti (1997, 52), for instance, states that in virtual classrooms "the usual activities of the classroom are carried out". According to Kynäslahti (1997), the virtual class of the Kilpisjärvi project, was an "as if" traditional classroom we know from our youth: a place with pupils and their teacher. It was full of elements that strengthened the illusion of the real world classroom: it was based on our everyday perceptions and real environments, where we act as learners and teachers, that is, in schools and classrooms. The Kilpisjärvi-project pupils at the Helsinki end did not feel as if they belonged to the same class as their Kilpisjärvi classmates. The only common interest they shared with their capital area mates was the teacher—the most salient part of the picture (Kynäslahti 1997, 54). The Helsinki end did not want to experience the environment as shared, they did not want to sign the pact of shared reality with the pupils 1,200 kilometres away from them, though it was "as if" those pupils were with them regularly. What went wrong? Or, are Tella & Mononen-Aaltonen (1998) wrong in their argument that a virtual environment "helps, facilitates and contributes to the emergence of a dialogic learning environment as it forces the learner to pay more attention to communication"? Was it because even though the virtual environment may give more space to communication than the traditional classroom, "it is not necessarily more efficient if there is no dialogue that is a crucial element in the creation of any learning organisation and especially in establishing an open multimedia based collaborative and networked learning environment"? (Tella & Mononen-Aaltonen 1998, 102–103)

In the following part, I will elaborate on the main argument of my article, which states that "the learning environment cannot be a physical space, a classroom, nor any particular media education tool. The learning environment is—dialogue." (Tella & Mononen-Aaltonen 1998, 102–103)

2.4 Learning environment as *atopos*

Atopos (Greek "without a place")

I follow the maxim of Kurt Lewin, who said that there is "nothing so practical as a good theory," and for my purposes dialogism, rooted in the writings of Bakhtin, Vygotsky and Bibler, is such a theory. It forms a basis for defining a learning environment as dialogue, as Tella & Mononen-Aaltonen (1998) do in their recent research. Tella & Mononen-Aaltonen underline that dialogue, in the sense they think of it, "does not stand for a debate or a dialectic dual to beat down one's opponent", but rather "refers to the building of a community". Also, they firmly argue that

> "[d]ialogue itself creates a most powerful learning environment which, without any difficulty, can include different kinds of technological tools as well" (Tella & Mononen-Aaltonen 1998, 120–121).

I will elaborate on the idea of a learning environment as dialogue, from the educator's point of view. To me, theory is not abstract and disconnected from the practical world, but highly usable. I argue that defining a learning environment as a dialogue has significant implications for the teaching–learning process in general, and that it is of utmost importance for those who need to deal with technology-based educational innovations. Certain aspects that have been considered critical become irrelevant, while others move from the periphery into the main focus and gain more emphasis in the discussion.

In the framework of dialogism, the distinction between *opiskeluympäristö* (a studying environment) and *oppimisympäristö* (a learning environment), which might seem appropriate for a Finnish educational researcher (cf. Tella 1998a, 1998c; Tella & Mononen-Aaltonen 1998, 99), now looses its significance. It is possible for dialogue to emerge in the classroom of an inner-city school as well as in a virtual community of learners from different parts of the world, formed via the latest developments of the information and communication technologies; in your remote village home with the your tutor in the capital city, via phone, email, or whatever technical device the human mind can produce; in your campus café with your fellow-student; on the train on your way to your next class with Bakhtin about the "Problems of Dostoevsky's Poetics". You can carry on a dialogue with yourself when your conversation partner has stepped out of the room. Thus, the dialogic learning environment cannot be a physical or virtual space, a classroom, nor any particular media education tool (Tella & Mononen-Aaltonen 1998, 103), it is *atopos*, without a place, without a location. It is not in the learner's head nor outside it. If anywhere, it is between, as it is always "double-voiced".

As "double-voiced", the dialogic learning environment satisfies the basic needs of an individual—his/her quest for dialogue:

> "A single voice ends nothing and resolves nothing. Two voices is the minimum for life, the minimum for existence." (Bakhtin 1984/1997, 252)

Two voices is the minimum for learning, too: that of a "learner" and that of a "teacher". In a dialogic learning environment, though, it is impossible to decide who is a teacher and who is not, as the other voice in the dialogue is not restricted to one's classmate or teacher, real or virtual; the other voice can be Arundhati Roy, the winner of the 1997 Booker prize, Krzysztof Kieslowsky, Karl Popper, or Bakhtin's followers Anatoli Akhutin and Vladimir Bibler, or that of one's own "in the dialogical community of an individual mind" (Aleksandrov & Struchkov 1993, 373; Bibler 1991). I have written "learner" and "teacher" in quotation marks, and instead of "book, or film, or display, or a 'responsive' computer"—as Bruner does (1995, 20)—I have used the term "the other voice", because in a dialogic learning environment one does not think in a "resource" way. It is the other mind revealed in the other's voice, through language, that is important.

3. LEARNING ENVIRONMENT AS DIALOGUE

In the current constructivist approaches to knowledge and learning the position of language and dialogue are central. Duffy & Cunningham (1996, 181) regard all learning "as a social, dialogical process of construction by distributed, multidimensional selves using tools and signs within a context created by various communities with which they interact".

We will compare this overall view of learning with Bakhtin's view of the dialogic nature of human thought and see that the views are consistent at many points. But we will also find that a dialogical process of construction is not "inexorably grounded in talk" (Duffy & Cunningham 1996, 181) nor in "dyadic or group discussion: talk, talk, talk!", that is strongly emphasised in many educational applications characterised as constructivist, e.g. reciprocal teaching, problem-based learning and collaborative groups (Duffy & Cunningham 1996, 180). In the framework of dialogism, dialogue is not mere talk, nor is it "classroom interaction as a mere sequence of turns-at-talk" (Kramsch 1991, 178), even if these surface phenomena are the easiest to research. To defend my argument, I quote Bakhtin on Dostoevsky:

> "Dostoevsky knew how to reveal, to see, to show the true realm of the life of an idea. The idea *lives* not in one person's *isolated* individual consciousness—if it remains there only, it degenerates and dies. The idea begins to live, that is, to take shape, to develop, to find and renew its verbal expression, to give birth to new ideas, only when it enters into genuine dialogic relationship with other ideas, with the ideas of *others*. Human thought becomes genuine thought, that is, an idea, only under conditions of living contact with another and alien thought, a thought embodied in someone else's voice, that is in someone else's consciousness expressed in discourse. At that point of contact between voice-consciousness the idea is born and lives." (Bakhtin 1984/1997, 87–88)

As we see, dialogue is not mere turn-taking. It is much more concerned with human thought in general and—how we come to know "each other's minds" (Bruner 1995, 12) through language as the above quotation from Bakhtin's *Problems of Dostoevsky's Poetics* shows. In the Bakhtian type of orientation, we are interested not only in talking and listening to others talk, but we are "genuinely exploring the intentions, frames of references, and reactions of the others. By identifying and discussing the dialogic context itself, the participants in the dialogue are given validity and importance as speakers and hearers in that dialogue; their contributions are given breadth and depth." (Kramsch 1993/1994,

28) The participants are reflecting on their learning as individuals and as members of their learning community or learning collective.

But another issue needs to be taken into account if we are to properly understand the nature of dialogue. Voloshinov introduces what we have come to call "addressivity" (cf. Tella & Mononen-Aaltonen 1998) as follows:

> "Orientation of the word toward the addressee has an extremely high significance. In point of fact, word is a two-sided act. It is determined equally by whose word it is and for whom it is meant. As word, it is precisely the product of the reciprocal relationship between speaker and listener, addresser and addressee. Each and every word expresses the 'one' in relation to the 'other'. I give myself verbal shape from another's point of view of the community to which I belong. A word is a bridge thrown between myself and another. If one end of the bridge depends on me, then the other depends on my addressee. A word is a territory shared by both addresser and addressee, by the speaker and his interlocutor." (Voloshinov 1929, 86; cited in Pearce 1994, 43)

We will continue along the constructivist line for a while. Dialogue offers an authentic, relevant, realistic context for learning, all attributes that are generally attached to learning and knowledge-building in the constructivist movement. However, researchers differ in their views on why this is important. In the Duffy—Cunningham (see Duffy & Cunningham 1996, 179) debate I take Duffy's side. Cunningham is more concerned about knowledge, while Duffy's concern is with learning and with the issue of transfer. Duffy asks: "How do we prepare ourselves to act effectively in particular contexts?" "What aspects of the context must be presented if the learning (knowledge) is to be used or elicited in other contexts?" "If I want to prepare myself to be a scientist, what sort of activity must I engage in and in what sort of environment?" (Duffy & Cunningham 1996, 179) I will let Akhutin, Bakhtin's follower and Bibler's colleague, and Bruner answer Duffy's fundamental questions.

Akhutin's anecdotal story about his studies at the Moscow University is illuminating: The "dose" of physics they were given at the Chemical Faculty was rather reduced in such a way that relativity theory was excluded as unnecessary for future chemists. Therefore, he decided to study on his own. But as he had heard a lot of horror stories about the theory, he began reading introductory literature, "all of which had been produced by other authors". This led to the situation that he could not understand anything at all. Finally, he came upon a collection of articles by Einstein and his colleagues, and everything became clear to him from the very first words. To quote Akhutin:

> "There Einstein did not suggest just another physical theory; ... he was conveying to the reader ... 'the pattern of relativity thinking'. This quality is peculiar to Einstein's writings in particular, but it is also characteristic of *primary sources* (= beginnings) in general. In other words: *It is the account of a theory* coupled with *the means of understanding it*, together with *the mode of thinking, that characterizes a theoretical-scientific creation.* Popularizers actually move in the opposite direction, trying to 'explain' the problem by having so 'chewed it over' that it might become 'swallowable'..." (Alexander & Struchkov 1993, 363)

What empowers Akhutin to understand relativity theory? Bruner would definitely say "externalization" and continue with the motto "thinking works its way into products", which is a retranslation of a Latin motto, *Scientia dependit in mores* (knowledge works its way into habits) (Bruner 1995, 22–23). He would probably refer to a French cultural psychologist's, Meyerson's, thinking, too. Meyerson's idea was that "the main function of all collective cultural activity is to produce 'works'—*œuvres*"as Meyerson called them. *Œuvres* are works that "achieve an existence of their own" (Bruner 1995, 22). In Akhutin's case, it was Einstein's *œuvre,* a record of his mental efforts, an embodiment of his thought, that now became accessible to Akhutin's reflective effort. To become a scientist is facilitated by studying the products of scientists. As Popper (1971/1978, 114) concludes: "We can learn more about production behavior from studying the products themselves than we can learn about the products by studying production behavior."

But there is one more thing to be added to Duffy's question about preparing oneself to become a scientist. It is, as Akhutin says, "to understand relativity theory means to think like Einstein". And he continues:

> "While being 'general', this theory is at the same time exclusively Einstein's, because it is in the deepest way bound up with the peculiar cast of Einstein's mind. By saying so I do not want to claim that relativity theory is Einstein's subjective point of view. What I do claim is that even the objective content of theoretical thinking has its beginning and finds its completion in the mind. ..." (Alexander & Struchkov 1996, 365)

It is in dialogue, be it face-to-face or virtual, within the community of scientists of our own time or those of the past, that science originates. To become a scientist is to enter their community, is the answer to the latter part of Duffy's question. His chances of winning a Nobel Prize, Bruner (1995, 154) assures, would increase enormously if he worked in the laboratory of somebody who had already won one, and concludes: "By entering such a community, you have entered not only upon a set of conventions of praxis but upon a way of exercising intelligence." As Tella

& Mononen-Aaltonen point out, citing Kumar (1995, 3; cited in Tella & Mononen-Aaltonen 1998, 121), "in an information-rich and knowledge-intensive society the most important feature will most probably consist of theoretical knowledge, which is likely to serve at the same time as a source of value and a source of growth to every human being".

Communal approaches to learning are not restricted to schools and other traditional educational institutions, but managers and leaders throughout the world are actively pursuing them in efforts to redesign their organisations for learning. In these efforts, too, dialogue seems to become a cornerstone. Summarising the findings of The MIT Dialogue Project, Isaacs (1996, 21) contends that dialogue is

1) "a powerful way of harnessing the inherent self-organizing collective intelligence of groups of people and of both broadening and deepening the collective inquiry process";
2) "an important breakthrough in the way human beings might govern themselves, whether in public or private domains"; and
3) "an innovative alternative approach to producing coordinated action among collectives" (Isaacs 1996, 21).

The MIT Dialogue Project initiated three long-term research sites:

—a domain inquiry, among a diverse population in a healthcare community in Grand Junction, Colorado;
—a social inquiry, with a diverse group of urban leaders in Boston; and
—an organizational inquiry, with a group of managers and union steelworkers in a steel mill in Kansas City. (Isaacs 1996, 27).

In Finland, Roman (1998) is writing his doctoral thesis on "Dialogue and Its Impact on Organisational Culture" at the Helsinki University of Technology. There are great expectations of the power of dialogue for social and organisational change—in the hope of gaining more profits. However, I would like to think of the interest in dialogue as an attempt to rediscover the wholeness we have lost in our postmodern "life in fragments". Unlike postmodernism, dialogism presents us with a theory of knowledge that admits that we can make sense of the world we inhabit. As Clark & Holquist (1984; cited in Pearce 1994, 10) have observed, we can "mean"—but only within the reflexive bounds of an interlocutory relationship. The dialogic subject can achieve a provisional and dynamic perception of the self/world through the refractive mirror of his or her addressee:

> "I can mean what I say, but only indirectly, at a second remove, in words I give and take to the community according to the protocols it observes. My voice can mean, but only with others—at times in chorus, at best of times in dialogue." (Clark & Holquist; cited in Pearce 1994, 10)

I will now pass on to describe dialogic learning environments, with the view to a definition at the end of the section. The description comprises four components or elements that are critical, in the sense that they make dialogue a *learning* environment. While discussing these elements, we should keep in mind, on the one hand, that dialogue penetrates them all, and on the other, that they are interdependent, interlinked, intertwined to such an extent that the best metaphor for them would be a rhizome (cf. Tella 1998; Tella, Mononen-Aaltonen & Kynäslahti 1998 in this publication). The dialogic learning environment forms an organic, living whole: take off one element, and it changes into something else. A dialogic learning environment is more than just a sum of its parts.

4. FOUR CRITICAL ELEMENTS OF DIALOGIC LEARNING ENVIRONMENTS

I suggested that a learning environment as dialogue is *atopos*. Dialogue, on the other hand, is not. It needs "a setting to take place" as Tella & Mononen-Aaltonen (1998, 101) note. For them, such a setting is a collective. Using the term "collective" instead of "community", a general term in the English-language literature, they follow the terminology of the Kitaigorodskaya School and the MIT Dialogue Project (Tella & Mononen-Aaltonen 1998, 94; 101), whose use of the term can also be explained by their reference to dialogue and dialogism. However, Tella & Mononen-Aaltonen seem to feel that the question about the environment for dialogue needs to be looked at on a more theoretical level, and find their thinking to be in line with the MIT Dialogue Project. Along with Isaacs, the director of The Dialogue Project they write: "More recently we have come to think of dialogue "as the creation of tangible, self-organizing, charged 'fields' of new meaning in which profound collective insight and reorientation appear, and out of which people can take aligned and effective action" (Isaacs 1996, 20; cited in Tella & Mononen-Aaltonen 1998, 101).

There are several points in the above quotation—tangible, charged, new meaning, collective insight, reorientation—that call to mind another "field", that of the zone of proximal development as well as a number of others that will add to our understanding of dialogic learning environments. Therefore, the MIT Dialogue Project definition of the "field" can serve as an appropriate starting point for our further discussion.

I will first give the MIT definition and then move on to four critical elements of dialogic learning environments (Table 1) that seem to me to accord Isaacs's definition, and taken together, to provide us with a firm theoretical basis for the definition of a learning environment. This is the core definition:

> "We define the field as the environment of collective attention, identity images, and dynamic movement of tacit thought in which these are contained." (Isaacs 1996, 24)

There are four points worth extracting from Isaac's definition to be discussed, compared and interpreted with the view to Bruner's subcommunity, Buber's the We, Bakhtin's dialogic field of vision, and Vygotsky's zone of proximal development (Table 1). They are "collective attention", "identity images", "tacit thought", and "dynamic movement".

TABLE 1. *Critical Elements of the Dialogic Learning Environment, Based on Bruner (1995), Buber (1963), Bakhtin (1929/1963/1984/1994), and Vygotsky (1929–1935/1996; 1978)*

A subcommunity that specializes in learning among its members	The *We*	The *dialogic field of vision*	The zone of proximal development
Bruner	Buber	Bakhtin	Vygotsky

I will first dwell on "collective attention" and show its connection to Bruner's notion of subcommunity. In his essay on culture, mind, and education, Bruner deals with the questions about "the interaction between the powers of individual minds and the means by which the culture aids or thwarts their realization" (Bruner 1995, 13). He points to nine tenets that he sees to have consequences for education from the cultural–psychological approach. One of them is what he calls "the interactional tenet". This tenet includes the proposal that the classroom be received as a subcommunity that specialises in learning among its members—a subcommunity of mutual learners.

The community "models ways of doing or knowing, provides opportunity for emulation, offers running commentary, provides 'scaffolding' for novices". And, contrary to traditional critics of schools, classrooms and teachers, Bruner's subcommunity even "provides a good context for teaching deliberately". (Bruner 1995, 20–21) I would like to claim that this is how "collective attention" in Isaacs's definition could and should be interpreted.

> "The importance of the dialogical relation of the self with another self derives from this need of man for conformation. Buber regards the precondition of actual dialogue to be a situation in which each of the interlocutors addresses himself to a particular "other" as he really is and acknowledges him as a human being. Such acknowledgement, however, does not mean agreement with the ideas of another, for dialogue can take place even when two men are at odds in their views. What acknowledgement does require is that mutuality be established between the speakers." (Cohen 1983, 86)

Mutuality is tangible in the sense that we can feel, notice and see it, identify with it. Martin Buber offers valuable insight into the second point of Isaacs's definition, "identity images". What this part of Isaacs's definition seems to suggest is the Buberian *We*-setting for dialogue to realise itself. In Buber's philosophy, the concept of *We* is overshadowed by the dominating doctrine of *I–Thou*, and as a consequence, the *We* has failed to attract sufficient attention. The Buberian *We* is not a crowd, a group, a collective, nor any multitude that can be represented as an object. Buber sees the *community* to be nearest to an actualisation of the *We* among all the social forms in which the *We* can be observed.

(Cohen 1983, 84–85) However, the *We* and the community are not identical: "The authentic We, as it objectively exists, can be recognized by the fact that when we examine any one of its parts we discover lodged inside, either actually or potentially, an essential relationship between one personality and another, between I and Thou." (Buber 1962a, 171, cited by Cohen 1983, 84) And Cohen (1983, 85) contends: "The We can become actual within a group or it can kindle outside of group existence." The Buberian *We* is animated in the shared speech and finds its beginning when one addresses another.

> "This We exists in any circumstance in which a man has revealed to his fellow something of the world in such a way that it is thenceforth truly grasped by the other, when he has conveyed his own experience so that it has penetrated the complex formed by the other's experiences and the other becomes, as it were, inwardly consummated. Although this *We* is as unlikely as the *I* to be an active concept expressed in the grammatical third person, it does not possess the same degree of permanence and continuity as the I. Buber notes that the *We* is the active principle that underlies the whole history of the spirit and action. Time and again it becomes actual and present and time and again it wanes and is no more." (Cohen 1983, 84–85)

This passage from Cohen/Buber is interlinked with the third point of our discussion, that of "tacit thought" and its relation to the Bakhtian notion of "the dialogic field of vision". The critical element here is the fragmentary nature of our beliefs, assumptions and thinking that govern the ways we perceive the world and take action. These tacit ways of thinking also include "theories" about our own minds and how they work. Referring to children's theories, Bruner writes: "These naive theories are brought into congruence with those of parents and teachers not through imitation, not through didactic instruction, but by discourse, collaboration, and negotiation" (Bruner 1995, 57). His argument holds true with adult learning as well. Isaacs gives support to Bruner's idea by stating that one purpose of dialogue is to access this tacit ground, perceive its impacts, and alter its effects (Isaacs 1996, 21). Therefore, it is of extreme significance that this tacit ground, the different truths, "the dialogic fields of vision" become known within the "We". I quote Bakhtin on this point:

> "Whenever someone else's 'truth' is presented in a given novel, it is introduced without fail into the *dialogic field of vision* of all the other major heroes of the novel. Ivan Karamazov, for example, knows and understands Zosima's truth, as well as Dmitry's truth, and Alyosha's truth, and the 'truth' of that old sensualist, his father Fyodor Pavlovich. Dmitry understands all these truths as well; Alyosha, too, understands them perfectly. In *The Possessed,* there is not a single idea that fails to find a dialogic response in Stavrogin's consciousness." (Bakhtin 1984/1997, 73)

It is through dialogue with others that learners discover their ways of thinking, their truths, their belief systems, their fields of vision, which of them they share with others and which are unique to them. The Russian krugozor (*krugozor*) literally means the circle of vision, and therefore translating it as a field of vision transmits the visual metaphor that it emphasises: "... [w]hat we see can never be what you see, if only (as Bakhtin put it in an early essay) because I can see what is behind your head" (Bakhtin 1981/1996, Glossary, translator's note, 425). The term has been translated also as "belief system" or "conceptual horizon".

The translator of Bakhtin's *The Dialogic Imagination* takes up an interesting point in the Glossary to Bakhtin's essays, that of his use of "zone". She writes: "In Bakhtin's view there are no zones belonging to no one, no 'no-man's land'. There are disputed zones, but never empty ones. A zone is the locus for hearing a voice; it is brought about *by* the voice." (Bakhtin 1981/1996, 434; translators note) In his autobiographic novel, *Angela's Ashes,* Frank McCourt hears his teacher's voice from years ago:

> "He tells us what is important and why. No master ever told us why before. ... He's the only master who stops and says, Do ye understand what I'm talking about? Do ye want to ask a question?" (McCourt 1997, 236)

By his voice, Frank McCourt's teacher brings about the zone of proximal development, which comprises the last critical element of the dialogic learning environment. The reader should know that, for Vygotsky, the most essential feature of teaching and education is that it creates the zone of proximal development (Vygotsky 1996, 334).

The zone of proximal development should be understood, not as a fixed state of ability, but as a range of potential for development, in Isaacs's terms, for "the dynamic movement" of the learner's mind. Vygotsky's definition of the zone of proximal development frequently appears in educational literature, but still I quote it here:

> "The zone of proximal development is the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky 1978, 86).

The zone of proximal development is the charged field of Isaacs's definition: it is charged with the learner's potential for moving towards the higher levels of development. The dynamic movement within the zone of proximal development is a prerequisite for growth and knowledge construction that moves the learner from one stage of development to another. This is done with help from outside one's mind, with the help of another voice, another mind. The zone of proximal development emphasises elasticity and unboundedness (Smagorinsky 1995, 192) as properties of the human mind, its potential for development that is not characteristic only of our childhood, the sense of our own "inner unfinalizability", our "capacity to outgrow, as it were, from within and to render *untrue* any externalizing and finalizing definition" of us. "As long as a person is alive he lives by the fact that he is not yet finalized, that he has not yet uttered his ultimate word." (Bakhtin 1984/1997, 59)

It is worth noticing that Duffy & Cunningham (1996, 183) seem to confirm our analysis of the critical elements. They say that neither the student nor the teacher owns the zone of proximal development; "rather, it is something that is established dynamically".

Before closing this section, we have to consider one more issue of importance. What has been discussed above might give the idea that we risk overestimating the importance of actual social exchange in constructing knowledge, which Bruner, too, warns us about (1995, 60), and this can lead to underestimating the importance of knowledge accumulated in the past. I have referred to this question above with the example of Akhutin and when referring to Popper (cf. Section 3). I must return to Popper's famous worlds: What is crucial for dialogic learning environments, too, is to differentiate between the subjective knowledge of World 2 and the objective knowledge of World 3.

As Bruner (1995) says, teaching should help the learner grasp the distinction between personal knowledge, on the one side, and "what is taken to be known" by the culture, on the other. But the learner "must not only grasp this distinction, but also understand its basis, as it were, in the history of knowledge" (Bruner 1995, 61). In a sense, we should follow Frank McCourt's teacher's advice:

> "He says, You have to study and learn so that you can make up your own mind about history and everything else but you can't make up an empty mind. Stock your mind, stock your mind. It is your house of treasure and no one in the world can interfere with it." (McCourt 1997, 236)

I would like to conclude this section with this metaphor of the mind, a palace. Above I have made reference to the inner community of creative work, and eventually, to the dialogical community of an individual mind (cf. Section 3). In the palace of your mind, "your collaborators and colleagues come throughout the whole world and all of history ... For Einstein, it may well be that Newton and Spinoza are more contemporaneous than some 'nearby' colleagues. It is precisely the membership in this community—or, to put it differently, the inner dialogism of profound, that is to say cultural, thought—that produces the apparent 'asociality' of a serious thinker or artist". (Aleksandrov & Struchkov 1993, 384) Who might be the nearby colleagues of pupils and students in their dialogic environments and dialogical communities of their minds?

> "You might be poor, your shoes might be broken, but your mind is a palace." (McCourt 1997, 237)

The preceding discussion on four critical elements of dialogic learning environments leads me to propose a preliminary definition of a learning environment. It reads:

A learning environment is a dialogue of the fields of vision, charged with the potential for development.

This definition reflects the critical elements of a dialogic learning environment. The definition has a sound theoretical basis: dialogic epistemology, and a sociocultural approach to learning. It is consistent with "dialogic pedagogy" that is outlined in the next section. General didactic principles can be drawn from it and dialogic learning environments can be created and designed to fit different educational settings, ranging from primary to tertiary education. It can contribute to change in educational, pedagogical and didactic practices.

5. Discussion on Some Characteristics of Dialogic Pedagogy

> "To be means to communicate dialogically. When dialogue ends, everything ends. Thus dialogue, by its very essence, cannot and must not come to an end." (Bakhtin 1984/1997, 252)

What does it mean to create a learning environment that is dialogue? What is it like? Dialogic pedagogy? Didactic principles of such a learning environment? Practice?

I will outline the answer to the above by presenting three views on dialogic pedagogy. The views are based on the work of three very different researchers and educators, with different cultural backgrounds, and different languages. Professor Kitaigorodskaya comes from the east, her post being at Moscow State University, and it is she to whom I would like to extend all my gratitude for bringing me to the world of dialogic theory and practice in foreign language education. Professor Kramsch represents the west. She has taught at MIT, Cornell, and at present, works at Berkeley. She, too, is an applied linguist, and lives, as she says in the preface to her book *Context and Culture in Language Teaching* "with two languages and two cultures" (Kramsch 1993, vii) as her Russian colleague. Then, Rauno Huttunen, a young Finnish philosopher with his "minor language" and "minor culture" from the University of Jyväskylä. It is very unlikely that they know anything about each other, but an obvious parallel exists between their views. What brings these three researchers into our discussion is their thorough understanding of dialogue and their deep conviction that, as Huttunen writes, "in the future, nobody can talk about the theory of teaching or the philosophy of teaching without the notion of dialogue" (Huttunen 1995, 5).

Rather than deal extensively with interpreting their views, presented in Table 2, or formulating possible answers to the above questions I have chosen to let two scholars, Buber through Cohen and Bakhtin, comment on them. Kramsch and her "colleagues" will join in. Their comments will refer to language education, but in most cases, we can omit the word "language" or "culture", without changing the point she is making.

I have structured the comments in a customary way: The commentators start with general observations on the characteristics of dialogic pedagogy, presented in Table 2, then Kramsch will move on to commenting on dialogues in educational settings. The discussion does not pretend to be exhaustive, but focuses principally on those issues and arguments that seem central to me. I will have very little to say in this discussion, as I do not have answers or solutions—yet. In a way, my article remains open-ended, uncompleted.

Bakhtin on Table 2, Rule 1:

> "Dostoevsky's novel is dialogic. It is constructed not as a whole of a single consciousness, absorbing other conscious-

ness as objects into itself, but as a whole formed by interaction of several consciousnesses, none of which entirely becomes an object for the other; this interaction provides no support for the viewer who would objectify an entire event according to some ordinary monologic category (thematically, lyrically or cognitively)—and this consequently makes the viewer also a participant. Not only does the novel give no firm support outside the rupture-prone world of dialogue for a third, monologically all-encompassing consciousness—but on the contrary, everything in the novel is structured to make dialogic opposition inescapable. Not a single element of the work is structured from the point of view of an nonparticipating 'third person.' In the novel itself, nonparticipating 'third persons' are not presented in any way." (Bakhtin 1984/1997, 18)

Bakhtin on Table 2, Rule 2:

"... [o]nly a dialogic and participatory orientation takes another person's discourse seriously, and is capable of approaching it both as a semantic position and as another point of view. Only through such an inner dialogic orientation can my discourse find itself in intimate contact with someone else's discourse, and yet at the same time not fuse with it, not swallow it up, not dissolve in itself the other's power to mean; that is, only thus can it retain fully its independence as a discourse." (Bakhtin 1984/1997, 64)

Buber through Cohen on Table 2, Rule 3:

"Buber conceives of the growth of the inward self as a product of one man's relation to another: that is, of the mutuality of realization, wherein one man realizes another's selfhood and the other is conscious of this realization, which is at the same time reciprocally announced. ... 'The soul of man needs conformation', Buber (1962b, 131) declares." (Cohen 1983, 86)

Buber through Cohen on Table 2, Rule 4:

"In examining the situation of total acknowledgement of one's fellow man, Buber speaks of 'knowing a man in one' s heart'. ... To know a man with the heart's knowledge is impossible if man is treated as an object which is observed as something separate from oneself. It can only be achieved if one enters into a simple relation with a person as 'if he is made actual to [the self]. Therefore the self designates the heart's knowledge—understood in this special sense—as *personal realization'.*" (Buber 1963, 224 cited in Cohen 1983, 86)

Sheldon through Kramsch on Table 2, Rule 4:

"In single-voiced discourse, the sole orientation of the speaker is to the self to the progress that he or she is making in learning the language. By contrast, in double-voiced discourse, as Sheldon describes it, 'the primary orientation is to the self, to one's agenda. The other orientation is to the members of the group. The orientation to others does not mean that the speaker necessarily acts in an altruistic, accommodating, or even self-sacrifying manner. It means, rather, that the speaker pays attention to the companion's point of view, even while pursuing her own agenda. As a result, the voice of the self is enmeshed with and regulated by the voice of the other' (Sheldon 1992: 99)." (Kramsch 1993/1994, 27–28)

Bakhtin on Table 2, Rule 5:

"The idea—as it was *seen* by Dostoevsky the artist—is not a subjective individual-psychological formation with 'permanent resident rights' in a person's head: no, the idea is inner-individual and inter-subjective—the realm of its existence is not individual consciousness but dialogic communion *between* consciousnesses. The idea of a live event, played out at the point of dialogic meeting between two or several consciousnesses. In this sense the idea is similar to the word, with which it is dialogically united. Like the word, the idea wants to be heard, understood, and 'answered' by other voices from other positions. Like the word, the idea by nature is dialogic, and monologue is merely the conventional compositional form of its expressions, a form that emerged out of the ideological monologism of modern times ..." (Bakhtin 1984/1997, 88)

TABLE 2. Some Characteristics of Dialogic Pedagogy in the Writings of Kitaigorodskaya, Kramsch, and Huttunen.

Kitaigorodskaya	Kramsch	Huttunen
• every participant is an active subject of communication • every participant has his/her say	• double-voiced discourse • the voice of the self is enmeshed with and regulated by the voice of the other	1 The Rule of Participation • active participation • participation based on voluntary action • everybody can have his/her say
• openness: the participant's readiness to reveal his/her own position to his/her partner; his /her ability to accept the partner's position	• the speaker pays attention to his/her companion's point of view, even while pursuing his/her own agenda • acceptance of difference; "cooperation" (solidarity)	2 The Rule of Involvement • the ability to understand the others' thoughts and emotions • the ability to reject one's beliefs and participate in the dialogue with commitment
• relationships based on confidence, sincerity, sympathy • equality: emphasis on the bilateral, reciprocal nature of communication • the ability to listen to the communication partner	• the speakers struggle to keep the channel of communication open in spite of or because of the ideological differences they recognize and maintain between them	3 The Rule of Reciprocity • mutual respect and caring
• mutual appreciation of the other • the communication partners are closely drawn to each other • seeing the other as a goal, not as a means	• genuine interest in exploring the intentions, frames of reference, and reactions of the other participants in the dialogue	4 The Rule of Sincerity and Honesty
• different views contrasted	• reflecting upon dialogic experiences	5 The Rule of Reflexivity • aiming at a better understanding of one's beliefs as well as those of the others'
• different opinions voiced in polyphonic communication, based on the principles of dialogue	• faith in the willingness and ability of people to bring about change through dialogue	
Kitaigorodskaya 1992, 156–163; 1991, 4–6	Kramsch 1993, 13–33	Huttunen 1995, 5–14

Citing Attinasi's and Friedrich's (1994) reflection on the nature of anthropological fieldwork, Kramsch (1993/1994) describes two sorts of dialogues that take place between ethnographers who attempt to describe and interpret the culture of a people's speech community and the people from that community, as well as in educational settings.

> "On the one hand, there are the 'relatively repetitious, formulaic, routine, even banal and vacuous sorts of dialogues that make up the great majority of conversations... These ordinary dialogues serve mainly to maintain a status quo in friendship, families, and neighborhoods'. On the other hand, there are memorable dialogues that Attinasi and Friederich call 'catalysts of change between dialoguing imaginations'; these dialogues elicit a 'fundamental realignment and re-evaluation of psychological values in the minds of the interlocutors. They cannot be pre-programmed or prefabricated. Their meaning is hardly or rarely realized at the time but emerges dynamically as they are ruminated on, reduced, expanded, re-actualized, and re-represented, often with reversal or slowing down of tempo, and otherwise transformed through subsequent imaginings'. Attinasi and Friedrich call such dialogues 'life-changing dialogues'."
> (Kramsch 1993/1994, 28–29)

What Bakhtin says about the world of Dostoevsky's novels describes well where these "life-changing dialogues" may and, according to my experience, do lead to the dialogic learning environment: From the point of view of consistently monologic visualisation and understanding of the representational world, the world of dialogue may seem chaotic and disorderly, and the participants in their knowledge building may feel like "some sort of conglomerate of disparate materials and incompatible principles for shaping them" (Bakhtin 1984/1997, 8). The polyphonic chaos is strengthened by the fundamental open-endedness of dialogue, both internal and external. The example of a truly polyphonic novel is *The Brothers Karamazov*, says Bakhtin, but "precisely for that reason, from the ordinary (that is, the monologic) point of view, the novel remained uncompleted" (Bakhtin 1984, 40). But it is precisely dialogue that organises and structures the polyphonic encounter of different "fields of vision". Dialogue, says Kitaigorodskaya, is a tool for organising and structuring the interpersonal process that emerges between the learners, and the learners and the teacher in the teaching–learning process (Kitaigorodskaya 1992, 63–65). We can also refer to Riley (1985, 2; cited in Kramsch 1993, 11) who asserts that discourse is "the process by which we create, relate, organize and realize meaning". All this points to dialogue as the fundamental structuring principle of learning.

The role of the teacher is crucial in bringing about dialogue, creating dialogic communication in the learning community, and for the growth of such a "We" where dialogue reigns. It is the teacher who gives the model of dialogic communication in his or her behaviour. Buber, as Cohen (1983) puts it, is unable to conceive of such a teacher in the role of an altogether uncommitted bystander:

> "He [Buber] cannot accept that aspect of the doctrine of the new education that prohibits the teacher from making demands on the pupil, and limits the teacher's role to guiding the pupil to sources of information and to methods of approach only when the pupil is moved to request guidance. Buber believes that the teacher should adopt the role of critical guide and directing spirit. He argues that in no way can such an approach be regarded as coercive; although the teacher's role is founded on the principle of freedom, his function also expresses a point of view and an orientation." (Cohen 1983, 32)

The teacher as well as the learners must exercise and develop dialogue consciously. This is because a dialogic pedagogy, Kramsch argues, is unlike traditional pedagogy, and asserts:

> "Not only can it not be pre-programmed, but it is likely to question the traditional social and political tenets of foreign language education. Furthermore, it sets new goals for language teachers—poetic, psychological, political goals that are not measurable on proficiency tests and do not constitute any easy-to-follow method. For all these reasons, such pedagogy should better be described, not as a blueprint for how to *teach* foreign languages, but as another way of *being* a language teacher.
>
> By integrating language and culture in this dialogic framework, it provides for the satisfaction of truly educational (rather than merely instructional) objectives, so long neglected in language teaching." (Kramsch 1993/1994, 30–31)

Those who run the risk and commit themselves and their efforts to creating dialogic learning environments in order to appropriate the most powerful human tool, dialogue, and to use it for increasing their subjective knowledge, i. e., Popper's world two, and eventually that of objective knowledge, i.e., Popper's world three, will experience what Kramsch (1993/1994, 30) decribes as "the profound pleasure that comes from understanding and being understood, from discovering multiple layers of meaning and having the ability and power to manipulate these meanings. ... This pleasure is an aesthetic experience that both engages one totally and leaves one totally free in the dialogic experience."

Instead of a Conclusion

"... [That] Theory *Y* is a great improvement over Theory *X*, some other group may disagree. ... You bring them into the discourse and try to achieve a new mutual understanding—Theory *Z*, perhaps—which both groups will recognize as an advance." (Bereiter, Scardamalia, Cassels & Hewitt 1997, 333)

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From Telepresence to Social Presence:

The Role of Presence in a Network-Based Learning Environment

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Abstract

The main purpose of this article is to examine the role of presence in a network-based learning environment. The article first examines and defines the concepts of two different types of presence: telepresence and social presence. In discussing telepresence, the article indicates that the meaning of the term has expanded from first referring to industrial remote control systems to currently also including references to virtual realities and interaction among geographically separated members of a group. Social presence, on the other hand, can be linked to a larger social context including eg motivation and social interaction. Finally, the article gives examples of how social presence manifests itself in a network-based learning environment. It concludes by emphasizing the importance of understanding the inherent qualities of the telematic tools used in network-based learning when trying to foster social presence.

Keywords: Presence, telepresence, social presence, telematic media, network-based learning environments.

1. Defining Types of "Presence"

As the use of modern information and communication technologies in teaching and learning continues to expand, the issue of presence is likely to draw increasing attention.

With the help of such telematic media as email, computer conferencing, videoconferencing and the WWW it is possible to create learning environments which do not require the participants' physical presence. Consequently, teachers who have little or no prior personal experience in telematically mediated learning environments may experience difficulty in coping with them unless they are aware of the existence and the potential significance of presence in such mediated environments that may exclude face-to-face interaction partly or completely.

Why examine the concept of presence? This question has been approached from a theoretical point of view by eg Lombard and Ditton (1997) who, after having extensively reviewed conceptualizations of presence in the literature, have come to the conclusion that research on presence is still in its infancy. On the other hand, several attempts have been made to define 'presence'; the actual definitions or prefixes to the term 'presence' reflect the particular viewpoint from which the issue is being approached. As the use of these various terms may be confusing, it is in place to define and examine the two most commonly used terms more closely, ie the terms telepresence and social presence.

2. DEFINING TELEPRESENCE

The term telepresence has been around since certain areas of industry started to design remote control systems and industrial robots. As explained by Martin (1982), the term telepresence is used to indicate that the operator of a distant mechanism is provided with signals or stimuli which give him the sense, to some extent, of being present where the mechanism is. Consequently, the user of a telepresence mechanism can "work" in another location, while seeing and feeling what the remote machine is doing. Telepresence is particularly useful when working in dangerous places such as mines or underwater or when performing difficult surgical operations.

In current usage, the concept of telepresence seems to have expanded and it may refer to technologically ever more advanced operations. McLellan (1996a), who defines telepresence as a feeling of being in a location other than where you actually are, links the notion of telepresence to the concept of cyberspace and virtual realities.

Another expansion in the usage of the term is adding a human perspective into the earlier solely technological focus. The main contributor to this expansion of meaning has been the Ontario Telepresence Project (Moore 1997), which was a three-year project focused on understanding how the work activities of groups, especially groups separated by distance, could be supported by organizationally grounded media space design. One of the main leaders of the project, Buxton (1993), states, "As we use the term, telepresence is the use of technology to establish a sense of shared *presence* or shared *space* among geographically separated members of a group" (1993, 816). Also emphasizing the human aspect, Mason (1994) in her discussion of improvements to conferencing systems in support of collaboration summarizes them as facilities which enhance the telepresence of the group, that is, the sense of interacting with real people.

3. Towards Social Presence

Biocca (1995), cited by McLellan (1996b), classifies presence into three types: spatial presence, self-reflective presence and social presence. According to Biocca, spatial presence is the sense of presence within a space. This space can be either a space visited via telepresence or a virtual space that only exists digitally. However, spatial presence is not limited to virtual reality applications; a sense of spatial presence can be achieved by eg multimedia applications.

In Biocca's classification, self-reflexive presence refers to the perception that the surrounding environment offers the same responses that one is accustomed to in a "real" environment, eg the trash can, the clocks and hourglasses on the computer desktop. This type of presence can be very subtle, thus presenting a challenge to the designers of graphic user interfaces and computer desktops.

Biocca's third form of presence, social presence, refers to the sense of being present in a social encounter with another person, for instance via a telephone call where two speakers are at different physical locations but can feel fully present with each other in the context of the conversation. As the concept of social presence is of special interest from the point of view of teaching, learning and studying in a network-based educational environment, we will now move on to discuss the concept in closer detail.

4. What is Social Presence?

The lack of sufficient research on presence seems particularly evident in connection with mediated communication in educational settings where the emphasis is on the concept of social presence. The concept of social presence was first introduced as early as 1976 by Short, Williams & Christie, who dealt with the concept from the perspective of social psychology. They defined social presence as a quality of the communications medium itself. Furthermore, they hypothesized that the users of any given communications medium are in some sense aware of the degree of social presence of the medium and therefore tend to avoid using the medium for certain types of interactions; specifically, interactions requiring a higher degree of social presence than they perceive the medium to have. They emphasized the importance of social presence in understanding person-to-person telecommunications.

As to the use of telecommunications in education, Mason (1994) describes social presence as the feeling that the people with whom one is collaborating are in the same room. McIsaac and Gunawardena (1996), on the other hand, define social presence as the degree to which a person feels "socially present" in a mediated situation, linking the issue to a larger social context including eg motivation, attitudes, social interaction and social equality.

Furthermore, Garrison (1997) considers social presence an important concept in understanding social context and creating a social climate for instance in computer conferences. He associates social presence with the degree individuals project themselves through the medium, which can be done verbally or nonverbally.

Garrison's considerations raise an important question: how does social presence actually manifest itself in a network-based learning environment? Some examples of such manifestations will be provided in the following chapter.

5. Examples of Social Presence in a Network-Based Learning Environment

The examples of social presence presented below are drawn from a course which the Department of Languages at the Helsinki School of Economics and Business Administration (HSEBA) launched in January 1996. The course in question was a new English course called Environmental Communication, which had two main purposes: first, to develop the participants' presentation and argumentation skills in English, and second, to give the participants insight into the problems related to companies' environmental reporting and communication.

The course, currently a regular part of the department's teaching programme, took place in a network-based learning environment, utilizing in addition to a few face-to-face sessions, such telematic media as email, computer conferencing, videoconferencing and a course site on the WWW. Two groups geographically located in different parts of the country took part in the course: one group of ten business students from HSEBA and another group of ten engineering and business students from the Lappeenranta University of Technology. The two groups communicated with each other via computer conferencing and via three one-hour videoconferences held between the groups during the courses.

Before launching the new course, the department had had some prior experience in using email and computer conferencing (eg Tammelin 1993) and a WWW–based course site in its English courses, but adding videoconferencing to the course design was a new dimension. In the design of the WWW site, the human aspect was emphasized. For instance, at the beginning of the course, the participants' home pages were placed on the course WWW site. Many of the HSEBA students mentioned in their final reports that they considered the idea of home pages a very good one because it gave them a chance to learn more about each other, particularly about the Lappeenranta students.

Furthermore, besides the threaded discussion forums focusing on the actual content of the course, there was also a café conference for social interaction. As the course leader, the writer of this article was aware of the fact that such a discussion forum does not necessarily function by itself; therefore the course assistant, a student at HSEBA, was assigned the special task of monitoring the café conference. If the discussion seemed to be drying out, her task was to try to initiate a new thread. In my role as the teacher, I also made an effort to keep the discussion rolling although I tried to refrain from taking any obvious moderator role.

The main purpose of the café conference was to establish a space where the participants could demonstrate their own social presence and sense the presence of the other participants. For instance, Feenberg (1993) states that the café conference has become commonplace in online educational programs. He also argues that through a café conference participants feel fully represented as human beings on a system that welcomes them in this way, rather than excluding all but their professional contribution.

During the course the café conference seemed to fulfil its purpose as shown by the following extract from a HSEBA student's final course report.

Example 1

> "Naturally the cafe was the most popular forum. It was a great idea to start this kind of discussion space so that everybody could say something, anything, because that really played a major role in creating the common atmosphere of this course."

It was also evident that some students contributed to the café conference much more often than others. There may have been simply technical reasons for it; during the semester when the first Environmental Communication was run there were particularly many technical problems regarding accessing the internet connection in the student network system. Many of the HSEBA participants complained about the technical problems and reported their frustrations either to the course assistant or myself.

On the other hand, the number of visits to the discussion forums may have also been related to the personalities and communication styles of the students; some students simply seemed to appreciate communicating in the written text-based environment more than others. One particular example of the impact that participating in a written text-based environment can have on a student was evident. The highest number of messages sent to the discussion forums came from a student who was the quietest member of the HSEBA group during the face-to-face sessions and the videoconferences. Through his messages he adopted a very proactive role not only in the content-based discussion forums but particularly in the café forum, thus giving a significant contribution towards creating a positive social climate. This highly analytical student analyzes his course experience as follows:

Example 2

> "My role as a student certainly became more active because of the different learning environment. In my opinion the discussion forums offer the verbally not so talented people a chance to express their opinions as well, and a chance to other people to hear about them. I think that any course that involves self-studying will benefit from a telematics-based learning environment, particularly from the email and WWW. The main difference compared to other courses was that the students could participate in building the course, and in this way it is possible to motivate people more efficiently."

The second example discloses the sense of humor of this same student who seemed quite serious during the face-to-face sessions. It is one of his many messages, whose main purpose was only to socialize with the others. The message is a thank-you note sent to the café forum after the course was officially over.

Example 3

> About teeth
>
> Mon, 29 Apr 1996 12:17:28–0700
> * Messages sorted by: [date][thread][subject][author]
> * Previous message: xxx: "It's snowing again!"
>
> Hello!
>
> First I would like to send a very special thanks to Maija for hosting us after the video conference on Wednesday. And thanks to everyone else too. The course was a huge success.
>
> I had two wisdom teeth pulled out on Friday. The other one needed a surgery (leikkaus) so I don't have to worry about masks this Wappu.
>
> Hoping that the weather will be fine during the next day.
> xxx

It seems that the personalities and individual communication styles of the students had an impact on how they experienced the use of different communication media and the need for physical presence. Contrary to the quiet student who appreciated computer con-ferencing and email so much, there were other types of students whose sense of social presence seemed to arise from the face-to-face sessions and the three videoconferences held between the Helsinki and Lappeenranta groups. In his course report, one such student explained that the positive atmosphere prevailing in the face-to-face sessions and the videoconferences had motivated him to try his best.

Example 4

> "In the planning meetings and (video)conferences the atmosphere was so inspiring and ambitious, that it motivated me to do my best and work eagerly. Participants were very active in finding new information and also informed and helped others to find out more. This forced me to try my best to find material and state arguments for my points of view. In HSEBA group meetings the good spirit showed its presence. Even though discussion was lively meetings ended up in mutual understanding."

Another student also emphasized the importance of face-to-face meetings.

Example 5

> "I feel that at least a few group meetings face to face are needed to create a certain atmosphere. A course where several communication channels are used is very different from a course where only for example email would be used to communicate between the participants. If you never see what the others really look like, it somehow makes it all much more distant and so there will not be the same kind of a connection."

In their final reports, the students were asked to analyze their perceptions of a network-based learning environment. Interesting observations were made by the following student who compares the students' presence in a network-based environment ,"virtual space" as she calls it, with a classroom-based environment, "normal class" as she calls it.

Example 6

> "In the Internet the student can be active or passive in the same way as in a normal class. He can participate in the conversation or only observe the others if he wishes - just like in a normal class. This is quite interesting, as you however cannot see in a virtual space if someone has visited the place or not if that person does not express himself. In a classroom you will notice right away if somebody is not present or perhaps sleeps."

In conclusion, based on the assumption that a positive social environment contributes to a beneficial learning experience, how, then, can social presence be fostered in a network-based learning environment? The examples presented above may give some clues but a more extensive analysis of network-based educational environments is certainly needed.

6. DISCUSSION

As the use of technology in educational environments is not yet as transparent as some innovative educators might like to think, it is easy to agree with the opinions of the many researchers implying that the role of presence in mediated learning environments is significant and calls for further research.

This article has been an introductory attempt to answer that call, by examining the concept of presence and some manifestations of social presence in particular. This attempt no doubt raises more questions than provides answers; therefore this article like so many others also concludes with a call for further research. However, the considerations presented here do raise one important practical implication: how to ensure that teachers and, consequently also learners, understand the inherent qualities of the new telematic media in making the participants feel that they are socially present in an educational setting?

This practical implication poses a challenge for teacher education. In an effort to meet this challenge, Tella (1997) has carried out an in-depth analysis regarding the multidimensionality of media education tools and consequently, the inherent qualities of these tools. Expanding the discussion to include social presence could be the next step.

It seems that in so-called classroom-based teaching and learning teachers who assume that a socially positive climate and a successful learning process are inter-related consider it their natural task to think of ways in which they can create and foster a sense of social presence in the classroom. In a network-based environment, however, it is possible to either overestimate, underestimate or perhaps completely neglect the impact that the use of various telematic media may have on fostering social presence if teachers do not have a sufficient understanding of the inherent qualities of the telematic media used. Nevertheless, it is to be emphasized that it is the presence of the teacher, not the presence of technology, that determines the learning process. As stated by Mason (1994), "As has been underlined many times, it is not the technology but the way it is used, which ultimately affects the learner. A good teacher has presence in any medium"(1994, 34).

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Towards the Recontext of the Virtual School

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Abstract

The increased use of information and communication technologies to establish virtual educational environments has challenged people in the educational field to discuss what it is all about in these electronic creations called 'virtual school', 'virtual classroom', 'virtual university', and so on. In this article we aim to explore the Virtual School concept and *virtuality*, a phenomenon we believe lies behind *virtual*.

The school, traditionally, has been the place where teachers and students meet each other. It has been the setting where the institutional teaching/learning process takes place. We argue that it is time to move from traditional schools towards more diverse and elaborated forms of schooling that we call a virtual school in this article. This calls for considerations of both the context of present school and of the possible contexts, or *re*contexts, of virtual schools. We also argue that the emergence of the virtual school asks for understanding the paradigmatic change within the school institution both on the practical and on the conceptual level. We believe that by examining this phenomenon we can better understand the virtual school and foresee its development in the future.

Keywords: Virtual school; virtuality; information and communication technologies; school; teaching; learning; recontext.

1. From Practice to 'Good Practice'

Etymologically, the verb teach has two primary meanings: 1) to cause to know (how), especially by showing or instructing, and 2) to guide the studies of someone. Thus, teaching always implies acting in one way or another towards someone else. According to Ollivier (1992, 244–245), the teacher's two major professional tasks are to communicate and to organise the activities students are intended to perform. Teaching can be regarded as a symbolic communicative process in which communication is directed towards evoking or eliciting responses from students. The teacher is a person able to mediate the intended meanings. This view emphasises the method of teaching or the how of teaching (Uljens 1995, 16).

The method of teaching can be contrasted with the content of teaching, i.e., with what aspects. According the view the teacher is "a person who knows". In this tradition teaching appears to be more firmly related to the content than to the knowledge of methods. (Uljens 1995, 16–19)

Teaching demands the teachers to be able to translate the ideas of content (what to teach) into practice (how to teach). The practice of teaching means balancing the two so that teachers can organise content knowledge into appropriate ways of teaching. This pedagogical know-how is a sort of pedagogical prerequisite that teachers cannot do without.

In case the two views are not adequately balanced, the situation in schools, as well as in virtual schools, generally reflects 'practice' rather than 'good practice' (Loveless 1995). 'Practice' implies that modern information and communication technologies (MICT) are often used as an addition (simply as adds-on) to the conventional classroom instruction and consequently the practice of teaching will not change. This is because there are strong pressures upon teachers to use MICT in response to the requirements of school authorities, the demands made by parents, and the national policies to promote technology in schools. These pressures can easily lead to a sort 'how-to' competence but simultaneously overlook some characteristics through which MICT can change the practice of schooling for both teachers and students (Loveless et al. 1997).

There exists a danger that the pedagogical nature and salient qualities of MICT can be lost if we have not posed the questions: what pedagogical purposes do MICT serve and how do these purposes differ between traditional schools and virtual schools? Accordingly, in this article, the what aspects of teaching primarily refer to the cognisance of the utility of MICT and their pedagogical applications. It is the knowledge that teachers need when they introduce MICT into their teaching.

'Good practice' does not deal uniquely with practical issues of managing to integrate MICT into the school context. Rather, it also deals with our beliefs and conceptions of what we regard as good and valuable. We agree with Alexander's (1996) model of general pedagogy, according to which 'good practice' is an aspiration as much as an achievement; about dilemmas more than certainty, compromise rather than consensus. In fact, "'good practice' can never be singular, fixed or absolute, a specification handled down or imposed from above (of teachers or students) ... it is plural, provisional and dynamic". (Alexander 1996, 71)

Alexander's notion of good practice is also a related and shared practice: teaching is both conceptually and practically related to students. In teaching the concept of interaction with its various definitions also emphasises this view. As far as MICT are concerned, Hillman et al. (1994) give a comprehensive list of various definitions that consider interaction as the 'fundamental element', 'key to the effective learning', and as 'defining characteristic of education'. In turn, teaching in traditional education is characteristically regarded as an interpersonal and interactive activity (cf. Anderson & Burns 1989, 9–12).

2. CONTEXTUALISED PRACTICE

So far we have emphasised the primacy of practical events and actions in the interactive teaching/learning process. But these processes do not take place in isolation. Rather, teachers and students interact in the *context* of school. Their interactive life in classroom is connected with many ties to the world outside the school system. In fact, the word 'context' comes from Latin *contextus*, which means 'joining together' (Duranti & Goodwin 1992, 4). Therefore, it is crucial to pay attention to the power of context. Goodson & Mangan (1995) argue that we can understand events and develop a theory of events only if we also understand the context and the preactive assumptions that are an essential part of our actions.

According to Seddon (1995), changes in modern schooling are very much of a contextual nature. The *milieu* within which educational practice occurs is shifting considerably. The context of education is no longer anything that can be taken for granted, a background to something else that is more important. Instead, context is now in the forefront and draws educators' close attention. That is why it is largely the context that defines what is 'real' and what is 'relevant' in teaching and learning that take place in schools.

Seddon (1994, 36–37) speaks about practice-based contextualism, in which the relationship between the context and the people involved is understood as an ongoing, complex cultural encounter in which "we chunk up the world as a basis for research and everyday practice ... [and] this chunking up is a procedure shaped by distinctive frames of explanation, both formal and informal" (Seddon 1995, 401). Consequently, every phenomenon can be regarded as problematic. There are a lot of problematic events such as 'education', 'school', or 'virtual school' that cannot be simply observed and understood.

Constructivistic notions of teaching and learning have also paved the way to more extended views on context. They see the context both as actual and symbolic: it is a field for action and the medium within which individuals construct their understandings of the events and actions. For pedagogical practices this extended view of contextuality is worth noting. This stance emphasises that both the actions taken and the symbolic constructs made and used inform each other in order to comprise a larger holistic entity.

3. From Physical Towards Virtual: From Context to Recontext

3.1 Virtual Environments

While continuing to discuss context, we now turn our attention from physical settings to virtual environments. The issue of virtuality is not restricted only to the present era or to the most advanced technology. Quéau (1995, 11, 18) states that virtuality brings us in a new way to the old questions about the essence of reality. The concept of virtuality refers to Duns Scotus, a metaphysician who lived in the

Middle Ages. He used the term *virtualiter* to describe the relation between human experiences and the real harmonised entity of things. Scotus underlined that the construct of a thing does not contain its empirical properties formally (as if one could get information about a thing regardless of empirical observation, but *virtualiter*, i.e. in a virtual way (Heim 1995, 253). Heim speaks of virtuality as a bridge between a given environment and the additions to it by man. When compared to the natural state of affairs, the virtual state incorporates the informal equivalencies. (Heim 1995, 253.) As a metaphor, Heim presents a medieval Scholastic consideration of people as finite beings going on the paths of their life: A finite being cannot see the things clearly that remain behind on the path nor the things that are going to happen after the next step. A divine being, on the contrary, is able to do it. God sees all at once and with a single glance all the paths and their events, gone and coming (Heim 1991, 69).

3.2 Possible Worlds

This interpretation leads us to *possible worlds*. Martin Kusch argues that the model of Duns Scotus deals with the simple idea that we can imagine our present world as an example of another world from what it actually is (Kusch 1988, 15). We can approach possible worlds in differing ways. We might think that they consist of the same elements as our present world. But instead of things being as they are they might be different, but still we could identify the existence of a possible world. There are, however, other approaches where the starting point is not our real world. We can imagine, as Kusch (1988, 39) does, that there are possible worlds which differ in radical ways from our real world. These kinds of possible worlds we cannot necessarily construct in our minds with familiar elements from our world.

Kusch (1988, 40) continues to problematic the question of identities between various worlds: can one person be a member of several worlds? If any detail was different from the way things really are, could we still regard a person as the same person he or she really is? We can also think that a person might belong to various worlds while not being bound with his or her world. The most elegant answer, according to Kusch, to the question of identity between worlds is an intermediate one that would deal with the characteristic properties of both worlds. Even if we might not talk about identity between various worlds, we can, nevertheless, distinguish between essential and incidental properties of these worlds. We might also argue that while belonging to one world only, a human being might still have a counterpart in another world. With Quéau's words we come back to the issue of virtuality. He proposes that virtuality brings people to a different reality which can be rational or irrational, logical or illogical, physical or fantastic (Quéau 1995, 16). In this article, this different reality is referred to as virtuality.

3.3 As If ...

In the previous chapter we claimed that there are different kinds of possible worlds which can be evaluated according to the degree they represent the world familiar to us or how radically they differ from the reality as we know it. In addition to the concept of possible worlds we can also study virtuality through the criterion of *as if*. A virtual world is experienced *as if* it were a real world. There is a certain contradiction between these two aspects: 1) virtuality reflecting a basic reality (an aspect of *as if*) and 2) virtuality representing unknown and unfamiliar but possible worlds. In the following we will look into the processes of simulation using this bipolar approach.

The representation of reality through technology deals with simulation. In addition to the artificial scopes of the real world, fantastic surrealistic environments can be produced with simulation technologies. In post-modern writings, simulations are often regarded as typical features of today's realm of life. Simon Penny (1996) speaks about the second phase simulation, where representation does not concern identical copies but deals with a new construction. Along with Penny (1996) it could be argued that art often imitates nature but claims that on several occasions nature does not lend itself to be presented through art; rather, it makes us reconstruct the organism in question.

Penny (1996 192) also wonders whether it is an artist's aim to simulate a real being or to create a feasible one. Here we go back to the essential properties mentioned by Kusch. Instead of simulations as if taken directly from the actual world, we can produce simulations that contain the essential properties of the things. The result still relates to a basic reality but at the same time it bears new qualities that differ from the world familiar to us. If we continue this kind of theorisation, we find the third stage of simulation where relation to reality tends to vanish, leading to the utmost stage of simulation called *simulacrum*. Baudrillard (1988) finds four successive phases of representation in simulation:

1. It is a reflection of a basic reality.
2. It masks and perverts a basic reality.
3. It masks the absence of a basic reality.
4. It bears no relation to any reality whatever: it is its own pure simulation. (Baudrillard 1988, 170)

3.4 From Decontextualisation to Recontextualisation

As we can see, Baudrillard's picture of simulation is rather discouraging. Our intention, however, is not to investigate simulation and virtual environments as misconstructions of reality but as new possibilities for classroom and school. But indeed, simulation and virtual environments carry an aspect of *decontextualisation* as well as an aspect of *recontextualisation*. In a virtual world, familiar physical, social and cultural contexts of a real world fade away and become replaced by different characteristics that work in a virtual environment. In the following, we will go deeper to this process of decontextualisation and recontextualisation.

In the research on virtual communities, MUDs (Multi-User Dungeons) and MUSEs (Multi-User Simulation Environments) have been a popular theme. For instance, Elizabeth Reid (1995) argues that in this kind of environment the illusion of reality depends heavily on the degree to which MUD mediates between the user's imagination.

> "Virtual worlds exist not in the technology used to represent them nor purely in the mind of users but in the relationship between internal mental constructs and technologically generated representations of these constructs. The illusion of reality lies not in the machinery itself but in the user's willingness to treat the manifestations of his or her imaginings as if they were real." (Reid 1995, 166)

MUDs are "magical, text-based worlds where users can assume fluid, anonymous identities and vicariously experience intriguing situations cast in a dramatic format" (Dede 1995, 48). MUDs are gradually transforming into MUSEs, whose main objective is to share learning within the computer-based world.

It is essential that participants react to each other's acts and that a person's action produce the same kind of reactions as in the real world. Accordingly, we must talk about interaction. It is characteristic for a virtual environment that by acting and by being reacted to a human being can experience that he or she is in this virtual environment. As we saw above, Reid emphasises the users' willingness to treat a virtual environment as a real one and the users' capability to share their imagination with each other. Thus, experiencing the virtual environment as if it were a real authentic environment appears as a contract upon a mutual shared (virtual) reality made by a virtual community. Stone speaks about electronic networks as 'a new manifestation of social space', which can be 'characterised as "virtual" space, an imaginary locus of interaction created by communal agreement' (Stone 1991, 83–84).

When we go to a virtual environment, we step out of our familiar surroundings and cross a border to a strange world. We become estranged from our everyday lives that are replaced by circumstances and activities of a virtual environment. There is a certain aspect of *liminality* here. Thus it is not surprising that virtual environments have been investigated using anthropological ritual research. In his study David Tomas approaches cyberspace using Van Gennep's concept of rites of passages and Turner's examinations of liminality. He quotes Turner's (1977, 97) statement about liminality as 'a realm of pure possibility when novel configurations of ideas and relations may arise' (Tomas 1991, 39). Tomas explains that "... 'jacking in' and out of cyberspace by a way of cyberdecks and matrix simulators suggest radically truncated version of separation and aggregation 'rite'" in which the hardware serves as portal to, and exit from a parallel virtual reality" (Tomas 1991, 40).

"Who are we when we are on-line?", asks Steven Jones in his study of virtual communities (Jones 1995, 15). Indeed, in a virtual environment people are able to change their character, their name, sex, age, nationality, personal history, etc., and even their humanity as the issue of cyborgs suggests (cf. Haraway 1991). As Tomas' ideas in the previous chapter suggested, when attending a virtual world we withdraw from the context of our real life. Our being or existence becomes decontextualised. What comes in lieu of our ordinary existence is the recontext of a virtual environment. The question we should ask is: What is this recontext? It can possibly deal with reversed presentations of reality or endless circles of simulacra as Baudrillard proposes. However, we believe in more logical developments than Baudrillard's hyperreality. Ferris investigated women's online communication. She sees newsgroup discussions as a potential way for women to be emancipated from the gender related communication: "... on-line communities can offer women a unique communication opportunity, allowing for the development and display of a distinct relational and cultural style" (Ferris 1996). Reid speaks about new modes of interaction and new cultural formations in virtual environments. She points to the feebleness of cultural indicators of social position, age, authority and personal appearances in CMC context. Thus, they must be created with virtual replacements (Reid 1995, 166, 182).

Dahlén, Hannerz & Lindquist (1996) have investigated the character of translocal communities based on mutual interaction. They analyse these communities as fields for anthropological research concluding that these translocal fields are not based on a physical environment but rather on a common idea and mutual interests. The existence of a translocal community is grounded on interaction between the participants indicating the common idea of the community. "Social space has replaced physical location as a metaphor where human interactions take place over electronic networks", argues Cutler (1995) and continues: "Through discourse made possible by interactive media (CMC), individuals find or form groups that share interests." He further argues that traditional communities based on location are fading away and distributed communities inhabited by distributed selves of persons in cyberspace keep replacing them. Many regard individualisation as responsible for circumscribing the activities of traditional organisations (school, organisations, and parties) in general. Personal development and growth are part of individualisation, and likewise this is a multilevel and multidimensional way of life, and not sequential, which applied to those generations who conducted their studies in industrial society. The principle is not simply to study full time; it is to study, live, work, and travel simultaneously and multidimensionally. This multidimensional way of life accentuating individualisation takes over younger and younger students, changing their attitudes towards school, university, and studying in general. The synchronised studying and becoming part of the labour market, idealised by the industrial society, is no longer a corresponding goal or norm as it was for the previous generations. All this intricately changes the basic principles of school activity. In fact, there is a strong undertone of existentialism in individualisation: the claim that a person only obtains his *raison d'être* by creating himself on his own, whether in the real world or in the virtual communities.

Hence, what is fundamental to virtual communities is the mutual interests the participants share and the interaction between them but based on individualised. These features are the essential properties that relate virtual communities to the real world. In a virtual environment, however, interaction is likely to become transformed and to reflect the re-context of a virtual community free from restrictions of physical world.

4. Conceptualising the Modern School: Towards a Virtual School

The virtual communities as depicted in the previous chapter owe a lot to the emergence of modern information and communication technologies (MICT), as they have laid the foundation for these virtual communities and in fact for the Virtual School concept we are referring to. In addition, and together with the latest developments in open and distance learning (ODL) tools, techniques and strategies, MICT are changing a lot in the working relationship between teachers and students. We argue that a *radical conceptual change* is about to take place in teaching as a result of the technological shift from traditional educational media, such as books, cassettes and videotapes, towards digital and telematic media, such as email, WWW, videoconferencing, telecommunications, teleservices, educational multimedia, and Virtual School. As early as 1987, Meeks called some of the initial technological approaches a 'quiet revolution', which would only seek access to different levels of education. *We argue that this revolution is already here,* calling for a careful analysis of the teacher's role as a mediator between physical and virtual learning environments. Educationalists have become more cognisant of new virtual learning environments enabled by the emergence and implementation of modern information and communication technologies. Thus, the focus has been moving towards a holistic learning environment. These aspects will be underscored in this paper, which aims to focus on the learning process and on the elements construed in the learning setting with the help of modern technology.

Virtual school is an information system based on new information and communication technologies, which is able to deal with most of the tasks of school without the need for a physical school building. Virtual school, thus, does not exist according to an ontological analysis as a concrete building with classrooms, office rooms, teachers, other staff, or pupils. It can be regarded as a real school, however, as it can support the basic activities of an ordinary physical school as indicated at the beginning of this paper. Virtual school is a logical extension of the use of computers in teaching. (Paulsen 1987; Blystone 1989; Paulsen & Rekkedal 1990; Tella 1992; Tella 1995; Tiffin & Rajasingham 1995) We can thus regard virtual school defined narrowly as by definition approaching the ideas of Illich (1972) about a school without a building but still connected to society. Similar ideas have been presented by Dalin (1989) when imagining the school of the year 2020, and wondering whether the classroom of the future can be limited by four walls, or does the classroom mean the nearby industry, home, the media world, or world reality.

Alvin Toffler (1981) was one of the first to warn that schools would not remain intact under the pressure of an information society. In the 1980s, several futurologists (e.g. Spitzer 1987; Stonier 1988) predicted that the position of school would change so that instead of being at school, students would also study in out-of-school contexts with the aid of interactive video recordings, computer systems and multilateral information nets. These opinions anticipated the emergence of a Virtual School.

In an industrial society, schools and universities were simply regarded as buildings, like factories, hospitals or concert halls. The information society is tearing down the walls of schools; the school is no longer a mere building; it is a learning centre intricately connected with the surrounding society thanks to the various tools of the information society. As a consequence of global networking, schools become part of a network culture, one of the examples of network learning and know-how.

As education in industrial society used to mean qualifying for a clear-cut profession or job in a synchronic period of time, in an information and networking society education is more of an attitude of self-development. The need for lifelong learning is accepted as a fact. This naturally moves the focus from pedagogics, children's education, towards andragogics, adult education. Some of the problems schools are now facing may result from the fact that it has been clinging to its former authority in the eyes of pupils, without acknowledging or yielding to societal change, unable to become an information and networking society school.

The traditional view of school as a central place of learning has lost some of its validity. The increased utilisation of international communications networks, the Internet in particular, at home, work and school, has created a situation where part of teaching and learning has moved outside the physical school. This development has been accelerated by the expansion of flexi-mode teaching in many countries.

Boyd (1987) sees three kinds of new educational opportunities through computer-mediated human communications systems. First, epistemological viewpoints, connected to discursive flexibility facilitated by computer-mediated communication. Second, affiliative viewpoints, which provide learners with new opportunities for peer tutoring and for establishing long-term affiliations between students and their school/ teachers, or among students as well as between various institutes of different walks of life. Third, the physical flexibility offered by CMHC gives new opportunities for students to study in more convenient places and at more convenient times. (Boyd 1987, 150–151)

Independence of time and place and historical neutrality is central to the concept of virtual school. In this paper, virtual school is also extended to cover different alternatives of symbiosis with physical school, not only the virtual school proper. The virtual school can work as a virtual extension of ordinary school or classroom activity, thus enabling new possible worlds and environments of learning. The concept does not thus exclusively emphasise geographic or temporal distance, even though it has to be seen as an implicit potential. The concept of virtual school emphasises collaborative learning and shared expertise as well as students' shared interests in learning.

If we regard virtual school as a symbiotic extension of ordinary school, part of the activities of physical school may be moved to virtual school and carried out there with the aid of information and communication technologies. Conceptually, active utilisation of the new means of communication provided by the new technology approaches the functional core of virtual school.

5. "Traditional" School vs. Virtual School

In the following, we compare an ordinary school with a virtual school. We try to take into account the same criteria we started this paper with when characterising a "traditional" school. Virtual school outdoes the traditional school in organising the students' school work, as it can operate around the clock and in all seasons. According to Rekkedal & Paulsen (1989), virtual school will probably be able to fulfil all professional, educational, administrational and social functions of the school organisation, although some of the tasks of the traditional school system are omitted (school catering, health services, etc.).

Virtual school promotes collaborative learning and it also brings different stages of education closer to each other. More importantly, virtual school can operate as the central communication forum for life-long learning. Virtual school is likely to link experts from various walks of life with the activities of the school, by creating an innovation forum for teachers, students and parents alike, which is expected to intensify collaborative interaction (e.g., Tella 1995, 156–157). According to Negroponte (1991), its independence of time and space is the single most valuable service and product which information technologies can provide for humankind. In virtual school this independence is clearly connected with educational goals.

In addition to virtual school, the same kind of learning environment utilising telematics is referred to as 'electronic education', 'electronic classroom', 'electronic college', 'electronic campus', 'on-line education', 'computer-assisted teleconferencing' (cf. e.g. Harasim 1987, 118; Henri 1992; Hernes & Haugen 1993). The term *virtual classroom* goes back to Roxanne Hiltz referring to the use of CMC "to create an electronic analogue of the communications forms that usually occur in a classroom including discussion as well as lectures and tests" (Hiltz 1986, 95). It appears that 'Virtual Classroom' is also a trademark of New Jersey Institute of

Technology (Harasim 1990, xiii). Paquette, Bergeron & Bourdeau (1993, 642) apply the concept of virtual classroom more widely, extending it to cover tools for facilitating co-operative working, distance use of multimedia documents, and a knowledge-based information system aimed at pupils. Tiffin & Rajasingham (1995, 10) speak of *virtual class* and contend that virtual class(room) is not an electronic simulation of conventional classroom. Tiffin & Rajasingham define their *virtual class* in the following way: "The idea of a virtual class is that everybody can talk and be heard and be identified and everybody can see the same words, diagrams and pictures, at the same time" (Tiffin & Rajasingham 1995, 6). The aspect of community is obvious in *virtual class*. "The virtual class is a meeting place for virtual communities of learners with a shared interest in the same subject" (Tiffin & Rajasingham 1995, 177).

Terminology appears to be still under a debate, though most of the terms refer to similar applications of technology in education. Whatever term we use, it seems obvious that the virtual school concept implies and includes elements, features or characteristics of possible worlds that differ from our real world. A virtual school is not identical with the school we are used to seeing as and taking for a school; rather, *it is this kind of school's possible counterpart*. Based on our arguments earlier in this paper, we find it appropriate to contend that a virtual school or a virtual class(room) includes those elements of school we are familiar with. Yet, at the same time, a virtual school means something more and it brings something extra(ordinary) we cannot expect from traditional school classes. In this anticipation, *virtuality* serves as a mediator between the "old" familiar school and the plurality of possible schools unknown to us.

What was said about the recontext of virtual communities mostly holds true with virtual school as well. The context of physical school and the realm of students' everyday lives become decontextualised. What is left of real life, are the essential qualities of a school: educational needs and interests of students and interaction between all participants pointing to answering these needs and interests (Kynäslahti 1997). This interaction is revitalised with new kinds of characteristics in the recontext of a virtual school influenced by widened spatial and temporal possibilities. As a form of virtual community, there are opportunities in virtual school to develop new kind of "sociality" and new kinds of educational cultures firmly based on the emerging information society and on the new communication culture about to be born. On this occasion, the educational needs of those whose access to education usually is rather limited, including women in many countries, ethnic minorities, and rural people, are fairly likely to become fulfilled or even emphasised (Kynäslahti & Stevens 1996).

6. A New Educational Culture About to Be Born Through Mediated Communication

The virtual interaction as it can be expected to take place in a virtual school is computer-mediated interaction but shared between the participants in the teaching/learning process. We conclude that mediation is a necessary but not sufficient prerequisite that enables the teacher to create a virtual learning environment. The fact remains that the interaction, though shared and therefore serving as a basis for a common experience, is no longer a *hic et nunc* type of interaction, taking place on the spot. In ordinary school classes, interaction is primarily immediate and 'on the spot', often leading to practical or matter-of-fact communication between teachers and students.

In computer-mediated virtual interaction, the communication process is based on a series of individual(ised) and autonomous decisions each participant has to perform in order to follow up what precedes the communication act. Mediated interaction, however, is not a simulation of interaction; it *is* a shared or joint interaction which might result in a feeling of shared expertise in a community of learners. It must also be borne in mind that experiences sensed or felt on the network are far from isolating experiences; rather, they can be exceedingly electrifying and felt as real.

In a virtual, networked communicative interaction, an individual can be more firmly in touch with his or her teacher than in a conventional yet tangible learning situation in a "traditional" classroom. This is due to an enhanced phenomenological-experiential level a learner can achieve from being fully committed to the virtual experience. In short, a shared feeling of expertise or a network-based experience is deeply grounded on the mutual interaction between teacher and student mediated with the aid of modern telecommunication tools.

As Ollivier (1992) put it, all teaching boils down to communication. We believe that a new communication culture is about to be born. It is deeply rooted in transferring and experiencing an enhanced interaction in a socially different habitat based on an information exchange system made possible by MICT and ODL and called a virtual school in this paper. So it is just fair to conclude that the new network-based communication culture is being born on the basic elements of computer-mediated virtual learning environments. Teaching in this new environment means a conceptual enlargement of both time and space, independence of 'hic et nunc' and 'on the spot' but not a decrease of any social dimensions grounded on new kinds of experiential elements that have not been possible before. In short, virtual learning environments imply emancipation from restrictions caused by conventional learning environments that a traditional classroom represents.

7. CONCLUSIONS

From what we have said and from what we have personally experienced we feel tempted to draw a few albeit provisional conclusions.

First, we are witnessing a paradigmatic change in the ways we should or are expected to see our learning environments. The change is radical in many respects. It is not only a pragmatic and tangible shift from traditional in-school learning environments to virtual, out-of-school "recontextualised" social contexts and computer-mediated learning environments represented by the Virtual School concept. It also concerns the existence proper when we take into account all possible worlds created by new virtual environments.

Second, this change is firmly grounded on global networking and more generally, on globalisation. Globalisation in education means not only free access to information and to international communications networks but also to communities of learner, thus leading to a high-profile expansive idea of a worldwide school as a contrast to the traditional school the industrial society thought of.

Third, the change is conceptual as most communication is mediated and human beings are obliged to take the "mediation factor" into account. The medium is still the message, i.e., the message tends to get mediated through the medium used in the communication act. The virtual communities, on the other hand, stand for something extra as far as communication and mediation are concerned. They represent something out of the ordinary, something amplified or intensified, new possible worlds in which people can act differently than they do in the real world. This if anything is bound to change both communication, culture, and school. We believe it is only fair to argue that based on new communication facilitated by modern technology, a new educational culture is being created. Probably we should be talking about a revolution.

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From Cooperative Learning Towards Communalism

Anu Passi & Sanna Vahtivuori

"Any true understanding is dialogic in nature."
(Bakhtin)

Abstract

In this article, we discuss the meanings and relations between cooperative, collaborative and communal learning. We also introduce the Sharans' (1992) Group Investigation model. It is seen as a collaborative learning model and as a step from cooperative learning towards communal learning through collaborative learning. Group Investigation enables a communal scientific inquiry and emphasises social characteristics of the learning process. The theoretical background of cooperative, collaborative and communal learning is also briefly presented.

Keywords: Cooperative learning; Collaborative learning; Communal learning; Communalism; Group Investigation.

INTRODUCTION

New learning models, strategies and skills are considered to be essential for the networked and knowledge-based society. One of the significant changes of the 20th century is that the powers of mind are ascendant over the force of things (Dyson et al. 1994). The on-going intellectualisation process emphasises collaboration and communalism between people. The real *renewal* comes from the combination of network communication, improved software and fast computers, which allows people to work and study together in ways we are not able to analyse yet (Dyson et al. 1994). This combination can generate a new kind of communalism and new communities of learners. Through working and studying together and constructing knowledge together we can challenge the change in post-modern society.

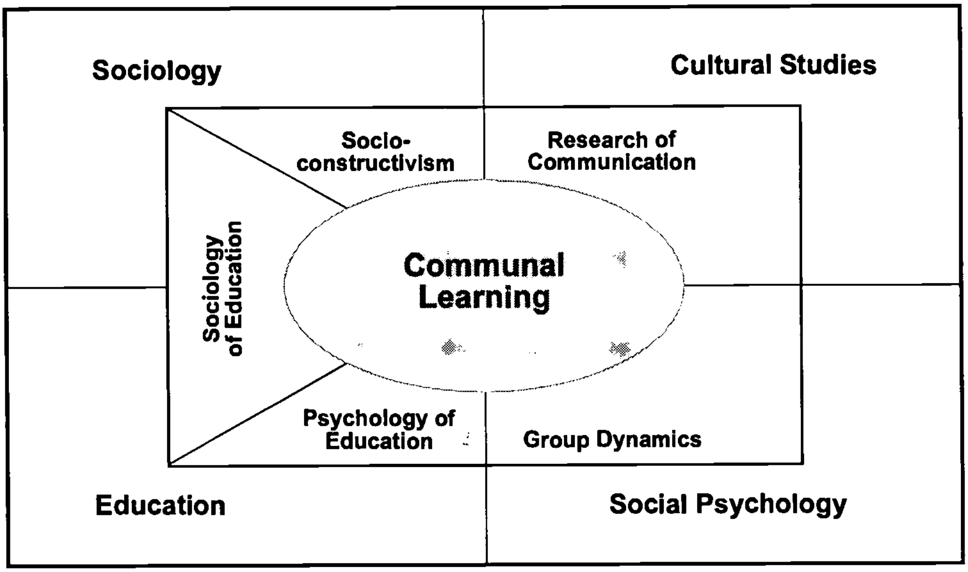

FIGURE 1. The Theoretical Frame for the Concept of Communal Learning is Interdisciplinary.

In this article, we discuss the meanings and relations between cooperative, collaborative and communal learning. Communalism and communal learning are seen as a part of media education research emerging from the interdisciplinary background. Our approach to communal learning is multidimensional and the concept of communal learning is defined in theoretical frame of education, sociology, social psychology and cultural studies. (Cf. Figure 1)

We will also introduce the Sharans' Group Investigation (1992) as a learning model and as a step from cooperative learning towards communal learning through collaborative learning. Our main interest is the combination of collaborative learning and the role of modern information and communication technologies in an open and flexible learning environment.

The Relations between the Cooperative and Collaborative Learning

Some Theoretical Aspects of Learning as a Social Process

Cooperative and collaborative learning are inspired by several theories from both sociocultural and sociocognitive perspectives. Cooperative and collaborative learning are based on a constructivist learning concept and the thoughts of Dewey, Lewin, Thelen and Kolb. According to Dewey (1943) the process of learning in school is a series of social, emotional, and intellectual events. Lewin (1947) has attributed significance to the interaction of people with their surroundings as the key to understanding human behaviour and learning. Thelen (1981) has elaborated the importance for educational and community life of organising groups of people. He forged the link between Dewey's perspective on school and Lewin's social ecology and technology. (See also Sharan & Sharan 1992, 6–9) Kolb's experiential learning model (1984) defines learning as an integrating process including experience, reflective observation, abstract conceptualisation and active experimentation. (Kolb 1984, 21, 42)

Vygotsky (1931/1962) is known for his sociocultural theory of learning. Knowledge, he (1962) claims, is socially constructed and developed through the relationship between all the participants in interaction. Vygotsky's main research interest has been explicating the Zone of Proximal Development. The postulation of the ZPD is that learning is culturally shaped by the social environment in which it takes place. The ZPD is a person's range of learning potential. The role of the teacher as a learning manager who supports and persuades a learner to extend his range of learning potential is important. (Vygotsky 1962; Smagorinsky, P. 1995, 191–212)

Vygotsky's model of learning emphasises the importance of social interaction in learning and the social environment. These are an integral part of the process of cognitive change. An individual has to work with a person or a group, which has a superior ability structure to get to an upper stage of performance. Vygotsky's vision has often been interpreted as suggesting a cooperative environment in which power is productively shared. Students are each other's colleagues and the teacher is a knowledgeable coach. (Tella 1997, 89)

Cooperative Learning

Two paradigms are current in education: the 'instructional' and the 'conversational'. The conversational paradigm can be seen as the basis of the cooperative learning, small-group study, group dynamics and experiential learning. (Romiszowski & Mason 1997, 6, 449–450) Cooperative learning can be seen as a tool or as a didactic means in organising small-group activities. Every group member does his or her own personal task, which usually is given by the teacher. Doing the task supports individual knowledge building. (Johnson & Johnson 1996, 1017–1044)

Various educators and professional literature offer abundant suggestions as to how to establish the cooperative classroom. (See e.g. Cohen 1986; Johnson & Johnson 1996; Kagan 1989; Slavin 1990; Sharan & Sharan 1990; Vähäpassi 1998) Most of these researchers have focused on different aspects of cooperative learning. Some methods are more teacher-directed than others are, although all of them emphasise the active role of the students (Sharan & Sharan 1994). According to Vähäpassi (1998), even if there is variability in cooperative learning methods and strategies, certain similarities can be found. All cooperative approaches are relevant for the background to collaborative and communal learning.

All approaches which are defined as cooperative learning methods should include positive interdependence, face-to-face promotive interaction, individual accountability, social skills and group processing (Johnson & Johnson 1994, 58–59; Vähäpassi 1998). With the help of cooperation and cooperative learning students will learn to have confidence in other people and their work. At the same time the students' self-direction and responsibility for their learning will be developed. (Sharan & Sharan 1992, 22; 1994; Johnson & Johnson 1994) The positive and communicative climate of the cooperative classroom encourages students to work together in small mixed-ability groups and to exchange materials, ideas and information through mutual help and interaction.

Group Investigation as a Collaborative Learning Model

Collaborative learning is based upon consensus building through cooperation by group members. Discussions are one of the most characteristic features of collaborative study. In collaborative learning the focus is on student explication and revision of their beliefs in the context of discourse (Sharan & Sharan 1992; Bereiter & Scardamalia 1993; Olson & Bruner 1996; see also Hakkarainen et al. 1998). Various researchers have tried to define the differences between the concepts of cooperation and collaboration. Panitz (1996) has argued that

> "Collaboration is a philosophy of interaction and personal lifestyle whereas cooperation is a structure of interaction designed to facilitate the accomplishment of an end product or goal." (Panitz, T. 1996)

In our opinion, the Sharans' Group Investigation (1992) is a holistic learning model which can be defined as a collaborative learning rather than cooperative learning method (Cf. Sharan & Sharan 1994; Vähäpassi 1998). Interactive discourse is elaborated in Group Investigation more than in other cooperative methods. Much research and experience show that student talk makes a significant contribution to learning. The Group Investigation is a collaborative model for classroom instruction and school learning that integrates interaction and communication in the classroom with the process of academic inquiry (Sharan & Sharan 1992, ix). Group Investigation can be defined in terms such as parallel aims, responsibility for collaboration, authentic problems, shared expertise and dialogic discussions. In Group Investigation students explore their ideas, clarify them for themselves and to one another, expand and modify them, and finally make them their own.

In Group Investigation the students are called on to use all their interpersonal and study skills and apply them to the planning of specific learning goals. They take an active part in examining, experiencing and understanding their study topic. The students' opportunities to learn by asking questions, to obtain information relevant to these questions and to interpret this information and their experience are maximised in Group Investigation. (Sharan & Sharan 1992) Group Investigation has effects on conducting student discussions in which they elaborate on the subject, challenge and amend one another's ideas, and thus remember these ideas more easily. (Cohen 1984; Sharan & Sharan 1992).

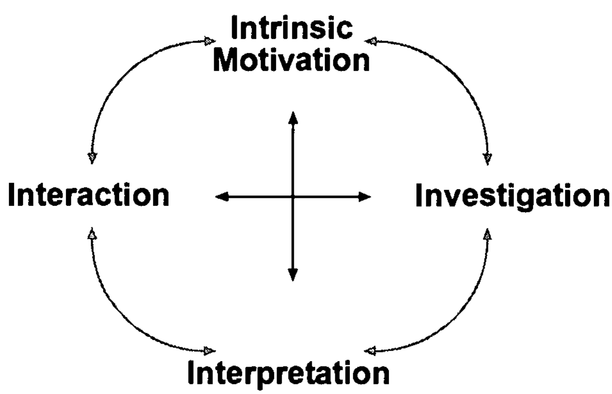

FIGURE 2.
THE FOUR CRITICAL COMPONENTS OF GROUP INVESTIGATION (SHARAN & SHARAN 1992, 18).

Four critical components typifying the Group Investigation approach are investigation, interaction, interpretation and intrinsic motivation. (Cf. Figure 2) They are interrelated and simultaneously present.

1 Investigation refers to the organisation and procedures for directing the conduct of classroom learning as a collaborative process of knowledge building. It is the most general component in Group Investigation. Investigation enables the other three components to take place.

2 Interaction describes the social dimension of the learning process. Interaction among students contributes to their ability to interpret and make the information meaningful. The interaction between peers is important in promoting verbalisation and discussion.

3 Interpretation occurs both at the social and the individual cognitive level. Individuals' understanding of the topic under

study is enhanced by their interpretation of the information. Students transform information into knowledge through interpretation of information.

4 Intrinsic motivation refers to the students' emotional involvement. The goal is to have students become personally interested in investigation. (Sharan 1992, 18-19) Intrinsic motivation can be seen as a consequence of the other three.

Effective investigation and interaction in groups depend on the extent to which students have mastered their social and academic skills. *The social skills play an important role in successful collaborative learning and therefore we argue that they are best trained through cooperative learning.* The teacher has to evaluate the groups' need of help in maintaining effective interaction among its members. Teachers are needed to guide and support their students throughout the process to develop their study and social skills and the learning process. To conclude the teacher's role changes from the sole source of knowledge to tutor, guide and learning manager. (Sharan & Sharan 1992; 1994)

> Group Investigation is a potential pedagogical method in distributing amount of speech evenly among the learners and teacher in classroom. The dialogue concerning the objects of learning is crucial in constructing meanings of the content. Group Investigation is about the creation of knowledge and improvement of learning practices in social groups. Group Investigation is one of the possible models of organising collaborative learning in open and flexible multi-media learning environments.

It establishes a new kind of thinking on the way towards communalism.

IN QUEST OF COMMUNAL LEARNING IN OPEN AND FLEXIBLE LEARNING ENVIRONMENTS

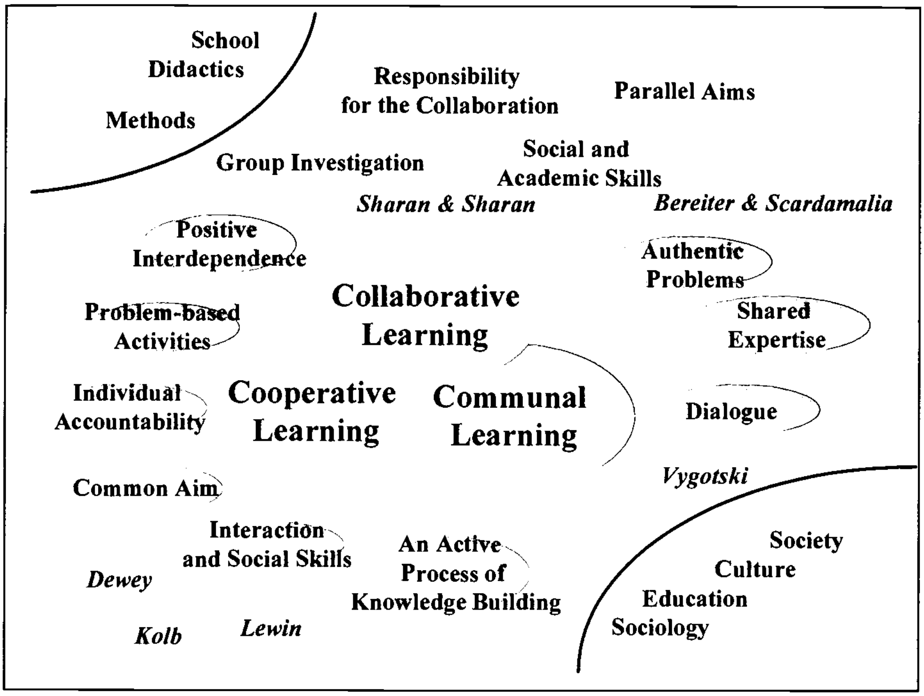

FIGURE 3. THE CONCEPTS TYPIFYING COOPERATIVE LEARNING, COLLABORATIVE LEARNING AND COMMUNAL LEARNING AND THE RELATIONS BETWEEN THEM.

Communal learning aims at creating new models of thinking and constructing new knowledge. In this article communal learning is defined as a higher concept idea of a cluster of related concepts (Cf. Figure 3). *While comparing collaborative and communal learning, the latter can be seen in a broader theoretical and ideological frame, which emphasises the social origins of metacognition: In communal learning the processes of understanding, acquiring, producing, and constructing new knowledge are social in nature. (*Cf. Hakkarainen et al. 1998*)* In learning communities the different beliefs, explanations and arguments will be compared critically and in public. *Communal learning comprises the following components: Students' well-*

developed social skills, intrinsic motivation and commitment to community and complex authentic study topics.

When students' social skills are supported and the teacher gives guidance for collaboration, a classroom can function as a knowledge-building community. It is essential that the emphasis in the processes of scientific inquiry be on the class as a collective, as a real scientific and intellectual community in which students act like researchers. The classroom community works to produce knowledge, a collective product, and not simply a summary of individual work or outputs from groupwork. After Scardamalia and Bereiter (1994), restructuring the school as a knowledge-building community means directing the community's efforts toward social processes aimed at their improvement. Educational technologies should help school to extend knowledge-building communities. (Cf. Scardamalia & Bereiter 1994)

Technology is to provide a facilitative infrastructure in learning. Versatile technology provides learners with a rich variety of real-life communication tools and genuine communication contexts. Such equipment extends, enhances and amplifies teachers' and learners' human resources. Information and communication technologies enable students to comment on each other's thinking and lead to dialogue and an accumulation of knowledge. The technical arrangements allow for small-group face-to-face and telematic discussion and also provide records that bring these to a broader audience. By trying to explain their ideas to other students and interacting with each other, students sharpen their thinking and gain new knowledge. The use of international communications networks, video-conferencing and e-mail have shifted the focus towards open, multimedia-based and holistic learning environments. A variety of systems enable people who are separated from each other by either distance or time to communicate by means of computers and networks. This allows a kind of virtual school. (Scardamalia & Bereiter 1994, 279; Tella 1997)

The learning skills taught in schools must have a life-long value for students. To accomplish this, the school should deploy information and communication technology pedagogically. Open and flexible learning situations will be organised by emphasising the content and communal working methods. Telecommunications should not be seen as either a limiting or dominating element. A well-organised multimedia learning environment offers emotional experiences to support communal learning. (Passi, Ristola & Vahtivuori 1997, 176–177)

Learning can be seen as a process of gaining expertise. When students are on their way to becoming experts they are working at the limit of their competence. This process of expertise acquisition requires social support. (Cf. Scardamalia & Bereiter 1994, 266–273) The school as a learning community should foster all the different competencies of the students, which allows full use of distributed expertise. According to Tella (1997) "the construct of distributed expertise of skills and knowledge ... in communities of learners, helps to develop mutual respect between and among students as they start realising that in order to accomplish shared goals they need each other" (Tella 1997, 77).

In communal learning students are seen as thinkers and experts as well as learners. Learning requires effort and action. Learning does not take place unless the student is actively trying to achieve a cognitive goal. Intentionality in learning is essential for productive learning outcomes. The personal commitment and intrinsic motivation of students are significant elements in the development towards purposiveness. (Also Sharan & Sharan 1992; Olson & Bruner 1996; Kansanen 1997, 38–39) Through meaningful and problem-based activities students' extrinsic motivation can be transformed into intrinsic motivation and successful communal studying becomes possible.

A Dialogue between Theory and Practice

This article is a part of a research and development study of an international EU-project, which was carried out in Kauniainen Upper Secondary School during the school year 1997–1998.

The project aims to familiarise students with the modern open and flexible learning environments and develop working methods, learning processes and international cooperation with the help of the project work and collaborative learning in four upper secondary schools in Estonia, Germany, Holland and Finland. The project is also to increase the appreciation of different cultures and the understanding of the value of intercultural and international communication and to assess the differences in attitudes and cultures of the countries in question. The cooperation with schools offers relevant field for investigating the theoretical models of collaborative learning.

Our study interest focuses on the combination of the collaborative learning and the modern open and flexible learning environments. Research problems include implementing and developing collaborative and communal learning models, perceiving student's role and the use of telematics in Kauniainen project. The objective of the research is to develop collaborative open and flexible multimedia learning environments guided by theory and pedagogical models of collaborative and communal learning.

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The LIVE project —Developing Pedagogical Networking through Teacher Education

Tomi Nummi & Riikka Ristola

"Let's go surfin' now, ev'rybody's learnin' how, come on a safari with me"

- Beach Boys

Abstract

In this article we are outlining characteristics of networking within and between schools. Our main objective is to develop further the theoretic background of the LIVE project, focusing on the networking models in teacher education. On the basis of three different cases carried out in the Media Education Centre during the school year 1997–98, we are introducing a three-level categorisation of networking in teacher education. Teachers having mutual interest, willingness to co-operate and permanent and functional physical networks to enable telematic communication are able to achieve the pedagogical networking level, an open and distance learning environment, where spatially separated learning groups form a co-operative virtual class. The challenge for teacher education is to educate pre- and in-service network teachers of tomorrow with a good command of creating pedagogical networks

Keywords: Pedagogical networking, teacher education, virtual school environments, open and distance learning.

1. INTRODUCTION TO THE LIVE PROJECT

The LIVE project is a three-year research and development project, intended to develop teaching and learning practices in an information-rich and knowledge-intensive virtual school environment with a particular emphasis on mobile communication. This is carried out by increasing the potential for co-operative and experiential learning in teacher education and by using modern information and communication technologies (MICT) in open and flexible learning environments effectively. In this article the theoretical background of the LIVE project is being further outlined on the basis of the first year's findings. Our focus is on one of the two main problem areas, the development of pedagogical networking models for teacher education. A more detailed description of the LIVE project can be found in Nummi, Rönkä & Sariola (1998).

2. APPROACHING NETWORKING

During the last few years the concept of networking has become one of the key issues in the discussion about the development of schools, especially where new media are involved. One of the main reasons for this was the reform of the national curriculum at the beginning of this decade (POPS 1994) which gave schools more freedom to organise their work. It also enabled various experiments in open and distance learning environments with the aid of the modern information and communication technologies (MICT). The role of networking can also be seen as a significant natural continuation of open and distance learning (ODL), which was originally based on the idea of a single learner's opportunity to study independent of time and space. The concepts of co-operative learning and virtual learning communities have also been included in ODL through networking.

Tella (1997, 44–45) divides the networking of the telematic virtual school learning environment into three categories, the micro, the meso and the global levels of networking. The micro level describes social networking between teachers and students. This is above all co-operation between independent individuals with the aid of MICT. The micro level of networking is independent of space; it can be conducted either globally or face-to-face.

At the meso level networking takes place in interaction between schools and/or other organisations and educational institutions. The nature of this networking is both pedagogical and technical. From our point of view meso level networking also needs engagement with the development of both pre- and in-service teacher education. If the learning cultures in schools are to be changed, it will not happen merely through pre-service teacher education. The teachers who have been working in schools for some time should also take an active role in this process. An enlightening example of this is the comparison between the pace of technological renewal and that of teaching staff. A Swedish study estimates that during the next ten years 80% of technology will become old-fashioned while only 20% of the teaching staff will be changed (Lindholm 1998).

The global networking level will permit both individuals and schools to become firmly attached to an open and flexible world-wide learning environment. The LIVE project is researching and developing networking at the micro and meso levels. Our aim is to enhance experiential learning independent of physical distance (Cf. Nummi, Rönkä & Sariola 1998a).

In their classification Helakorpi & Suonperä (1995) also introduce three categories for the networking of schools, called the internal, local and distance levels respectively. As internal networking takes place in team-work and cooperative processes inside the school, local networking is co-operation between the school and its immediate society. The distance network, which is based on creating decentralised clusters of experts using telematic communication, enlarges onto this. The idea of teachers as active members of these clusters introduces the concept of teacher network skills. A network teacher of the future is presumed to master new post-modern network cultures, developed system and future thinking, outlining of values and communication skills. (Helakorpi & Suonperä 1995, 477) The challenge for teacher educators is how to educate students to master these skills and how to evaluate this mastery.

A wide variety of categories are created by analysing different classifications of networking, depending on the point of view from which the networking is being examined. While Helakorpi & Suonperä classify the networking levels of a school by the property of distance, Tella´s viewpoint is more socio-cultural than spatial. Since this article is part of the LIVE project research, we wanted to create a classification of our own to examine networking of schools from a pedagogical point of view, especially through teacher education.

The lowest level of networking is **physical networking**. This includes the technical infrastructure needed for telematic communication based on telephone lines and computers with Internet connections. A more sophisticated environment may include a complex LAN/ WAN network with video conferencing and groupware facilities. More important than the technological progressiveness of this network are the development, maintenance, usability and uniformity of this system throughout the network. No higher level of networking is possible if the infrastructure behind it is unstable or out of use. In Finland we have a very high level of technological infrastructure. The objective of the Ministry of Education is to physically network all schools by the year 2000 (cf. Ministry of education 1995). The physical is more concerned with the maintenance of these systems.

We call the second level of networking **social networking.** It is based on the fact of people knowing each other, having interrelationships and interests in working together. The information society offers people new, complementary communication tools to maintain these relations. Information networks create new types of social structures, virtual communities and means of social participation (Tapper 1998, 4). Social networks promote interaction in telematic networks. The network is a resource to be exploited in the field of education as well.

The third level of networking is an active learning environment, not just a resource. When the interaction in the social network has produced motivation for people to co-operate, we can speak about **pedagogical networking**. It means above all teachers exploiting decentralised knowledge, creating open, distance and co-operative learning environments and being active partners in them. Pedagogical networking is an intentional and goal-oriented activity by means of media education in an MICT-rich environment. Evaluation of different activities, especially learning, is characteristic of pedagogical networking and in that sense it also differs from social networking. One of the challenges of teacher education is to train network educators, virtual teachers who have the skills and abilities in pedagogical networking. In the next section we will introduce three examples of how to implement this in teacher education.

3. THREE CASES OF NETWORKING TEACHER EDUCATION

3.1 LIVE development groups

In this section we will describe the phenomena of networking through three cases. The first is an example of a development group, which started its work during the first year of the LIVE project (1997–1998). The members of this group are all teachers or lecturers at the University training school (an upper and lower secondary school) tutored by the researchers of the LIVE project. The main objective of the work of this development team has been to promote teachers' pedagogical thinking in open and flexible learning environments. Another aim has been to support training school teachers pedagogically and technically when they start using modern information and communication technologies (MICT) in their work. Teachers taking part in the work of the development group have familiarised themselves with the various phases of LIVE working (see MEP6) such as didactic media planning (cf. Sariola 1997; 1998). During the school year 1997–1998 teachers carried out some pilot projects using integrated mobile communicators in their own classes. These projects have been reported to the research group of the LIVE project. The development group has become a part of the research arrangements as well as the objects of the research through these experiments.

From the educational point of view a group of teachers working within one school towards the same set of goals forms the smallest networking unit. The members of the development group establish this kind of network when they plan LIVE working. In the practical implementation of LIVE working the co-operative planning of at least two teachers is needed. The idea of co-operation as a part of networking arises from the theoretical background of the LIVE project (Nummi, Rönkä & Sariola 1998b). In the development group, teachers work co-operatively in a technology-rich environment where planning together is a key issue. Teachers have been able to introduce and develop new ideas together, get support and encouragement from their colleagues and discuss the values of the use of MICT.

A development group is an organic part of everyday life of a school and its developmental activities. Teachers can establish internal networks (local networking) in schools whenever needed. Through these development teams, the value of the most natural basis of MICT-based networking, the colleague next door, is promoted. At the same time, interaction in the networks also promotes new thinking and new innovative activity (Andersson 1994). By means of LIVE working, local networking can be extended to the surroundings of the school. Authentic information is gathered using portable telecommunication equipment, where it is most naturally available—market places, shopping centres, museums, enterprises, universities, etc. The role of experiential learning as a mean of more effective learning is enhanced through networking.

In their self-evaluation reports the members of the development teams wrote that there had been efforts towards networking and co-operation in their teams. Professional development can also be seen through the development of ideas and innovations within the development teams. Working in the group is seen as in-service education, which supports the theory that in networked organisations in-service education increasingly takes place in working places (Helakorpi & Suonperä 1995, 480).

3.2 Teacher training practice

Another example of networked teacher education comes from teacher training practice, where open and distance learning methods have been used by the students as well as in the tutoring process between the student and the lecturer (teacher educator). In this particular example student teachers were physically separated: one was at the Second University Training School in Helsinki and the other one at Kilpisjärvi about 1,100 km north of Helsinki. During the interactive phase of teaching the pupils in both schools networked into co-operative groups using LIVE working. Before the teaching session there was a meeting in which the teleteam of teachers (student teachers, local tutoring teachers and a teacher educator) planned the upcoming work and evaluated the plans using video- and audioconferencing (Ristola & Rönkä 1998). Helakorpi & Suonperä (1995, 482) compares a team of teachers to an amoeba which functions flexibly according to pedagogical needs.

In the planning phase the element of openness, i.e. creating choices for the pupils, was emphasised. At the same time this session was part of a teacher training practice session, in other words a simulation of a real classroom situation. Giving student teachers real experiences in implementing networking and open and distance learning during part of their studies is a key issue in educating teachers to have a good command of telematic communication. In their portfolios students have also brought up the question of time as a key factor of networking. The network established during the teacher training period is a short-term, almost momentary phenomenon, but in the background there is a permanent basic network of teacher education which is constantly maintained.

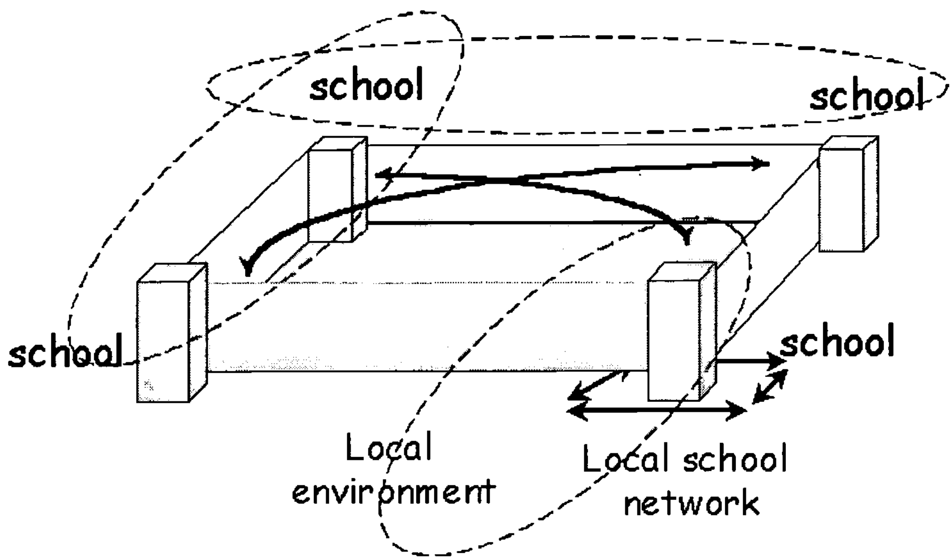

FIGURE 1. AN EXAMPLE OF A BASIC NETWORK OF SCHOOLS.

3.3 An in-service course in media education

The third example of networking in teacher education comes from the area of in-service teacher education. Since autumn 1996, the Media Education Centre has organised a 5 credit (7,5 ECTS) course in media education. The course is financed by the National Board of Education and is free for all teachers working in primary, secondary and tertiary schools as well as in folk high schools or workers' institutes. The main objective of the National Board of Education has been to give the participating teachers the skills and knowledge to work as pedagogical MICT experts in their own schools. In the courses organised by the Media Education Centre, this aim has been achieved by initiating teachers into the working methods of team- and network-based learning and open learning environments and by giving them facilities for telematic communication through co-operative working.

The main core of the course is a 2 credit (3 ECTS) pedagogical project, which is focused on the development of the pedagogical use of MICT in the teacher's own working environment. For this project the participants are divided into tutor groups of around 15 people. In the first tutor group meeting the group is further divided into 4-5 person **teleteams** based on their own areas of interest and the subject of their project. The aim is that in every teleteam there is a pair of teachers from two different schools. This enables creation of a team where teachers will be networked inside their own school as well as between schools.

As mentioned before, every teleteam plans and carries out a pedagogical application related to its own area of specialisation. The subject of this application can be, for example, an analysis of the learning material available on the information networks, production of WWW learning materials, a learning module based on video-conferencing technology, or a research-related analysis of distance education. A teleteam is also responsible for deciding the common objectives, working and evaluation methods and criteria for their project. Every teleteam will get feedback from their tutor as well as from other colleagues in the tutor group via e-mail, a web-based discussion forum and during the face-to-face meetings taking place 4-5 times during the four-month course.

The analysis of the feedback gathered from the participants shows that networking of teachers has been an essential part of their learning experience. Having an opportunity to share one's own experiences, problems, frustrations, successes with colleagues of a similar background has been seen as important. Tutor group meetings have also been important events for getting feedback on one's own decisions and gaining new ideas when listening to and commenting on other people's work. Evaluation of the projects clearly shows that teleteams, which have had clear and common aims and functional communication channels for their project, have been the most successful. The pressure to keep up with the schedule is also stronger, working in a co-operative team where every member has his/her own task to accomplish. One of the biggest problems of the teleteams has been of a technical nature. Members have not had functional e-mail connections or easy access to web-based discussion, so that co-operation has been limited. Problems also arise when a teacher comes to the course without a clear picture of his or her own aims or areas of interest. These teachers might become part of a team whose project does not have a clear connection with their everyday work.

4. OUTLINING NETWORKING IN TEACHER EDUCATION

In this section we will outline networking on the basis of the first-year findings of the LIVE project. In Figure 2 we describe the process and the environment in which networking takes place from the viewpoint of teacher education.

The basis of pedagogical networking is the network itself. One example of this network has been introduced in the previous section of this article. The basic network consists of two to four schools with permanent and effective telematic connections such as Internet access or ISDN-based distance education equipment. A permanent physical network between networked schools enables the development of a temporary pedagogical network around a common theme.

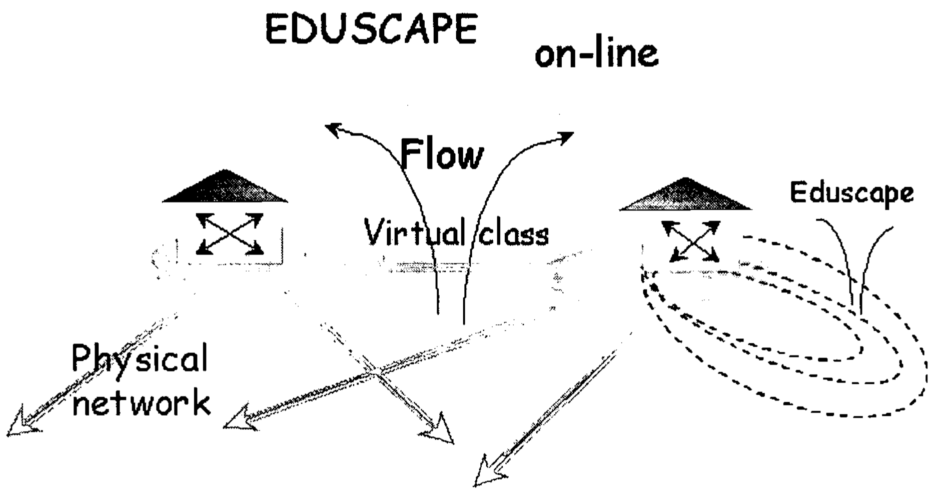

FIGURE 2. The Environment of Pedagogical Networking.

Pedagogical networking is by no means a constant, symbiotic co-operative effort between two or more schools, but rather a temporary but active series of educational activities arising from the willingness to work together. These activities consist of the planning, implementation and evaluation phases of a co-operative learning process. During the planning phase of a common project a phenomenon we call **flow** arises (cf. Figure 2). We do not use the concept of flow to describe an autotelic experience as Tella & Mononen-Aaltonen (1998) referring to Csikszentmihalyi (1988) do, but rather as a buoyant force which gives the learning groups of a decentralised network an experience of virtual co-operation independent of place. Through pedagogical networking the partner schools in a local project can also temporarily be part of a global stream of educational activities that Kynäslahti (in this publication) calls eduscape.

In addition to understanding the structure of pedagogical networking, it is important to consider the teacher's skills and knowledge in relation to the development of the information society. The teacher's network knowledge, which should be developed during pre- or in-service teacher education, forms the foundation of pedagogical networking. Network knowledge can be defined as the teacher's ability to plan and carry out an educational project in open and distance learning environments. To accomplish such a complex task, the teacher also needs to know the curricular content of various educational institutions as well as the characteristics of the various media and how these characteristics effect a learning situation. The teacher's own interaction skills and flexibility in the planning phase are also important. To maintain and to develop the physical network, teachers also need to be familiar with the terminology used in the field of telecomunications and computing technologies. They have to be able to decide which technological choices are suitable for their school. From the viewpoint of administration, networking also requires understanding of the mechanisms of the network economy. Teachers mastering network knowledge can be seen as entities of decentralised expertise, but rather than being individuals, they should be able to combine other expert knowledge (teachers, students, specialists) for the good of their pedagogical network.

To summarise the various aspects of a teacher's network knowledge, it can be said that the most demanding task for a teacher in a pedagogical network is the maintenance of interaction, which should be done at all levels of the network, using various media in a pedagogically meaningful way. The challenge in teacher education is to develop tuition and tutoring skills in a complex, multi-mediated pedagogical network, opening future and in-service teachers virtual wormholes to the global networking level.

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The Role of Distance Education Instructor: Attitudes, Skills, and Strategies

Jusri DeVries & Seppo Tella

Abstract

The role of the faculty member in a distance education setting is an area which has been largely ignored in the past. This must be examined and clarified if the creation of a successful learning environment is the goal. Distance education (DE)—as well as distance teaching (DT) and distance learning (DL)—requires new skills and attitudes different from those required in a "traditional" classroom. Since many educators are unfamiliar with this innovative educational setting, training on both the technical aspects of the system and the strategies for teaching students at a distance would benefit both teachers and students.

BACKGROUND

Although distance education has sometimes been called the poor relation of the education system (Tella 1998), we argue that distance education at its best is an applied field, borrowing from a variety of theoretical frameworks. Although no single, universally accepted definition of distance education exists, most agree that distance education is distinguished from other forms of education by its dependence on some form of mechanical or digital means of communication (Dillon & Walsh 1992; Nummi, Rönkä & Sariola 1998). This difference implies changes not only in our traditional patterns of communication but also in the way in which we organize the function of education. Beaudoin (1990) observes that

> "...the emergence of increasingly student-centered learning activities in the 1970's facilitated by new instructional technology introduced in the 1980's is contributing to a dramatic evolution in teaching staff roles, and raises fundamental questions within the professoriate about how it will contribute to the teaching-learning process in the 1990's and beyond."

Despite the fact that much of the literature on distance education suggests the importance of teachers, this group has been largely neglected by the research (Beaudoin 1990; cf. Sariola 1998). The dominant theme of distance education research has been the learner and the organization; research has focused primarily upon learner outcomes, learner characteristics, and learner attitudes, and, on the other hand, upon the salient features that depict the organization that is in charge of the DE courses (cf. e.g., Tella & Kynäslahti 1998).

From a teacher development perspective, Lindquist (1978) stresses the role of ownership and values and suggests that, for an innovation to be successful, the innovation must fit the local scene and be perceived as belonging to those whom it affects. For this reason, it is imperative that teaching staff be involved, in an active way, with the implementation and administration of a distance education program (Schuttloffel 1994). For many, this will require that they rethink their attitudes about the topic or gain new and needed skills (Cummings 1995).

ATTITUDES

Many researchers have examined and analyzed teaching faculty attitudes toward distance teaching. These analyses include comparisons of attitudes toward distance and traditional teaching, motivations for teaching at a distance, barriers to distance teaching, and the status of those associated with distance teaching (Dillon & Walsh 1992).

In general, these studies report that teaching faculty who teach at a distance are positive toward distance teaching (Dillon 1989; Johnson & Silvernail 1990; Mani 1988; Parer 1988; Purdy & Icenogle 1976; Taylor & White 1991). The report also provides evidence that teachers' attitudes improve as experience with distance education increases, and as instructors become more familiar with the technology and logistics of distance teaching (Gilcher & Johnstone 1989; Kirby & Garrison 1989). Additionally, teaching faculty believe distance students perform as well as or better than traditional students, although the faculty agree that distance teaching is not appropriate for all content areas (Dillon 1989; Johnson & Silvernail 1990; Parer 1988).

Findings by Clark, Soliman, and Sungaila (1985) show higher-level teachers, i.e. senior faculty and professors, find distance teaching both more enjoyable and more demanding than faculty in the lower ranks. When citing the benefits of distance teaching, teaching faculty describe intrinsic rewards such as prestige and self esteem rather than extrinsic or monetary rewards (Dillon & Walsh 1992; Taylor & White 1991).

According to the instructors, the primary benefits of distance teaching include the ability to reach new populations of learners, the opportunity to work with better prepared and more motivated students, flexibility in work schedule, and pedagogical advantages such as the necessity for more efficient organization and the ability to use a broader range of media-based resources (Clark, Soliman & Sungaila 1985; Dillon, Hengst & Zoller 1991; Johnson & Silvernail 1990; Taylor & White 1991).

Although Taylor & White (1991) found educators to be positive toward distance teaching, their study also indicates teaching faculty prefer traditional face-to-face instruction, citing the quality of interaction and satisfaction gained from the act of teaching in traditional settings. Scriven (1986) found that the majority of instructors believe that distance teaching is as important as traditional teaching, but 25 % of the faculty would avoid teaching distance students if they could. Additionally, teaching faculty perceive distance teaching as less rewarding, offering fewer career advantages, and as less scholarly than other teaching activities (Dillon 1989; Parer 1988; Siaciwena 1989; Stinehart 1988). A recent study by Wolcott (1997), based on interviews with faculty members, De program administrators and the chief academic officers at four US research universities, conclude that 1) distance education occupies a marginal status; 2) distance teaching is neither highly valued nor well-rewarded as scholarly activity; 3) distance teaching is not highly related to promotion and tenure decision, and 4) rewards for distance teaching are dependent on the academic unit's commitment to distance education (Wolcott 1997).

As with anything new or different, many have greeted distance education with skepticism and, in some instances, with outright disdain. Some faculty have viewed distance education is a bothersome task that must be dealt with on top of everything else, while others have viewed it as merely a new fad, that would quickly fade into the background as had other instructional technology fads (Schuttloffel 1998). Still others resisted distance education as clearly inferior to face-to-face instruction, due to a lack of knowledge about how to deal with the fact that students are not in physical proximity with the instructor (Cummings 1995). Though things have changed, some of these attitudes still prevail (Willis 1993).

Of course, distance education has its disadvantages. One of these is that initially additional time is required for a faculty member to adopt this teaching method. Since most teachers have not been taught via this method, it is not something with which they have experience. As a result, most instructors need a fair amount of training in order to be able to effectively teach via this method. Lombardi (1994) feels that university education, whether the generic undergraduate curriculum or the most specialized advanced training in scientific analysis, requires little technical sophistication to deliver. He makes a case for universities to use the much touted "information highway" to deal with some of the problems faced by "traditional" education, like lack of classroom space or equipment, the increasing cost of tuition, lack of parking space and the regimented schedule of when education can take place.

Another possible disadvantage concerns the quality of the visual images when using a televised format. A study cited by Weaver (1982) has shown that students expect at least basic production values in courses delivered via televised signals. This means that the visuals must be legible on television, the audio must be audible and the instructor must be interesting. In many cases this also means that the faculty member cannot teach the exactly same way he or she does in classroom and expect to maintain the interest level of the students. Some instructors adapt easily to the television medium but many others simply cannot make the transition effectively without a great deal of preparation and assistance. Towards the end of the 1990s, DE faculty have become more cognizant of the fact that teaching via videoconferencing is an extremely demanding area; it calls for much advance preparation and various ways of activating the students.

In the eyes of many faculty, the extra time commitment may seem to outweigh any rewards gained from teaching distant students. One possible strategy for overcoming negative views and accommodating the additional time requirements of the teaching faculty is to offer incentives such as release time. Willis (1994) notes that as a general guideline, it takes about twice the time to develop a distance delivered course as it does to develop and organize a course for traditional delivery. A possible solution to this dilemma is release time. Willis indicates that "institutions with a commitment to maintaining the quality of distance delivered courses typically provide two to five credit hour releases, or equivalent monetary 'overloads' to instructors charged with distant course adaptation." Even if most authorities admit that extra time is needed in preparing good distance education, few are willing to pay more. In fact, there are cases of teachers' fees being lowered because of DE commitments.

A number of other "rewards" are often noted in discussions of teacher incentives, but probably none is so vital as the issues of promotion and tenure (as in the American system). Here, a difficulty arises. The problem lies in the issue of administrators properly valuing the distance educator. In most academic evaluation exercises an administrator evaluates a faculty member's performance in doing academic activities that are familiar to the administrator. Typical examples are publishing, teaching and research. However, a large percentage of today's university administrators have never taught distance education courses and therefore are ill-equipped to properly assign merit and worth to the efforts of a faculty member who may have redesigned a course to be delivered via the Internet and videoconferencing technology. Willis (1994) notes that as part of the effort to improve teachers and course evaluations of distant courses, some new evaluation methods must be employed. Specifically, he suggests that "rather than rely[ing] solely on paper and pencil evaluation measures, ... teaching faculty review committees should consider using qualitative indicators, such as interviews with distant students and observations of the distant teacher at work." On the whole, the issue of evaluation needs to be reconsidered. On the European level, the ECTS (European Credit Transfer System) is relatively common and widely used within the EU countries. However, there is an urgent need for a VCTS (virtual credit transfer system), as there will be more and more virtual distance education courses accessible. In this respect, co-operation between Canada, the US and Europe would be most natural.

The importance of proper rewards for distance education teaching faculty in the promotion system cannot be overemphasized. For most faculty, tenure and promotion are the goals of their academic efforts. Any activities which are not seen as directly contributing to the attainment of these goals will certainly merit less attention and effort than the more traditionally valued academic endeavors, such as research and publishing. For distance education to succeed in today's university, it is imperative that it be seen by instructors and administrators as an important and valued effort in the tenure and promotion activity. If this can be achieved, distance education will more easily be seen as valuable and worthwhile for educators.

For undertaking such a challenging and time-consuming task, Gilcher & Johnstone (1988) suggest further that faculty members ought to be formally recognized and compensated by their institutions for the first time they develop courses for the telecommunications system.

REQUIRED FACULTY SKILLS

Successful teaching and learning in a distance education setting is dependent upon proficient use of the medium, as well as the 'can-do' attitude of the instructor. It is apparent that distance education requires additional instructional skills not required of most face-to-face instructors. The distance education experience presents both student and instructor with an environment to which neither may be accustomed. Teacher training on both the technical aspects of the system and the strategies for teaching students at a distance would benefit both teachers and students (Gilcher & Johnstone 1988).

A number of studies provide information on the characteristics of instructors who participate in distance education. In a national survey of faculty members who used telecourses, LaRose (1986) found that the majority were full-time and had previously taught one or more television courses. Another survey revealed that the majority of the instructors who were teaching their first telecourses had been at their institutions for six or more years, over two thirds held a master's degree and nearly one third held a doctorate (Dillon 1989). In a 1991 study by Dillon, Hengst & Zoller, 44 percent of the respondent group were from the humanities, social sciences, and natural sciences and 54 percent were from the professional fields of business, education, and engineering (Moore & Kearsley 1996).

In general, data indicate that faculty members who deliver education at a distance are well educated, full-time veteran instructors representing all sectors of higher education from all ranks and from a wide variety of disciplines (Dillon & Walsh 1992). Additionally, in order to enhance the overall teaching/learning transaction, distance education instructors in any medium and at any level of instruction should develop a repertoire of behaviors and skills unique to the distance teaching experience (Moore & Thompson 1990) as a complement to traditional classroom techniques. Bronstein, Gill & Koneman (1982) and Boone (1984) propose the following guidelines, among others, for enhancing the instructional delivery:

- Maintain a natural style of delivery; enunciate clearly and speak slowly.
- Spontaneity; avoid reading from a script.
- Use visuals effectively and frequently.
- Use frequent changes of pace or stimuli to maintain interest.
- Draw participants into discussions as frequently as possible.

Most instructors in general, would recognize these guidelines as those that are very beneficial to creating an effective face-to-face classroom environment. However, in a distance learning setting, these guidelines become requirements if the distance education experience is to be effective. It is worth mentioning that several studies indicated that distance teaching resulted in improved teaching in the traditional classroom. Faculty members cited improved organization and the opportunity to try new teaching methods as positively influencing their classes (Clark, Soliman & Sungaila 1985; Gilcher & Johnstone 1989; Johnson & Silvernail 1990; Parer 1988).

TEACHERS' DEVELOPMENT FOR EFFECTIVE DISTANCE LEARNING

Several studies suggest that the success or failure of technologically mediated educational experiences depends to a large extent on the skill and commitment of the teachers and facilitators who are directing those experiences (Moore & Thompson 1990). In a survey of schools of education and teacher training programs (undergraduate and graduate) Riccobono (1986) examined the extent to which future teachers and administrators are trained in distance education technologies. Results indicated that only 52 % of the institutions offered training in the management of small groups of students using computers, while only 37 % offered instruction in the use of live interactive television for instruction, and a mere 26 % offered courses in the use of audio technologies in instruction.

Research reveals a strong desire among faculty members to receive early, appropriate training for these unfamiliar teaching experiences. (DeVries, Helford, and Rugg 1998). Gilcher & Johnstone (1988) note that the most frequently received suggestion was to provide more training on how to effectively use technology to teach distant students. The literature includes many examples of general and specific guidelines for training teleconference facilitators or teachers. Gilcher & Johnstone (1988) note that the "ideal" teaching/learning environment would provide instructors with strategies for teaching students at a distance and discussion on the planning and management of organizational details involved in distance delivery as well as the technical aspects of the system.

Additionally, teaching staff must have assistance in developing instructional materials. Students are video and audio consumers, contends Weaver (1982), and have been constantly exposed to high quality production. As such they would expect the same production values in a college credit course and could lose interest quickly if the basic production values are not present. One of the initial problems with teaching via videoconferencing still is the poor quality of the picture, even in the best of ISDN systems. Students as well as faculty first need to get used to the "jerky" pictures inferior to the TV picture before they can start coping with the real educational aspects of the situation. Desktop video conference systems are even worse in this respect (DeVries, Helford, and Rugg 1998).

The distance education environment presents instructors with the challenge of managing multiple learning sites. This demands that the distance learning instructor be not only an extremely effective teacher but that he or she also acquire the skills to effectively utilize and manage "facilitators." Willis (1993) notes that facilitators have a role specifically related to the distance education sites, to "set up and troubleshoot equipment, distribute course materials, collect assignments, and proctor tests." The facilitator performs many of the same duties commonly known as teaching assistants, however he or she also "picks up student cues regarding interest, motivation, and performance that are unavailable to the distant teacher" (Willis 1993).

SUMMARY

Several key issues require consideration in the area of instructors participation when planning implementation of a distance education program. These include attitude, incentives or rewards, evaluation procedures, needed skills, and adequate training. Just how important a role does faculty member development play in the success of distance education? The answer can be summed up by stating that the key to success in distance learning is the teacher. If the teacher is good, the technology can become almost transparent. No technology can overcome poor teaching.

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Current Research Activities in the *LUONTI* Project

Jari Lavonen & Veijo Meisalo

Abstract

In this article we briefly describe the starting point and theoretical background of our modern learning environment project, LUONTI (Learning, Understanding and Openness for Nature and Technological Innovations). Our project was founded in autumn 1995 with the view that MICT (Modern Information and Communication Technologies) will lead to a situation, where teaching no longer distributes individual facts, but helps students effectively to collect, process, and evaluate information, as well as to structure large areas of knowledge. In the LUONTI project we are doing research and development work to provide new innovative and versatile materials and equipment for different types of schools. We produce computer programs, interfaces and sensors for school laboratories, teachers' guides, and even some textbooks for schools. There is also an in-service training programme for teachers where the new versatility of our approach is demonstrated.

We have also started the evaluation part of the LUONTI project where new materials are tested in different schools. As an example we present in this article one active research project in the LUONTI project. In our Get Electronics Project, the GEP, we developed new approaches to teach and learn the basics of electricity and electronics in Finnish upper comprehensive schools. In the project, our aim was to support science and technology teachers in three main areas: (i) planning and implementing courses in the basics of electricity and electronics; (ii) preparing study materials including a kit for

experimenting with electricity and electronics; and (iii) developing modes of interaction between industry, and science and technology instruction in schools. In this paper, we also analyse the effectiveness of the project, that is, whether those 120 teachers taking part in the project actually arranged courses using the themes, and how the teachers appreciated our co-operation with industry.

1. STARTING POINTS OF THE *LUONTI* PROJECT

New technologies provide a whole range of opportunities to renew and develop teaching. However, there are few possibilities to persuade major producers of software and hardware to take into consideration the demands of pedagogical aspects and the issues of good school practice in the development of new products. We have found it necessary to get ourselves involved even in research and development work directed to augment the possibilities of modern learning environments to enable the students to grow to adults, who are creative, innovative, and co-operative members of society.

When we reflect more closely on the starting points of the *LUONTI* project, we come to the conclusion that its roots are deep in our experiences in science teacher education. Jari Lavonen has been working as a lecturer in physics and chemistry in the Teacher Training School and as a lecturer of education of physics and chemistry at the Department of Teacher Education for more than ten years. Veijo Meisalo started his scientific career as an experimental physicist and his work in teacher education began almost three decades ago. He first worked as a lecturer and as a temporarily appointed professor at the department of Physics, University of Helsinki. In 1976 he was appointed an associate professor at the Oulu Department of Teacher Education, University of Oulu and from the following year at the Department of Teacher Education, University of Helsinki. He has worked also as Head of the Department of Teacher Education and as Dean of the Faculty of Education at the University of Helsinki. Both of us have been active in producing teaching materials for schools as well as for teacher education.

The role of student laboratory work in science teaching was studied from the beginning of the eighties at the Department of Teacher Education (see e.g. Meisalo et al. 1990). The goals of the school curricula as well as the interactions in the teaching-learning situation were analysed, the main emphasis being, however, in the development of evaluation methods of student practical work. While the experimental nature of sciences was considered to be most important, the promotion of a wide spectrum of models of teaching in school practice was set as the goal of the *FINISTE* network (Meisalo & Kuitunen 1990). Both Lavonen and Meisalo were active in this project, which was organised as a national branch of the *UNESCO* network *INISTE* (International Network for Information in Science and Technology Education). The development of school oriented approaches to creative problem solving was one of the valuable outcomes of this project (Sahlberg et al. 1993; Kuitunen & Meisalo 1996).

Educational technology was a topic of interest as early as the 1970s, when Meisalo was a member of an expert group of the Council of Europe. The aim of the group was to develop co-ordinated production of 8 mm teaching films for school physics. When Lavonen started his work as a teacher of physics and chemistry at the Second Teacher Training School of the Department of Teacher Education, it became obvious that new technologies could be applied more effectively in science teaching than what was possible with any commercial apparatus available to us. This was actually the decisive factor for the research and development work that gradually led to the *LUONTI* project.

The instruction of science and technology in general education has been under intensive development during the 1990s in Finland as well as in most other countries (see Black & Atkin 1996). According to opinions expressed by *OECD* countries and our private sector, general education in mathematics, science, and technology has a vital role in promoting further national innovations and securing competitiveness.

The tradition of the Finnish curriculum system has been centralised so that for any essential local amendments to the National Curriculum the school had to apply for a permission of national authorities. In the reform that was introduced with the Finnish National Framework Curriculum in 1994 (National Framework Curriculum 1994), planning, implementing, and evaluating school instruction were decentralised to schools and to the teachers' level. We were active in the planning workgroup of the National Board of Education making preparations for the reform (Meisalo 1994). The new more open curriculum has made it easier to implement different educational innovations on the school level. The curriculum guidelines for natural sciences in Finland emphasise an experimental or perceptional approach as a starting point for learning. According to this, the teaching of natural sciences and technology should proceed from making observations and measurements towards forming concepts, principles and laws. It was within these criteria that computer programs, hardware and sensors were developed during the *LUONTI* project. The current curriculas guidelines offer a good starting point for individual schools to allow the experimental approach to lead their own development work.

Over the last few years many studies have been made on how pupils of different age groups predict and explain natural phenomena (e.g. Driver 1989; Pfundt & Duit 1993). The main result of these investigations is that pupils' conceptions of natural phenomena are markedly different from the concepts, which usually underpin teaching programmes. In order to solve this problem we need teaching strategies which induce students to make changes in their beliefs about how the world works. Such strategies have to address both instructional methodology and content. Some that appear to be effective are already being developed and tested. All these strategies are conceptual change strategies. In our research we have developed laboratory tools which can be used to facilitate conceptual change. We believe that learning is an active process in which the learner constructs his or her own personal world view. What is learned in any new situation depends as much on the ideas the learner brings to the situation as on the learning situation; learning is a result of an interaction between new situations and present knowledge. When pupils use microcomputer-based data acquisition they can easily repeat an experiment and investigate how the situation changes when they change one parameter. They can also easily investigate how their suggestions work in the real world.

According to a modern learning theory the pupil has to construct his or her own personal view of the world (e.g. Treagust, Duit & Fraser 1996, 4). In science teaching this means that we have to use an experimental approach which is the natural way of teaching physics and chemistry. The starting point in teaching is the observation of a phenomenon in nature. After recognition of the phenomenon we can obtain quantitative knowledge of the phenomenon by observation or measurements. Concepts and natural laws can be defined by presenting invariances between entities. The theory and the laws can then be applied when we are analysing new phenomena. The role of the computer in the experimental approach is the data acquisition, graphical presentations, analysis of the data, modelling etc. All these functions help pupils to understand new concepts and natural laws. As pointed out by Kurki-Suonio (1994, 141–146; 252–259; 264–270), it is important to realise that perception of a concept or law is done by the pupil, not by the teacher nor by the computer. Each processual element has to be learnt by the pupil. He has to learn to observe, measure, plan and realise controlled experiments and do experimental research and to conceptualise observations, represent results, interpret, model, predict, etc. Therefore computerisation should not proceed too fast. Only processes already learnt by pupil can be automated without violating natural learning.

The computer is an excellent assistant when we want to increase the number of experiments performed during science lessons. For example it helps in data collection, in the differentiation and integration of data, in the curve fitting of data and in the numerical or graphical display of data. Our software has been designed to help us to present the correlation between entities in many different ways. For example, the graphical display of data or curve fitting helps one to analyse the dependence between variables and formulate a mathematical model or the relevant natural law. When we use computers in teaching, we have to understand that they are not the single solution to better education. We must understand that when we are interacting with nature, the computer is only a tool. In addition we must remember to communicate with our pupils. When we use microcomputer-based data acquisition we save time in our interactions with nature, and we can thus increase human interactions (e.g. Entwistle 1988, 1–6).

Curricular reforms in Finland, technological progress and the transfer of decision-making at the school level, together with the prospects for working life, mean that instruction in science and technology have to be based on new material. Our project plan for *LUONTI* (Learning, Understanding and Openness for Nature and Technological Innovations) was formulated in autumn 1994. The project's objectives are:

- to create learning environments that make use of modern technology and information technology in schools to support pupils in using a microcomputer based laboratory to collect data that are graphed in real time and then to manipulate and analyse them graphically and mathematically;
- to support integration within science and technology teaching;
- to prepare material and equipment for instructing science and technology;
- to develop computer programs, interfaces and sensors for instruction of science teaching, control technology and robotics;
- to develop teachers' inservice and preservice education;
- to develop modes of interaction between industry and instruction in science and technology;
- to investigate what pupils learn in modern learning environment of this kind.

The central principles used in developing the teaching of the natural sciences and technology in our project are based on combining research and development work and teacher education. This work is organised according to the principles of action research. Also some surveys are conducted on the state of the teaching and learning of natural sciences and the practical problems. According to data collected, new goals are placed on the new development cycle for materials and equipment for instructing science and technology.

2. The "Extended Marketplace" Model

The new technology provides a whole range of opportunities to renew and develop teaching. However, reforms should not be made by only considering the terms of hardware and software dealers. Pedagogic aspects must also be considered. The solutions offered to schools must enable the pupil to grow into an adult who can function as a creative, innovative and co-operative member of the work community. One area in our project is to find new ways of exploiting communication and information technology in science and technology education. In our research we feel strongly that the teaching and learning of science and technology should be based on observations and experiments while the computer has to be included as an integral part of the school laboratory. Modern information and communication technologies (MICT) will lead to a situation where teaching no longer consists of distributing individual bits of information, but of showing pupils how to gather, process and evaluate information and identify larger areas of information (Meisalo 1989).

The concept of learning environment was publicly introduced in Finland in 1994. This coincided with a need to underline the new roles of teachers and students: the teacher is transformed from a disseminator of knowledge to a person who rather directs a student's studies; the student, then, was now seen as an active organiser of his or her own structure of knowledge, skills, and personality (National Framework Curriculum 1994). In practice, in school it is the teacher who creates an appropriate learning environment by choosing relevant study materials and working methods. In Finland, decentralisation in education can be seen, e.g., in the fact that no requirements exist concerning the use of certain textbooks approved by an authority. Teachers and students in Finland may quite freely choose, modify, or develop their own study material, and also utilise possibilities offered by modern information and communication technologies. When this happens, the role of the teacher changes gradually, and the role of textbooks probably becomes more akin to that of reference books, the use of workbooks declines, and other teaching materials become more important tools of learning. When we use computers in science and technology teaching the learning environment can be described by the *Extended Marketplace* metaphor to illustrate the pedagogical character of a technology-rich learning environmen. *The Extended Marketplace* is not restricted to a computer, but widens to include Nature herself even outside the school as experienced during field trips and other practical activities and projects. Computers are used as tools, as teachers and pupils work towards defined goals. This model illustrates the possibilities for open approaches and creative problem solving. Pupils and teachers should be free to use a wide variety of instruments and tools for their investigations.

According to this metaphor, openness is possible when teaching moves from a process where the teacher has the main role to one where the pupil may choose between independent work and team work and may help to determine work methods and speed, objectives, equipment and material. The pupil might have at his or her disposal for example a library, a laboratory with measuring devices and a computer equipped with versatile software. The tools for creative problem solving are provided by the learning environment and student co-operation is favoured to take advantage of brainstorming and other dynamical group processes. With the help of a modem or a more advanced data link, international data banks and other source of information may be accessed. In an open environment the teacher is a consultant who guides and supports pupils' learning.

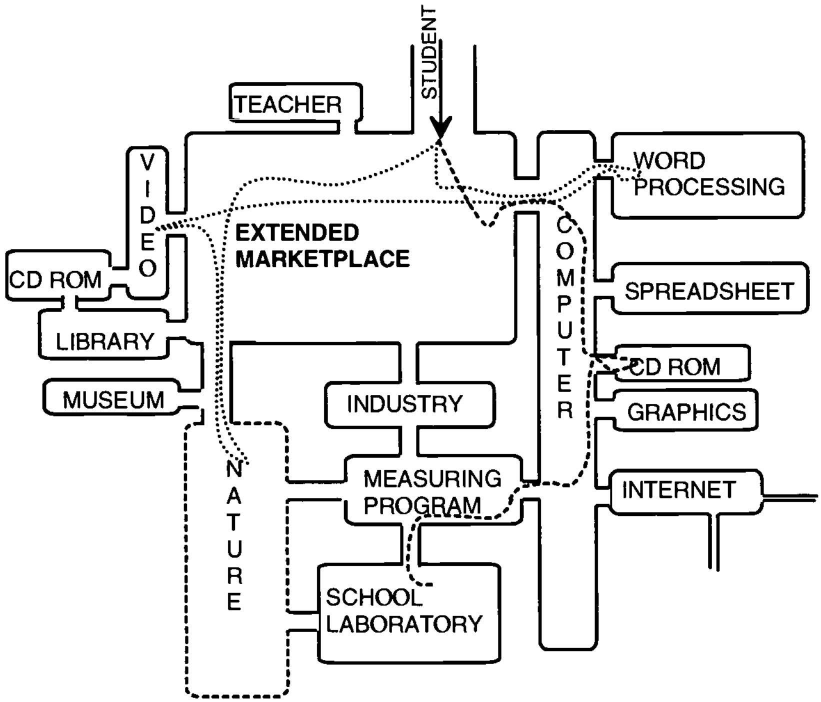

FIGURE 1. MICT IN AN OPEN LEARNING ENVIRONMENT.

Multimedia-assisted means freedom to choose the interaction tools and the approach. The pupil does not need to follow just one path in order to reach the objectives; instead, there are several alternative ways of reaching them.

Figure 1 shows how pupils' paths cross now and then, at which point there is interaction between the pupils. Pupil–pupil interaction is promoted at crossing points, which are formed when more paths are drawn in the same diagram.

The Extended Marketplace Model in Figure 1 helps analyse the use of *MICT* in teaching—for example how they affect work methods and develop the pupil's personality. *MICT* include a wide range of tools and have a central role in the pupil's learning environment where

- the pupil's personality can be developed more broadly by giving students many types of authentic learning experiences,
- learning methods as practical work including laboratory experiments in school laboratory and elsewhere, projects taking advantage of direct interaction with nature etc. become more effective and functions as versatile tools for teachers,
- the pupils get acquainted with *MICT* and modern technology in general, which serves as a window to the advances of technology in science in society,
- the pupils interaction with their social environment (from sports clubs to business organisations) becomes more effective and varied,
- routine tasks are reduced and pupil–pupil interaction is increased while the teacher–pupil interaction becomes more symmetrical,
- connection to data banks, even to remote library sources, to other students groups with similar interests, and to different types of specialists, is made possible through information networks,
- the processing, presentation and evaluation of information is made more efficient, rapid and more versatile,
- integration within science and technology teaching is promoted by teacher co-operation and other teachers are invited to join the effort of activating new pedagogical approaches in the versatile environment.

Instruction in science and technology is typically experimental, and a computer and measuring devices connected to it can easily be used when measuring and processing the results, proposing a model for phenomena and presenting the results. In our project we feel strongly that when we utilise computers in science teaching emphasis has to be put on direct observations and experiments instead of computer simulations. Science teaching should be based on direct observations and experiments whereas the computer has to be seen as an integral part of the school laboratory. Routine tasks in teaching will be reduced, and in class there will be more time for interaction with nature and between the teacher and the pupils. This project aims at finding new ways of exploiting information technology in experimental work. Therefore the *Empirica Measurement System* and *Empirica Control System,* which can be connected to the serial port of a computer, were developed for the project.

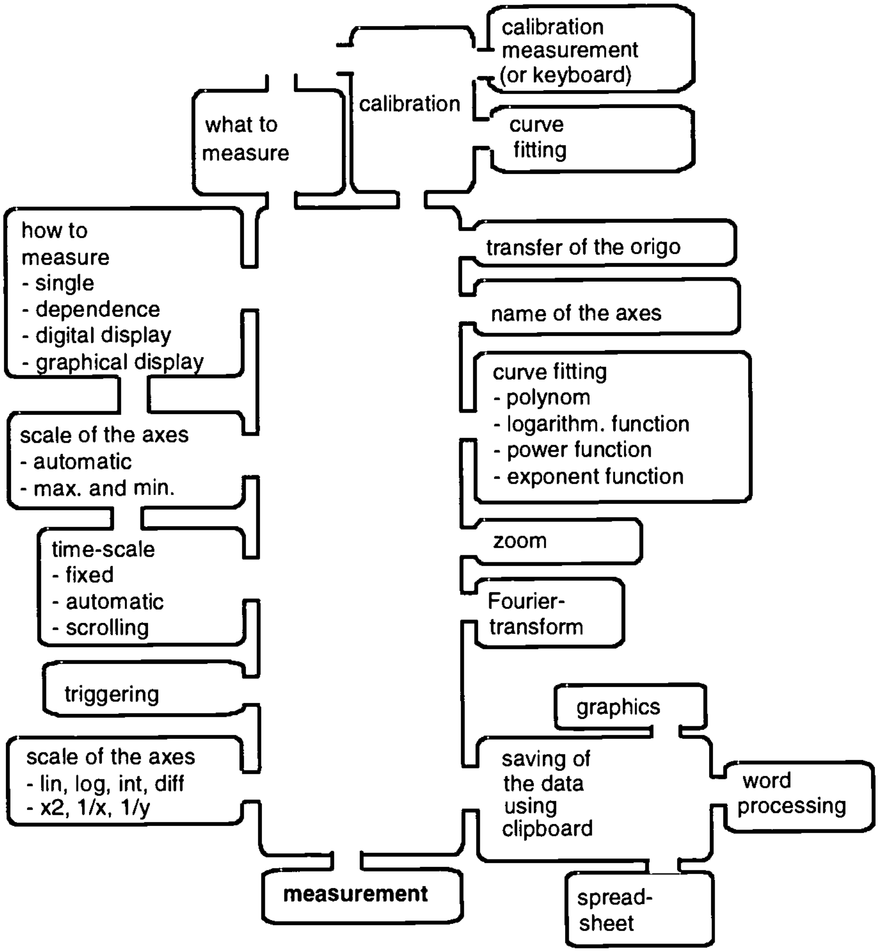

FIGURE 2. THE "MARKETPLACE" AS A METAPHOR FOR DEVELOPING SOFTWARE.

We also used the "*Marketplace*" as a metaphor when we developed our software. Pupils can select tools from pull down menus or dialogues and get the measurements in the selected windows.

3. Science and Technology as Part of General Knowledge

In most cases, objects, phenomena, and structures and systems act as subjects in research of natural sciences. Moreover, the human being tends to consciously utilise natural phenomena. Actually, this tendency began the development of technology. The most central difference between technology and natural sciences is how the study problem is posed. Consequently, a natural scientist will mostly ask why, and a scientist in technology how or what is the use of this. When asking how, a scientist wants to create a technological application and utilise it. Asking why, then, is meant to acquire deeper understanding and a widened view of the natural world. These two modes of questions lead to different interaction or processes between the researcher and the environment. The two modes are also quite different in what makes up their nature and purpose (see Bunge 1983; Kurki-Suonio & Kurki-Suonio 1994, 144–153; Herschbach 1996; Yager 1996).

Traditionally, in Finnish schools, science and technology have been taught in physics, chemistry and technology classes (in Finland the subject "Technology" is called technical work). We analysed the starting points of the *LUONTI* project by considering the prerequisites that could be demanded of general knowledge in a modern society even though curricula in Finland are based on the idea of advancing the personal development of students. According to Harva (1980, 9), the concept of general knowledge can be approached by using three basic questions:

> What is general knowledge?
> What does general knowledge consist of?
> What functions does general knowledge have?

General knowledge may be defined as such knowledge and skills that are essential for everybody to be able to live as a human being and a citizen. Hence, general knowledge should not be limited to academic knowledge but it includes, among other things, social, communicational, and expressive skills. Learning skills have clearly become the central aim in a teaching-learning situation. From the point of view of this study, general knowledge can be illustrated with an advance organiser as in Figure 2 (cf. Hegarty-Hazel 1990, 60–69, 183; Gott & Duggan 1996, 793).

In our project we were interested in developing instruction in science and technology. By developing this instruction, a student's general knowledge in natural sciences and technology may also be advanced. Likewise, his or her skills in processing, presenting, and evaluating knowledge may become more effective. Attaining general knowledge in technology, or technological literacy, is often one of the main goals of technology education (e.g. Dyrenfurth 1996). Study materials developed during the *LUONTI* project, including the hardware and software may develop a student's skills in various ways. For example, working with an electronics project may improve general working skills, social skills, and interpersonal skills. In this context, a skill is defined as expertise, an ability to do something (Hudson 1994, 94). However, defining a skill more generally is quite problematic as there exist several, very different skills—from playing football to the ability to classify or to generalise. In Figure 3, most of the components of general knowledge are presented in a concise way (see also Jarvis 1993, 2; 194).

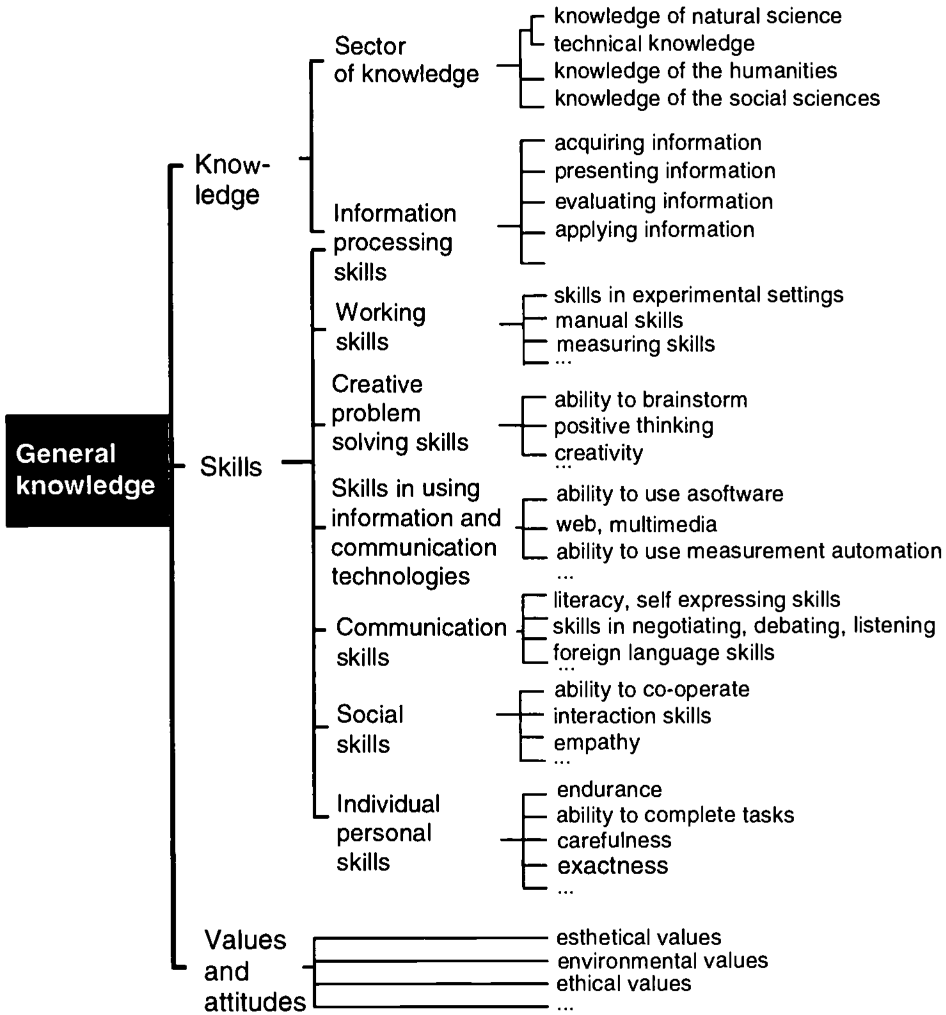

FIGURE 3. COMPONENTS OF GENERAL KNOWLEDGE.

4. INNOVATIONS IN SCIENCE AND TECHNOLOGY

Change, reform, purposefulness, and intentional and systematic planning are typical features of educational innovations. These innovations can be categorised in three groups: (i) introducing new or re-edited study material, (ii) introducing new teaching methods or approaches, and (iii) changing old beliefs in schools (Fullan 1991, 37). According to Fullan and Pomfret (1977, 355-397), factors affecting diffusion of an innovation include, among other things,

(i) characteristics of the reform, such as simplicity vs. complexity,
(ii) diffusion strategies, such as in-service training, resources, and the feedback system,
(iii) characteristics of the beneficiaries, such as the school climate and support by the organisational environment, and
(iv) characteristics of sociopolitical units on the macro level, such as the remuneration system.

Black and Atkin (1996) analysed 23 different development projects in mathematics, science, and technology education in various *OECD* countries. They discovered that school reform and diffusion of innovations are much more complex tasks than they obviously seem to be. For example, even if diffusion of an innovation is successful, the consequences might be unpredictable: the students may become more motivated, and yet learn less; or the teachers may get excited about the innovation, but the students may be against it. Duit and Confrey (1996, 86–87) studied several development projects in science education that were carried out in the framework of constructivism. They suggested that, in practice, teaching and studying science can be improved through developing study material and experimental teaching methods, and, especially, through utilising modern information and communication technologies in as many ways as possible. Another approach that has proved to be useful is creating a totally new construction and structure to replace a traditional curriculum content. An example of this can be seen in teaching the concept of energy.

The instructional materials developed during the *LUONTI* project were based on a thorough analysis of teaching and learning situations (see Roth 1994; Lorsbach & Tobin 1995; Duit and Confrey 1996, 86-87). Developing instructional materials, especially textbook authoring, is often quite unrewarding (cf. Sutton 1989). The schedules tend to be very tight, and there are several stakeholders whose preferences should be paid attention to. In particular, textbooks are criticised for the way they approach a subject, different mistakes in the contents, and logical discontinuity. Arons (1997, 368) sums up this critique as follows:

> "Existing texts were obsolete, full of errors and misstatements, and intellectually sterile. They had been copied and recopied from each other for several generations by authors who themselves did not have adequate understanding of the subject matter."

This kind of critique is fairly typical, but those criticising have seldom been able themselves to present textbooks with a higher quality. In fact, it is short of a miracle that textbooks have not been given more attention during various reform projects although textbooks still play a vital role in teaching-learning situations (cf. Duit & Confrey 1996, 87).

According to Chapter 2 it is thus quite natural to prefer an experimental approach in teaching science and technology because such an approach should enhance learning. The importance of the working methods of experimental science is further verified by the better acquiring of scientific literacy, a better understanding of the experimental nature of natural sciences, and the development of metacognitive skills. Moreover, as a student's skills are trained, his or her attitudes become more positive, and seen from a wider perspective, personal growth evolves. (See Hegarty-Hazel 1990, 3–17). Nevertheless, developing working methods of experimental science and evaluating these methods is not an easy task. Much research has been carried out on working methods of experimental science and their effects on learning in science. Furthermore, various development strategies have been created based on this research (see Hegarty-Hazel 1990; Hodson 1996). Yet, there does not exist a common opinion among researchers about the meaning and importance of the working methods of experimental science such as practical work or student laboratories (White 1996, 761–774).

5. New Tools for Science and Technology Education

In this chapter we introduce two instructional materials developed during the *LUONTI* project. When we use instructional materials in teaching, we have to understand that they are not the single solution to better education. When we use microcomputer-based data acquisition we save time in our interactions with nature, and we can thus increase human interactions. When we have more time for human interaction it is easier for pupils to assimilate physical concepts. We are going to investigate how teacher can increase human interaction for example by the following methods:

- The teacher must learn to ask questions that lead the pupils to fully articulate the interpretations and explanations in their own words.
- The teacher must demand that his pupils describe their observation in their own words prior to using the terms that science has chosen for these same observations and concepts.
- The teacher should ask his pupils to use the concepts in a more extended manner and in new contexts.

- The teacher has to teach basic skills which can be applied to any scientific investigation. These basic skills are: asking questions, observing, classifying, recording, interpreting, analysing, concluding, suggesting explanations, predicting, making test (fair), applying ideas and so on.

5.1 Empirica Control

The main aim of *Empirica Control* for *Windows* -research project is to develop better methods and tools for science and technology teaching. One of the innovations which is used in this research is the *Empirica Control for Windows 95* visual (icon oriented) programming environment. It makes it possible to indicate and control changes in a physical environment by using different sensors and responding to these changes through outputs. Similar products are not available elsewhere.

The main aim of technology education is to give technological literacy to the pupils. The significance of science and technological education is inevitably going to increase. During the last few decades technological adaptations have changed the world faster and more thoroughly than ever before. These fundamental changes in society force the school system to include science and technological education as one of its main goals. There have been suggestions in Finland that technological education should be compulsory for all pupils. This is not just a Finnish trend. In different countries technology education has been adopted in science, design and technology and arts and aesthetics.

It is possible to create with the *Empirica Control* an open learning environment, which gives the teacher and pupils an opportunity to form and solve open-ended questions, where there is not just one correct answer. The completely new feature in *Empirica Control* is its graphical programming language based on icons, which makes programming easier than before. When programming with traditional, command-based languages like Basic and Logo one had to be very careful with the correct structure and spelling of the code. With these types of languages the skill of using the tool, not the problem-solving, becomes the main aim. When programming the user adds icons to the program diagram. All the parameters for commands are set from dialogue windows, which means fewer details to memorise. This is another improvement on text- based languages. The graphic orientation of the language makes the programming more concrete than before. Command icons are linked with lines and structured like a program diagram, a flow chart. While running a program, a ball moves beside the icons indicating which of the commands the computer is currently processing. One can imagine that writing the program is the same as making rules for that blue ball.

The *Empirica* I/O Interface, the *Empirica Control* software and for example the "*LASY*" Robotics Kit is an excellent way of introducing the key concepts of robotics and computer control of mechanisms. The *Empirica Control* software creates a programming environment, where pupils can

- construct procedures to control the movement of the models,
- use digital or analogue input, or the keyboard as the input,
- use digital output, logbook, printer and computer speakers as an output,
- collect and display feedback from several sensors,
- print the created algorithms as simplified flow diagrams for project reports.

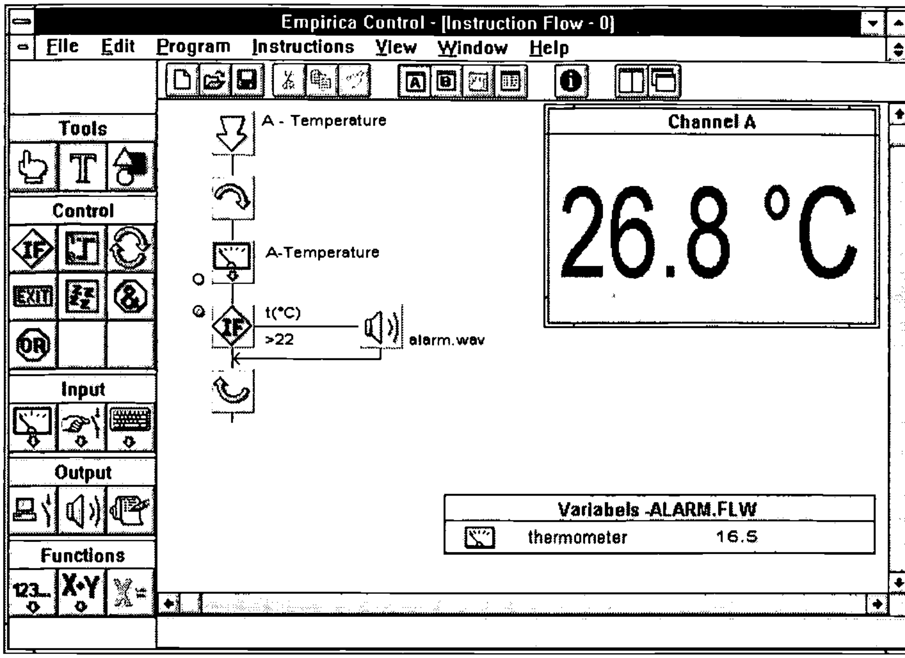

FIGURE 4. A SIMPLE PROGRAM CREATED BY 9-YEAR-OLD PUPILS TO CONTROL THE ROOM TEMPERATURE WITH THE HELP OF THE EMPIRICA CONTROL PROGRAMMING ENVIRONMENT.

Perhaps the most important question in using the open learning environment is how to design proper environments. An open learning environment is a resource for inquiring and experimental education. In our *LUONTI* project we understand that "an open learning environment" is wider than just one computer with suitable programs and devices. An open learning environment is more like "an open market square", where pupils have access to a vast range of resources: a library, computers, nature, a laboratory etc. The main problem to be researched in the primary school is the usefulness of *Empirica Control* (Lattu 1998). The action research method was chosen, because there is little previous experience on how to use *Empirica Control* in real-life technology education. Action research makes it possible to make changes in the material to be learnt and adjust both teaching and study methods. Each action research cycle contains both pre- and post- interviews to find out how pupils' technological thinking has developed during the study period, whose main goal is to make pupils familiar with the model of technological constructions. The research problems directly linked with *Empirica Control* are: 1) What kind of experience are the pupils and the teacher going to get from the teaching periods? 2) Are the pupils able to use the *Empirica Control* during the teaching period? 3) Do the children who have attended the period explain technological processes differently compared to those who have not?

5.2 The Empirica Measurement System

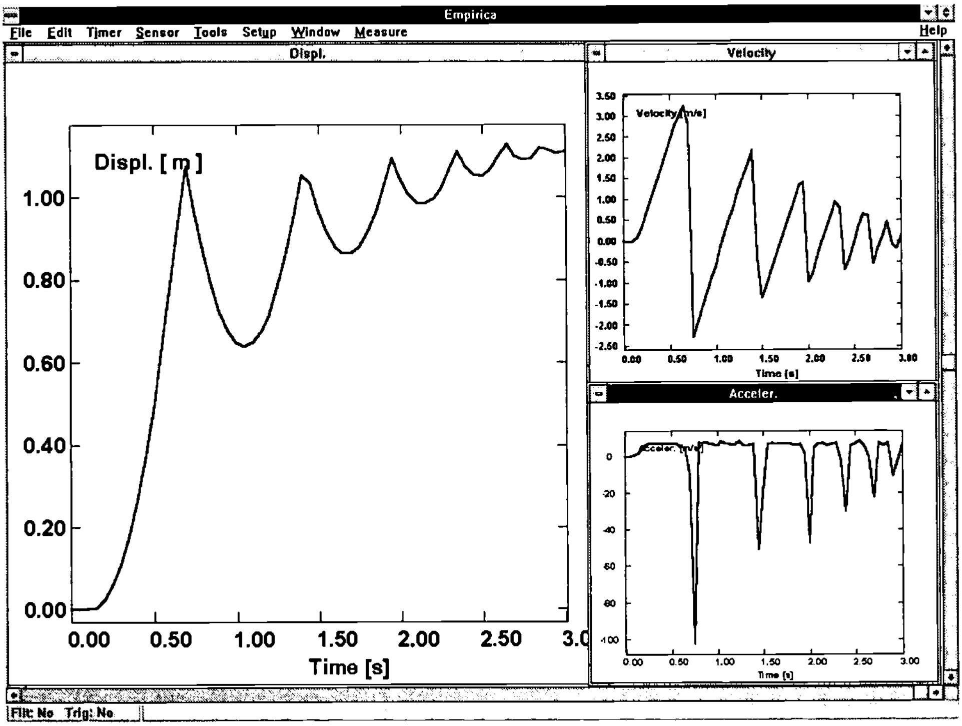

FIGURE 5. GRAPHIC DISPLAY OF THE DATA MEASURED BY A STUDENT IN A SECONDARY SCHOOL.

The present version of the measurement program *Empirica for Windows* 3.1 or 95 operates in a *Windows* environment.

The data is transferred from the measurement sensor to the computer through a two-channel *Empirica Interface* connected to the RS-232 serial port. With the *Empirica Measurement System,* and an appropriate sensor, the following entities can be measured: time, frequency, velocity, acceleration, strain, mass, voltage, current, resistance, electric energy, electric power, temperature, illumination, pressure, acidity (pH), conductivity, oxygen content, absorbance, humidity, the density of a magnetic flux, and number of electrical pulses.

Measurement results can be presented numerically or graphically on the screen, or they can be printed or saved. Files can be transferred to spread sheet or word processing programs. The *Empirica Measurement Program* is available in Finnish, Swedish and English with manuals and tips for teaching. The *Empirica Measurement Program* has a package of tools, which allows:

- the zooming of graphics and the addition of text,
- curve fitting to the data (ax, ax^2, ex, log x, etc.),
- scaling of axes (LOG, INT, 1/x, 1/y, x^2 etc.),
- graphic integration and derivation of data.

The basic configuration of the measurement system can be expanded from two to ten channels. The resolution of the AD converter is 14 bits and the sampling frequency 100 kHz. All 22 transducers in the system are connected to the Interface with one cable and always into the same socket. All the ranges and settings for the transducers are made using the *Windows* program. There are no extra switches and the transducers do not require batteries.

In a study about to be started we are going to develop new models of using *Empirica* in the teaching of chemistry. We believe that learning is an active process in which the learner constructs his or her own personal world view. What is learnt in any new situation depends as much on the ideas the learner brings to the situation as on the learning situation; learning is a result of an interaction between new situations and present knowledge. In chemistry teaching this means that we have to use an experimental approach, which is the natural way of teaching chemistry. The starting point in teaching is the observation of a phenomenon in nature. After recognition of the phenomenon we can obtain quantitative knowledge of the phenomenon by observation or measurements. Concepts and principles can be defined by presenting the collected data graphically. When pupils use microcomputer-based data acquisition they can also easily repeat an experiment and investigate how the situation changes when they change one parameter. They can also easily investigate how their suggestions work in the real world.

The word "experiment" is often used in physics teaching synonymously with practical activity. When we teach chemistry we hope that practical activity leads to better understanding. Practical activity is not pedagogically experimental if pupils do not construct concepts or natural laws. When a teacher is planning a lesson he or she must know how a new concept or law is constructed, how the mind works to process new information, what preconception the pupils have and so on. The role of the computer in the experimental approach is the data acquisition, graphical presentations, analysis of the data, modelling etc. All of them help pupils to understand new concepts and natural laws. It is important to realise that perception of the concept or law is a process mediated by the pupil, not by the teacher, nor by the computer. Therefore computerisation should not proceed too fast. Only processes already learnt by pupil can become automated without violating natural learning.

The main problem in this study is the usefulness of *Empirica* -measurement system in the teaching of chemistry. Again, an action research method was chosen, because it makes it possible to make changes in the material to be learnt and adjust both teaching and study methods. The research problems directly linked with *Empirica* -measurement system are: 1) What kind of experience are the pupils and the teacher going to get under the teaching periods? 2) Are the pupils able to use the Empirica -measurement system during the teaching period? 3) Do the children who have attended the period explain chemical concepts and principles differently compared to those who have not?

6. THE GET ELECTRONICS PROJECT

The Get Electronics Project, *GEP*, was initiated at the beginning of July, 1994 by the Department of Teacher Education of the University of Helsinki, three large firms within the industry, and a council from the science teachers' union and the technology teachers' union. This coincided with the period when the Finnish educational authorities and comprehensive schools in Finland were making their new curricula based on the new National Framework Curriculum of 1994. The following aims were set for the project:

- to develop learning environments for Finnish comprehensive schools using modern technology in concordance with the new 1994 framework curriculum,
- to support teachers of Physics and Technology in planning and implementing instruction in basics of electronics and electricity,

- to prepare study materials including the kit for experimenting with electricity and electronics for individual students to learn the basics of electronics and electricity
- to develop a dialogue between teachers of physics and technology, and the relevant private industrial sector.

The reform that the *GEP* included was planned keeping in mind more general problems related to educational innovations (see Chapter 4). From the very beginning, one of the aims was to create a package of study materials that would allow alternative ways of studying the basics of electronics and electricity according to the needs of individual teachers and students. Furthermore, we endeavoured to promote the use of working methods of experimental sciences as well as project work in this process (see Sellwood 1991). The study materials were planned according to the principles presented in Chapters 2–4. A textbook was published to support teaching and study this content. Moreover, the kit for experimenting with electricity and electronics was manufactured and a teacher's manual for this; these were meant to help the students to learn basic concepts, principles, and skills. The first volume of the textbook was a reference book that included basic information about the basics of electronics and electricity while the second volume consisted of guidance to various experimental student work. The third volume dealt with broader projects, which could be undertaken during classes.

In addition to developing study material, a strategy for innovation diffusion was chosen: we decided to invite 60 upper comprehensive schools to participate in the project. The teachers of Physics and Technology in these schools were given in-service training in teaching the basics of electronics and electricity. They were instructed to use varied working methods and to emphasise experiments and practical work by pupils. The schools were also given 16 textbooks and the kit for experimenting with electricity and electronics for free in order to implement the desired instruction. The training took place during the first stages of the project when the study materials were not yet ready. With the help of this training, co-operation between the participating teachers of Physics and Technology gradually evolved; the first tangible form of this co-operation was that they completed the kit for experimenting with electricity and electronics to suit their instruction. One of the guidelines during the planning stage of the project was that the project should become sequential in order to maintain teacher enthusiasm for as long as possible. In addition to this attempts, were made to prevent possible hindrances to the start of co-operation at the school level by training the participants and providing study material. Also special attention was paid to the diffusion of the innovation so it would be dependent on co-operation between two quite different groups of teachers, namely teachers of Physics and Technology. Hence, supporting this co-operation was emphasised through training and other sustaining measures.

One year after the active part of the *GEP* we made a survey to find out how the desired effects of the project had been realised. In the study, we used an *ex post facto* design with one study group (n = 120) and one non-equivalent control group (n = 120) (Cohen & Manion 1986, 94–118). The design differs from a typical *ex post facto* design as it has a control group. However, with a design like this, finding out whether possible changes in the schools in the study were caused specifically by the *GEP* is more reliable. The difference in sampling methods between the two groups, however, complicates interpretations since only the sampling process used to choose the control group can be considered as purely random. The study group consisted of 60 schools participating in the *GEP* and respectively one teacher of

Physics and one of Technology in these schools. The schools in the study group were chosen using the following procedure: Local clubs of the National Organisation of Teachers of Physics were asked to suggest a couple of suitable schools, which could participate. As a prerequisite, one teacher of Physics and one of Technology in each school had to commit themselves to the project. The control group was formed by choosing at random 60 schools, and one teacher of Physics and one of Technology from each of these schools. Both groups received a questionnaire by mail in mid April, 1997 and a reminder in mid May. Altogether 240 questionnaires were mailed, and 82 teachers, or 34 per cent, returned the questionnaire in time. After the reminder, a total of 134 teachers, or 55 per cent, returned the questionnaire.

It was our intention that it should be possible to increase the internal validity of the study in many ways, one of which induced the most important single means, was using several independent persons as classifiers of the open-ended questions in the questionnaire. These questions were classified by two experts in the teaching of Physics and two in the teaching of Technology; i.e., four independent classifiers were used. The results of these classifiers were compared, and possible contradictory classifications were discussed until unanimity was reached.

6.1 Results

On analysis with the chi square test none of important attribute variables, i.e., professional position, the major subject in the competence profile of a teacher, his educational background, or knowledge and skills in basics of electronics or electricity showed non-significant differentials between the study and the control groups. Teachers in both groups emphasised the importance of studying the basics of electronics and electricity; they saw these studies as a means of enhancing general knowledge. The study group was more unanimous than the control group in making studies in the basics of electronics and electricity compulsory (2 = 10.6**).

Teachers in both groups gave an average of 11 to 20 hours of lessons in the basics of electronics and electricity within the normal teaching hours in their subjects. Although there were no differences in the number of electronic and electricity lessons, the study group of the teachers used more "hands on" methods during their classes. A statistically significant difference between the groups occurred for the number of working methods used in experimental science (2 = 13.0**). A total of 26 per cent of the teachers in the control group had arranged elective courses on the basics of electronics and electricity while out of the teachers participating in the *GEP*, 43 per cent had already arranged these courses. Furthermore, 32 per cent of the *GEP* teachers planned to arrange such a course during the following academic year. In the most favourable case, as many as 30 per cent of the age group of students had chosen this kind of elective course to study the basics of electronics and electricity.

Teachers in both groups were asked to assess how the study material they had been using, i.e., textbooks, reference books, electronics kits, etc., were applied to teaching the basics of electronics and electricity. The study group teachers evaluated the study material considerably more favourably than the control group teachers (2 = 17.1***).

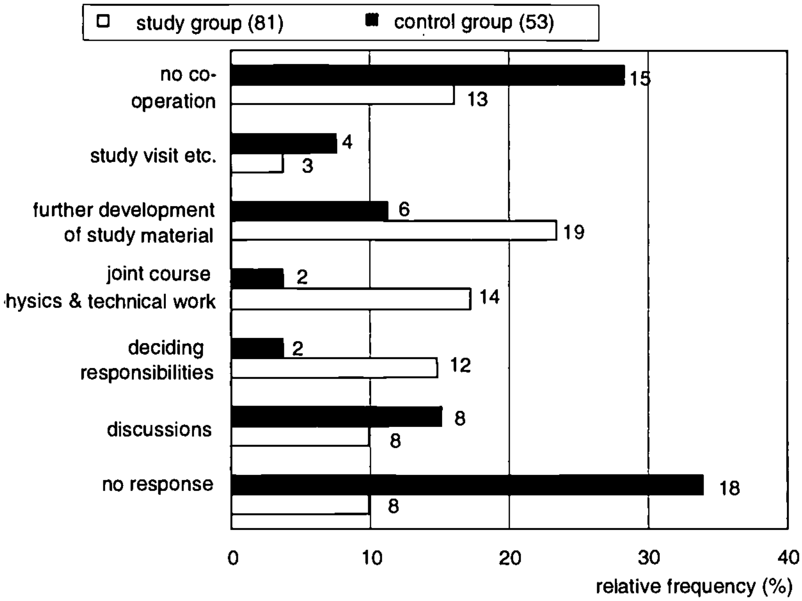

FIGURE 6. Forms of Co-operation between Teachers of Physics and Technology in the Study and Control Groups.

When the teachers were asked what they had done themselves to develop the teaching of electronics and electricity, a distribution shown in Figure 6 resulted. From this distribution one can see that the study group teachers had been more active in reforming their teaching than the control group teachers (2 = 15.0**). It was also discovered that teachers of Physics and Technology in the study group had begun mutual co-operation more actively than in the control group (2 = 23.2***). This co-operation in the study group was essentially more excessive than in the control group (2 = 24.0***). Moreover, the study group teachers were more satisfied with the co-operation (2 = 27.2***). More than 90 per cent of the study group teachers felt that the participation of related industries was positive; the rest of these teachers did not answer this question, or answered that they were not able to say anything about the importance of industry participation.

6.2 Discussion

The results of the study showed that the *GEP* was successful in helping to develop the teaching of the basics of electronics and electricity. The study also confirmed that a reform aiming at promoting working methods of experimental science in teaching will be boosted if the participating schools and teachers are supported by providing study materials including the kit for experimenting with electricity and electronics. Our study supports the interpretation that in everyday school life, teachers do not have sufficient time to create individual study materials or developing hands on equipment for students (cf. Duit & Confrey 1996, 87).

Apparently, consulting the teachers about the possibility to participate in the project at the stage when the course study materials were still under development, was a favourable decision. In this way, the teachers were able to have a say in how they wanted the materials to look. Also, it was very appropriate that the teacher's manual was finished only after feedback from the first pilot phase had been received. This ensured that the problems faced during the pilot phase could be taken into account, and it was possible to include guidance on how these problems could be tackled in the final version of the manual. The study further verified that the most important factors when introducing an educational innovation in schools include: 1) clarification of the aim and purpose of the innovation in co-operation with the users of the materials, 2) further development of the materials in collaboration with the users, and 3) evaluation of the final version of the materials and readiness to continue development.

A reform project as such is not capable of changing school, teaching, and learning—not without teachers and students working together. Nevertheless, new study materials and in-service training may boost this reform and lead to further development processes following the initial reform. One of the key ideas in the project was to leave a proportion of the intended in-service training to be carried out at the school level. The rationale behind this was that beginning co-operation between the two teacher groups would become more natural and genuine. This seemed to be the opinion of the teachers, too, as only 7 per cent of them thought that the training was unfavourable for co-operation. The study also showed that if more than just one teacher from a school, or even a couple of teachers from neighbouring schools, participate, this would be beneficial to the reform project. Social interaction is a characteristic of developmental processes as it is to all types of learning; professional learning and development is co-operative also in the teaching profession.

Finally, the study seemed to confirm that training in a development project is better if it is carried out in two reciprocal modes: distance and contact teaching. This will keep up participating teachers' interest and enthusiasm; and professional learning and developing professional skills might become cumulative.

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On-Line Distance Learning Environment and Tools to Create It:

Design Based on Theory and Practice

Sólveig Jakobsdóttir, Sigurjón Myrdal, Haukur Ágústsson & Nicholas A. Kearney

Abstract

In the 1997 European Commission Multimedia Joint Call Proposal "Educational Bank of Europe[1]", the authors of this paper were asked to develop a new, ideal authoring tool, based on a pedagogical approach as a basis for design, for creating on-line learning environments (the "Network Education Databench"). The proposal was not included in the small percentage of projects selected for funding, but we believe that the rationale for its development is highly valid and that powerful authoring tools are still needed for designers and developers of distance education materials. We also believe that educational needs rather than technological developments should increasingly drive the design of tools for on-line teaching and learning. In this paper, we will outline some pedagogical needs that could drive the design of on-line environments and the development of tools to create them. Such a summary could also help educators select from the range of distance education authoring tools already available.

Keywords: Authoring tools; on-line teaching and learning; distance education materials.

[1] Pétur Thorsteinsson was the main author of the proposal. Pétur is well known in Iceland as an educator but especially for his role in establishing the Icelandic Educational Network in 1992. Its roots go back to 1988, when IMBA, the Icelandic schools computer centre, began operation at Kópasker, in north Iceland where Pétur Thorsteinsson was principal. The Icelandic Educational Network was established primarily to meet the needs of educational institutions and their workers.

PREVIOUS RESEARCH, THEORY, AND PRACTICE

To develop our design recommendations, we explored pedagogical methods described as effective in the distance education literature and methods that have been used successfully in distance education programmes at the colleges and schools where we work[2]. We then decided what types of features needed to be part of the design of an ideal authoring tool in order to provide maximal flexibility for future course producers, teachers, and learners. We especially recommended that tools should enable the use of methods that had been shown to work well in distance education, methods that were supported by learning theories in relation to computer and Internet technologies, and methods that could aid different user groups with different types of needs (e.g., younger as well as the older population and/or the disabled). Our work in this area revealed the following findings with their design implications.

DISTANCE EDUCATION LITERATURE

After an extensive review of the research literature concerning distance education, Schlosser and Anderson (1994) concluded that distance learners had the potential to learn at least as much and as well as learners taught face-to-face and that good distance teaching pedagogy was not in essence different from good conventional teaching techniques. According to Schlosser and Anderson, research clearly showed that distance education was an effective method for teaching and learning. However, based on the

[2] Kennaraháskóli Íslands (University College of Education), Verkmenntaskólinn á Akureyri (Akureyri Vocational College), and Florida Centre de Formació.

review, they advised distance educators to offer students structured notetaking, interactive study guides, and visuals. Furthermore, Schlosser and Anderson described Perraton's synthesis of existing theories regarding distance education. She emphasized increased dialogue in distance education, for example with group discussion and that multi-media programs were more likely to be effective than programs relying on a single medium. Perraton also emphasised feedback as a crucial part of a distance-learning system and that to be effective, materials should ensure that students engaged in frequent and regular activities over and above reading, watching or listening. In another literature review, Threlkeld and Brzoska (1994) concluded that a multitude of studies suggested that the media itself was not as important to instruction as other variables, such as learner characteristics, motivation, and instructional methods. However, they found that support for the distance learner was very important, for example, instructor feedback as well as access to library resources and other supporting materials.

Implications from these findings regarding on-line learning environments include, for example, possibilities for on-line note taking, and easy access to on-line communication between students and between students and teachers (or e.g., mentors). In addition, it should be easy to incorporate multi-media based materials.

In the four years since the above literature reviews appeared there has been an explosion in possibilities of using the Internet and/or hypermedia (especially the World Wide Web) to provide distance learning experiences. In the next part of this section we will discuss implications from theory and research in relation to such technology.

Learning Theories and New Technologies

With the development of new technologies, there has been a pronounced shift in learning theories from behaviorism to constructivism. A new educational system is called for that changes the focus from teaching to learning and integrates technology to improve students' thinking skills and to help them create individual, personal knowledge (Means and Olson 1995; Kizlik 1996) that can be shared immediately with anyone in the world (Kizlik 1996). Students need to learn the skills for creating artistically, analyse logically, communicate clearly and compute efficiently or otherwise to be illiterate for the age we live in (Omori and Bunderson 1995). Constructivism requires a more complex and flexible curriculum than behaviorism and targets cognitive skills (Stahl, Sumner et al. 1995). A setting of resources and activities needs to be provided to serve as catalyst for development of these skills and opportunities should be given for students to articulate evolving understandings (Stahl, Sumner et al. 1995) in collaboration with others. Another important transformation advocated by current educational reform movements is the shift from teaching discrete skills and information within particular subjects to centring instruction around authentic, challenging projects (Means and Olson 1995).

The new technologies currently at our disposal do not only provide us and users with opportunities to break new avenues in traditional education, but, more importantly, to explore new dimensions of the very concept of education. The tools presently available make it possible to re-evaluate and rethink educational models and eventually to break away from the epistemological restrictions of Modernity. The first step could be to rethink the conventional integration of content and method, information and tool, learner and institution in education.

Modern instructional theory is founded on the metaphor of the curriculum (i.e. translated from Greek: the track). It is built around the idea of rationality and linear progress. Also the teacher centred approach has been emphasised. Curriculum theory proposes quantitative objectives determined in advance. In Post-Modern times this paradigm collapses. Open episteme replaces the closed ones, more complicated structures emerge as the learner acquires extensive autonomy and freedom in his or her search for knowledge, skills and values. The belief in gradual collection of stable knowledge has given way to a constant reconstruction of fluid knowledge (Kuhn 1962; Doll 1989). In the modern schools curriculum theory has most often presupposed rigid lesson plans, clear objectives and precise instructional methods. The Post-Modern condition is vague, flexible and transitory. It should be accepted that educational aims can never be definite, knowledge is relative and the educational process is infinite (Dewey 1974; Hargraves 1994). The rapid evolution of the Internet technology in the last decade or two, e.g. the emergence of the hypertext and multi-media on the multi-dimensional World Wide Web provide us with the educational metaphor of the "fishing net," bungled up in an irregular shapeless heap. The "fishing net" does not predetermine beginning or end. There the value and importance of data, information and knowledge are neither predisposed nor will become finalised.

The multiplicity of the Web (e.g., text, chart, picture, colour, audio, video) and its hypertext character, provides possibilities to create rich educational environments to practice different types of skills and to give students different perspectives and a chance for multidimensional learning. Kellogg and Viehland (1995) also suggested that the global and interactive nature of the Internet, its community of users, and its enormous resources indicate that this technology may be different in crucial ways than earlier technologies used in education. Educators and students can become active participants in the Internet world, which is a real world of people and events that supports and engages users as human beings and global citizens. Research on students' learning with hypermedia indicates that inclusion of images and sounds can improve comprehension and production of text while more fully bringing culture to students (Ayersman 1996). In addition, students can benefit from constructing products within a hypermedia environment (Turner and Dipinto 1995; Ayersman 1996), for example, in order to develop complex cognitive skills such as decomposing a topic into subtopics, organising diverse data and information, and formulating an innovative and responsible point of view (Turner and Dipinto).

Course producers and teachers that want to approach students within the constructivist paradigm should be able to have their students engage in, for example:

- Collaborative learning or dialog through on-line communication.
- Activities where students construct something that can be shared and viewed by others on-line (e.g., essays, graphics, computer tools or simulations).
- Activities with opportunities to explore/learn from context and for role play, for example virtual field trips or simulations. Simulation makes possible creation of multidimensional learning environments. Different students/learners can make use of the same virtual context for various purposes. A virtual environment can thrive on various "players" in different roles, initially produced (by teacher/creator) subsequently shaped by students. For example a learning environment could be produced as a fishing village, where

students create imagined community, construct environment and organisation, act out social roles, write culture and histories, institutions, industries, events etc.
- Authentic projects/problems, for example, submitted by companies or institutes that could benefit from student input to solve different types of real problems.

Design implications from the above include (again) opportunities to communicate and collaborate, opportunities for students to submit/"publish" their materials, and tools for course producers to create virtual environments. Also, it should be easy to include forums, e.g. where "real" projects could be submitted to be worked on by students.

NEEDS OF INDIVIDUALS

People of all ages (including older adults and/or people with visual and hearing impairment) should be able to take advantage of educational materials created through advanced authoring tools for distance educators. Therefore, the multi-media aspect is especially important and text material should be convertible to audio for the visually impaired or vice versa for the hearing impaired. Also, course materials (teacher or student created) could be automatically translated into different languages for users in different countries.

There are several theories and models regarding learners' motivation. One such model, the ARCS model (Keller 1987) predicts that learners will be motivated with learning materials that hold their attention, that they feel are relevant, that they work on with confidence and from which they derive satisfaction. On the basis of this model, it may be especially important in distance learning materials that course requirements and expectations should be clearly spelled out (Wolcott, Napper et al. 1994) in order for students to work with more confidence. Also, the relevance of information should be emphasised and enthusiasm for the subject should be built, e.g., by allowing learners flexibility in setting their learning objectives and selecting projects to work on. In addition, multimedia design could result in better attention and satisfaction of users.

One approach could have an origin in motivation (a need, an idea), which leads to multidimensional and flexible orientation (search for information). Information consequently produces personal internalisation (ideas, skills, knowledge), and possibly and preferably an externalisation (action) in social context. This again creates motivation to look for further information.

Design implications from the above include possibilities of courses where students can set their own objectives and select their own projects to work on, and course requirements should be clear. Also, multi-media/multi-language options are important for the design of course materials.

Prior Experience

Finally, we also present design implications that can be drawn from the concrete experiences of providing distance education programmes at different institutions.

Verkmenntaskólinn á Akureyri. Experience from the distance learning initiative at the Verkmenntaskólinn á Akureyri shows a need to match the courses in the program as closely as possible the courses in the traditional program in order to fulfil all requirements for graduation from the high school/ junior college. This experience supports Schwier's

(1994) prediction that prescriptive and learner-controlled strategies will coexist in distance education because although there was a growing progression toward increased learner autonomy there was also an increasing pressure for accountability in education. Schwier suggested, therefore, that even if "democratic" models of learning would become popular there would still be a need for prescriptive, objective-driven instruction. Other experiences at the Verkmenntaskólinn suggest that course materials need to be carefully designed with considerable structure, and students like to be kept on schedule. Tools that are regarded as especially useful and that might decrease the (expensive) need for human interaction are tools for the creation of interactive materials, (such as interactive exercises for immediate reinforcement or correction) and computer-based tests and surveys for the evaluation of student status.

Florida Centre de Formació, Valencia. Two major factors are important regarding distance education experiences in Valencia. The first is that the Spanish education system still revolves around the figure of the teacher as the central provider of knowledge. The implications of that focus are that many students need education in the principles of learner autonomy before they can make full use of materials, and that they require a lot of structure and scheduling to avoid a sense of aimlessness, and consequent high dropout rates. The second factor is what is colloquially referred to as "titulitis". Many students will simply not enrol unless there is a recognised qualification to be had. Education as an end in itself is not a common perception. This means that all courses have to be closely linked to traditional official courses. A typical example is the Official School of Languages television course, which allows students to opt for the official title at the end of their studies. As an initiative, this is a very positive idea, and it is too early (3 years from inception) to have a clear idea of the success of the venture. Experience on the ground suggests that many students have problems with the level of autonomy required and end up using more traditional learning environments to complete their studies. These students do, however, tend to be highly motivated and able to articulate their needs, which indicate that the learning curve is probably steep as regards learner autonomy. The increasing use of the Internet and its growing popularity seem also to indicate that there are grounds for optimism with respect to this, as long as the factors mentioned are taken into account.

Kennaraháskóli Íslands. An extensive study by Jónasson (1997) of the distance education program at the University College of Education (the first cohort completing a B.Ed. degree through distance education at the college) showed that structure was very important to the learners. Students wanted a clear overview of each course from the beginning of the course and liked to have lectures delivered through the Internet as well as instructional modules. Other findings included that students greatly benefited from on-line interaction and discussion. In addition, Myrdal (1994) reported that it was relatively easy to use the Internet for the preparation of teachers, and there were no problems associated with the program implementation that could not be solved (even if several students had no previous experience with computers or the Internet). He also concluded that Internet use opened up possibilities that traditional formats could not and there was a question if the quality of the traditional program could become as high as of the distance education program but not vice versa.

Design implications from the above include the need to link courses to official qualifications and materials used in similar traditional programs when they exist, the need for clear course overviews and high structure. In addition, communication with teachers and other students is very important, and distance learning initiatives can safely take advantage of Internet options in spite of little prior computer and Internet knowledge among students.

DESIGN GUIDELINES

In Table 1, we provide a summary of the design implications identified so far in this paper: on one hand for an on-line distance learning environment and when relevant for and "ideal" authoring tool to create such an environment. These relate to four different areas: communication/interaction; learning materials, resources, and tools; student-centered learning, and qualifications.

TABLE 1. DESIGN IMPLICATIONS FOR ON-LINE DISTANCE LEARNING ENVIRONMENT AND AUTHORING TOOLS BASED ON RESEARCH FINDINGS AND/OR EXPERIENCE.

Features of an "Ideal" On-line Distance Learning Environment	"Ideal" Authoring Tool for Creating Such an Environment
Communications/interaction	
• Communication between teachers and students and between students (and others). • Provision of feedback in teacher-led courses, and possibly the provision of automatic feedback, e.g., after interactive tests/exercises. • Connections to "the real world", e.g. forums where businesses and institutions could submit materials (student projects).	• Enables different kinds of communication, e.g. via e-mail, conferences/forums, chats. • Enables provision of feedback, including automatic feedback.
Learning materials, resources, and tools	
• Provides learning materials of various types (e.g. text, visual, auditory). (Table 1 continues)	• Provides easy access to resources, e.g. to databases of visual and auditory (non-copyrighted) materials for course producers.

• Provides resources of various types (e.g., study guides, translation tools, support materials) • Provides advice and instructions for students on how to use study guides. • Includes interactive exercises and/or tests. • Includes virtual environments. • Includes "authentic problems." • Note-taking option. • Provides clear overview, complete information about expectations.	• Enables inclusion of multi-media materials. • Enables linking to other on-line resources. • Enables translation to different languages. • Provides instructions for designers and teachers to produce good study guides. • Provides a tool to construct interactive exercises and tests. • Provides a tool to enable creation of virtual environments. • Provides on-line note-taking feature. • Enables designer/teachers to structure materials easily and give clear overviews.
Student-centered learning	
• Opportunities to create "concrete" materials that can be shared and viewed by others. • Flexibility in setting own objectives and selecting programs.	• Enables creation of forums or "spaces" where students can submit materials and view materials created by others. • Enables creation of forums or "spaces" for different groups/individuals.
Qualifications	
• Official qualifications/links to established programs.	• Encourages/enables creation of a "formal" front (e.g. with course numbers, links to other courses/programs)

In the next section, we examine how one popular authoring tool measures up to our standard of an "ideal" authoring tool for distance educators.

EXAMPLE: WEB COURSE IN A BOX

One authoring tool, Web Course in a Box (see e.g., http://www.madduck.com) for creating on-line courseware is described in a recent issue of TechTrends by Don E. Descy (1998), and it has also been tested recently in courses at Kennaraháskóli Íslands. It is provided free of charge from the above web site, (which is of course a big plus). When one examines Web Course in a Box with our guidelines (see above) in mind, one can identify both strengths and weeknesses in different areas as shown in Table 2 below.

TABLE 2. WEB COURSE IN A BOX: STRENGTH AND WEAKNESS.

+ Strength	- Weakness
Communications/interaction	
• Enables use of different kinds of on-line communications including e-mail, postlist, and conferences. • Creates automatic feedback in relation to quizzes.	• Chat option is not available • Conferences/forums are rather primitive. One can, e.g. only view contributions as threaded and by date, not by topics or by sender.
Learning materials, resources, and tools	
• Enables uploading of various file types, text, graphics, audio, and video. (Those accessing the files, however, have to have the capabilities to view the files). • Enables linking to on-line resources: Both easy to access because the authoring environment is on the web and to include in the created enviroment. • Provides a guide for designers/teachers on web-based learning and how to use the authoring tool. • Provides a guide for students on how to use the web. • Provides a tool to construct interactive exercises and tests (with some automatic feedback).	• Does not have a built-in database or links to multi-media materials and does not enable the creation of such materials with the tool itself. However, there is, of course, easy access to databases because the authoring environment is on the web. • Has a built-in English vocabulary that can be somewhat manipulated by the webmaster and the designer but there are still core words that will be displayed on the pages in mixture with any language used for the site. • Tool to create tests is not very powerful and teachers have very limited information about students' performance, except for the score.

(Table 2 continues)

• Enables designers/teachers to structure materials easily and give clear overviews.	• Does not provide tools to enable creation of virtual environments. • Does not provide on-line note-taking feature. • Built-in structure is very inflexible and in many ways difficult (or impossible) to manipulate.
Student-centered learning	
• Enables creation of forums or "spaces" (open or closed for different groups) where students can submit materials and view materials created by others. • Students can easily create their own homepages that become part of the web.	• The homepages students create with the tool have set categories labeled in English.
Qualifications	
• The environment provides a rather "standard/official course" look.	• The tool demands course numbers, sections, and term information that has to be included on the site, regardless of whether the information is appropriate or not.

As can be seen from Table 2, there are features of Web Course in a Box that match our recommendations. However, the tool limits in many ways what could be done to provide a powerful on-line learning environment. The environment could, e.g., provide more and even better ways to communicate, the content structure and language is too hard to manipulate, there is no note-taking feature, and including multi-media materials or multi-language materials could be easier.

FINAL WORDS

The construction of an ideal authoring tool containing open virtual environments can provide a variety of experiences, roles and solutions for the creation of a powerful educational environment. Such a tool should be effective and versatile for accessing instructional and informational material from a comprehensive database, -and in fact from the entire Internet. It should enable course designers and distance educators to create diverse courseware and a wide choice of information packages for use in educational institutions and individuals as well, in e.g. the training of the work-force, for use in intranet situations and answering to the various needs and choices of individuals.

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An editors' comment: After having submitted their text, the Icelandic authors found an URL they wished to include at the end of their References as an example of relevant WWW sites:

http://www.ctt.bc.ca/landonline/

TIIVISTELMÄT

Tella, Seppo, Mononen-Aaltonen, Marja, Kynäslahti, Heikki ja Nummi, Tomi, Passi, Anu, Ristola, Riikka, Sariola, Janne, Vahtivuori, Sanna ja Wager, Petra. Towards a Communal Curriculum: Strategic Planning and the Emerging Knowledge of Media Education.
Mediakasvatuksen (media education) professuuri perustettiin Helsingin yliopiston kasvatustieteelliseen tiedekuntaan 1.8.1996. Mediakasvatuskeskus aloitti toimintansa kuukautta myöhemmin mediakasvatuksen tieteenalaa tutkivana ja opetusta antavana yksikkönä. Tässä artikkelissa pohditaan tietostrategia-ajattelun kautta mediakasvatusta tieteenä ja Mediakasvatuskeskusta toimintayhteisönä. Pohdinta lähtee siitä nopeasti kehittyvästä ja muuttuvasta aikakautemme milieustä, jonka puitteissa mediakasvatuskin on saanut syntynsä. Elinikäinen oppiminen ja uudenlainen yhteisöllisyys ovat näihin kehityspiirteisiin liittyviä ilmiöitä kasvatuksen alueella. Artikkelissa kartoitetaan teoriatasolla myös yhteisöllisen opetussuunnitelman lähtökohtia.

Artikkelissa ennakoidaan myös uutta opettajuutta ja opettajan muuttuvaa roolia tieto- ja viestintäyhteiskunnassa sekä pohditaan opettajankoulutuksen uusia haasteita erityisesti mediakasvatuksen näkökulmasta. Keskeinen painotus asetetaan tiedolle ja tiedon synnylle, joita tarkastellaan Popperin kolmen maailman teorian kautta. Tietostrategiaa ja sen toteutusta pohditaan eri lähtökohdista käsin ja artikkelissa annetaan myös käytännön ohjeita tietostrategian teosta. Lopuksi hahmotetaan ja visioidaan Mediakasvatuskeskusta mahdollisimman hyvänä tutkimuksen ja opetuksen toimintayhteisönä.

Avainsanat: mediakasvatus, tieto, strategia, tietostrategia, yhteisöllisyys, opettajankoulutus, oppiminen, opettaminen.

Tella, Seppo. The Concept of Media Education Revisited: From a Classificatory Analysis to a Rhizomatic Overview.
Artikkelin tarkoituksena on analysoida mediakasvatuksen käsitettä. Alustava aiempi analyysi esitetään ensin (Tella 1997c). Artikkeli pyrkii edelleen valaisemaan yhtäältä eri tieteiden ja tieteen- ja tiedonalueiden välisiä suhteita ja toisaalta niiden suhdetta mediakasvatukseen. Tavoitteena on luoda luokittelu tai yleinen tarkastelutapa, jota mediakasvatuksen piirissä toimivat henkilöt voivat kommentoida. Tämä luokittelu muuttuu myöhemmin artikkelissa risomaattiseksi yleiskatsaukseksi.

Yksi analyysin keskeisiä havaintoja on se, että mediakasvatuksen käsitteellinen alue on laajentunut sisältämään suuren joukon toisista tieteistä tai tiedonalueilta tulevia käsitteitä. Samaan aikaan muutama megatrendi on tullut esille, nimittäin viestintä ja välitteisyys.

Avainsanat: mediakasvatus, viestintä, välitteisyys, opettajankoulutus, virtuaalipedagogiikka, didaktiikka, kognitiivinen kasvatustiede, kognitiotiede, kognitiivinen psykologia, oppimispsykologia, sosiologia, filosofia, kulttuuri, opetustekniikka, tieto- ja viestintäyhteiskunta.

Kynäslahti, Heikki. Considerations on Eduscape.
Artikkelissa pohditaan lyhysti mahdollista 'eduscape'-käsitettä. *Eduscape* nähdään ylipaikallisten koulutuksen virtojen eräänlaisena 'paikkana'. Käsitettä tarkastellaan deterritorialisaation ja *space of flows* -käsitteiden pohjalta. Ajan ja paikan suhde sekä globalisaatioilmiö liittyvät myös eduscapeen. Deterritorialisaation lähtökohtana esitetään Deleuzen ja Guattarin filosofisia pohdintoja, mutta käsitettä tulkitaan enemmänkin siinä muodossa kuin sitä käsitellään transnationaalin kulttuurin tutkimuksessa. *Space of flows* on lainattu Castellsilta (1996) liittyen yhteiskunnan, paikan ja tekniikan suhteiden tarkasteluun. Globalisaatio nähdään yksilöiden ja ryhmän näkökulmasta, eli maailmanlaajuisten ilmiöiden ja paikallisen tason vuorovaikutuksena.

Mononen-Aaltonen, Marja. A Learning Environment—A Euphemism for Instruction or a Potential for Dialogue?
Oppimisympäristön käsite esiintyy useasti kasvatustutkimuksen ja -teorian diskurssissa samoin kuin kansallisissa kasvatusalan kehittämistä koskevissa dokumenteissa. Tutkijoiden ja kasvatusalan edustajien kesken ei kuitenkaan ole yksimielisyyttä siitä, mikä oppimisympäristö on. Se on läheisesti sidoksissa konstruktivistiseen ajatteluun ja modernin tieto- ja viestintätekniikan kehitykseen. Oppimisympäristöstä on erilaisia näkemyksiä, joista kukin tuo mieliimme erilaisia kuvia opetuksesta, oppimisesta ja opiskelusta. Tässä artikkelissa tutkitaan kolmea oppimisympäristön metaforaa: oppimisympäristöt ekosysteemeinä, oppimisympäristöt paikkoina ja oppimisympäristöt tilana. Artikkelin johtopäätöksenä on, että sen sijaan että etsisimme ekosysteemeistä, paikoista tai tiloista vaihtoehtoja luokkahuoneille ja olemassaoleville kasvatuksellisille, pedagogisille tai didaktisille käytänteille, meidän tulisi pikemminkin määritellä oppimisympäristö *dialogina*. Tämä auttaisi meitä ymmärtämään oppimisympäristön potentiaalista arvoa ja sen roolia opetuksen ja opiskelun suunnittelussa informaatiorikkaassa ja tietointensiivisessa yhteiskunnassamme, jonka tärkein piirre todennäköisimmin on teoriatieto. Dialogismin viitekehyksessä artikkelissa argumentoidaan dialogisen oppimisympäristön ja dialogisen pedagogiikan puolesta.

Avainsanat: oppimisympäristö, dialoginen oppimisympäristö, dialogi, dialoginen pedagogiikka.

Tammelin, Maija. From Telepresence to Social Presence: The Role of Presence in a Network-Based Learning Environment.
Artikkeli tarkastelee läsnäolon käsitettä sellaisena kuin se ilmenee telematiikkaa hyödyntävässä opiskelu- ja oppimisympäristössä. Artikkeli pyrkii määrittelemään, mitä tarkoitetaan erityisesti etäläsnäololla (*telepresence*) ja sosiaalisella läsnäololla (*social presence*). Etäläsnäolon käsite on laajentunut nykyisin sisältämään teollisuuden kauko-ohjausjärjestelmien lisäksi yhteyden virtuaalitodellisuuteen sekä myös ihmisten väliseen vuorovaikutukseen. Sosiaalinen läsnäolo liittyy monien tutkijoiden mukaan laajempaan sosiaaliseen kontekstiin, joka kattaa esimerkiksi opiskelumotivaation ja sosiaalisen vuorovaikutuksen. Artikkelissa annetaan esimerkkejä siitä, miten sosiaalinen läsnäolo voi ilmetä telema-

tiikkaa hyödyntävässä ympäristössä. Lopuksi artikkeli korostaa sitä, että jos halutaan edistää sosiaalisen läsnäolon ilmentymistä, on tärkeää ymmärtää, minkälaisia ominaisuuksia eri telemaattisilla medioilla on.

Avainsanat: etäläsnäolo, sosiaalinen läsnäolo, telemaattiset mediat, verkottuvat oppimisympäristöt.

Tella, Seppo, Kynäslahti, Heikki & Husu, Jukka. Towards the Recontext of the Virtual School.

Tieto- ja viestintätekniikan lisääntynyt käyttö virtuaalisten opiskeluympäristöjen luomisessa on asettanut kasvatusalalle haasteita pohtia näiden 'virtuaalikoulun', 'virtuaaliluokan' ja 'virtuaaliyliopiston' nimellä kulkevien elektronisten luomusten todellista luonnetta. Tässä artikkelissa tutkitaan virtuaalikoulun käsitettä ja virtuaali-adjektiivin taustalla uskoaksemme olevaa virtualiteetti-ilmiötä.

Koulu on traditionaalisesti ollut paikka, jossa opettajat ja oppilaat kohtaavat toisensa. Se on paikka, jossa institutionaalinen opetus–oppimis-prosessi tapahtuu. Väitämme, että on aika siirtyä traditionaalisista kouluista kohden vaihtelevampia ja elaboroidumpia koulutusmuotoja, joita tässä artikkelissa kutsutaan virtuaalikouluksi. Tämä edellyttää sekä nykyisen koulun kontekstin että virtuaalikoulujen mahdollisten eli rekontekstien (*recontexts*) pohdintaa. Väitämme edelleen, että virtuaalikoulun synty edellyttää sen paradigmaattisen muutoksen ymmärtämistä, joka tapahtuu kouluinstituutiossa sekä käytännön että käsitteellisellä tasolla. Uskomme, että tarkastelemalla tätä ilmiötä voimme ymmärtää paremmin virtuaalikoulua ja ennakoida tulevaisuuden kehitystä.

Avainsanat: virtuaalikoulu, virtuaalisuus, tieto- ja viestintätekniikka, koulu, opetus, oppiminen, rekonteksti.

Passi, Anu & Vahtivuori, Sanna. From Co-operative Learning Towards Communalism.

Artikkelissa tarkastellaan yhteistoiminnalliseen ja yhteisölliseen opiskeluun liittyvien käsitteiden merkityksiä ja keskinäisiä suhteita. Tarkemman analyysin kohteena on Sharan & Sharanin (1992) ryhmätutkimus. Ryhmätutkimus nähdään yhtenä yhteistoiminnallisen opiskelun kehittyneimmistä suuntauksista sekä askeleena kohti yhteisöllisyyttä. Ryhmätutkimusta verrataan akateemisen tiedeyhteisön työskentelyyn, jossa oppijoiden välinen dialogi ja yhteisöllinen tiedonrakentaminen ovat keskeisiä. Artikkelissa luodaan myös lyhyt katsaus yhteistoiminnallisen ja yhteisöllisen opiskelun teoreettiseen taustaan.

Avainsanat: yhteistoiminnallinen opiskelu, yhteisöllinen opiskelu, yhteisöllisyys, ryhmätutkimus.

Nummi, Tomi & Ristola, Riikka. The LIVE Project—Developing Pedagogical Networking through Teacher Education.
Artikkelissa luonnehditaan koulujen sisällä ja kesken tapahtuvaa verkottumista. Päätavoitteena on kehittää edelleen LIVE-projektin teoriataustaa ja keskittyä opettajankoulutuksen verkostomalleihin. Mediakasvatuskeskuksessa kouluvuonna 1997–98 toteutettujen kolmen tapaustutkimuksen perusteella esitetään opettajankoulutuksen kolmitasoinen verkottumisluokitus. Opettajat, joilla on yhteinen intressi, halua yhteistyöhön sekä pysyvä ja toimiva telemaattisen viestinnän mahdollistava fyysinen verkko, voivat saavuttaa pedagogisen verkottumistason, avoimen ja etäopiskeluympäristön, jossa spatiaalisesti erillään olevat opiskeluryhmät muodostavat yhteistoiminnallisen virtuaaliluokan. Opettajankoulutuksen haasteena on sekä perus- että täydennyskoulutuksessa kasvattaa huomispäivän verkottumisen hallitsevia opettajia, joilla on taito luoda pedagogisia verkostoja.

Avainsanat: pedagoginen verkottuminen, opettajankoulutus, virtuaalikouluympäristö, avoin ja etäopiskelu.

DeVries, Jusri & Tella, Seppo. The Role of Distance Education Instructor: Attitudes, Skills, and Strategies.
Etäopettajan roolia akateemisen työyhteisön jäsenenä on tutkittu huomattavan vähän. Tätä on kuitenkin tutkittava ja selvennettävä, jos tehokkaan opiskeluympäristön luominen on tavoitteena. Etäopetus, samoin kuin etäopiskelu, vaatii uusia taitoja ja asenteita, jotka eroavat "perinteisessä" luokkahuoneessa tarvittavista. Koska monet kasvattajat eivät tunne tätä innovatiivista opetusympäristöä, sekä opettajat että opiskelijat hyötyisivät järjestelmän teknisestä koulutuksesta ja etäopetusstrategioiden opettamisesta.

Avainsanat: etäopettaja, akateeminen työyhteisö, rooli, opiskeluympäristö.

Lavonen, Jari & Meisalo, Veijo. Current research activities in the *LUONTI* project.
Artikkelissa kuvataan lyhyesti modernin opiskeluympäristöprojektimme LUONTI-projektin (Luonnontieteiden opetuksen teknologiset innovaatiot) lähtökohtaa ja teoreettista taustaa. Projektimme aloitus syksyllä 1995 perustui ajatukseen, että moderni tieto- ja viestintätekniikka johtaa tilanteeseen, jossa opetuksessa ei enää jaeta yksittäisiä faktoja vaan siinä autetaan opiskelijoita keräämään, prosessoimaan ja arvioimaan informaatiota tehokkaasti ja samalla jäsentämään sitä. LUONTI-projektissa tutkimme ja kehitämme uusia innovatiivisia ja joustavia materiaaleja ja laitteita erilaisia koulutyyppejä varten. Tuotamme tietokoneohjelmia, käyttöliittymiä ja mittalaitteita koululaboratorioihin, opettajan oppaita ja myös koulukäyttöön tarkoitettuja oppikirjoja. Opettajille on myös tarjolla täydennyskoulutusta, jossa havainnollistetaan lähestymistapamme joustavuutta.

Avainsanat: LUONTI-projekti, moderni tieto- ja viestintätekniikka, teknologiaopetus, koululaboratorio, täydennyskoulutus.

Sólveig Jakobsdóttir, Sigurjón Myrdal, Haukur Ágústsson & Nickolas A. Kearney. On-Line Distance Learning Environment and Tools to Create It: Design Based on Theory and Practice.
Artikkelin kirjoittajat osallistuivat 1997 Euroopan yhteisöjen multimediayhteishakuun tarkoituksena laatia pedagogiseen lähestymistapaan pohjaava ja verkko-opiskeluympäristöön sopiva ohjelmankehitin ("Verkko-opetustietopenkki"). Vaikka hakemus ei päässytkään hyväksyttyjen muutamien projektien joukkoon, uskomme, että kehittimen toiminta-ajatus on hyvin perusteltu ja että tehokkaita ohjelmankehittimiä tarvitaan yhä etäopetusmateriaalien suunnittelijoiden ja kehittelijöiden käyttöön. Uskomme myös, että verkko-opetuksen ja opiskelun suunnittelun pitäisi ohjautua yhä enemmän kasvatustarpeista kuin teknisistä innovaatioista. Tässä artikkelissa luonnostellaan pedagogisia tarpeita, jotka voisivat ohjata verkko-opiskeluympäristöjen suunnittelua ja niiden luomiseen tarkoitettujen työvälineiden kehitystyötä. Tarkoituksena on edellään auttaa kasvattajia valitsemaan nyt jo olemassa olevien työvälineiden kesken.

Avainsanat: ohjelmankehitin, verkko-opetus ja -opiskelu, etäopetusmateriaalit.

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