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# Learning Bridges

## Toward Participatory Learning Environments

*I'm gonna be a circusist when I grow up!*

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# Foreword

Bridges connect islands to each other. Bridges are also an apt metaphor for building connections among different learning environments and the learners and experts in them. Bridges are then viewed as operational models and cultural resources. What might the bridges of learning be like? What materials would they be made of and what shapes would they take?

Building bridges that promote learning requires a profound understanding of interaction, collaboration, meaningful learning, and support for such learning in different environments. What is of particular importance for the planning and building of learning bridges is pedagogical and psychological know-how on how individuals and communities learn and develop at different phases of their life and in different environments. Today, developments in information and communication technology also bring about new dimensions to interaction, collaboration, and learning. Making good use of them, though, requires a pedagogical understanding of the possibilities offered by the new technologies.

This book was born out of a desire to promote learning in and across different learning environments. As teachers, teacher educators, and researchers, we have come to notice how deplorably few bridges there are that adequately support such learning as fully harnesses the funds of knowledge the learners have constructed in different contexts. The permanence, meaningfulness, and joy of learning will weaken significantly if we cannot create connections within and across different contexts of learning to support the interaction and collaboration of learners and experts.

Just like building physical structures, building bridges for learning also requires professional skill and know-how. It is our aspiration that this book should provide up-to-date insights and ideas to people developing learning environments in education and cultural institutions as well as in administration and politics related to these fields. We present recent research-based knowledge on how learning can be supported in different environments. We explore topics such as funds of knowledge in the contexts of learning, agency, moving across the boundaries of learning contexts, dialogic inquiry and participatory pedagogy, multi-professional collaboration, and thoughts on future curricula. At the end of the book we offer recommendations for developing learning environments.

Our goal is to support teachers, teacher trainees, and other developers of learning environments in the valuable work they do. We hope that professionals working in school administration and educational policy can also make use of the ideas roused by our book in their work of development and decision-making.

Besides professional skill and know-how, building bridges also requires a great deal of collaboration among the different quarters. This book, too, is a result of collaboration. Designing and working on the book was a process of doing things together. As authors, we have answered for one chapter each as follows: Kristiina Kumpulainen for Funds of knowledge in the contexts of learning, Lasse Lipponen for Agency, Jaakko Hilppö for Moving across the boundaries of contexts for learning, Antti Rajala for Dialogic inquiry and participatory pedagogy, Varpu Tissari for Multi-professional collaboration, and Leena Krokfors for Thoughts on future curricula.

We planned the book in meetings and book seminars and commented on each other's chapters. At the planning stage we also benefited from the services of Ms. Minna-Rosa Kanniainen, who served the project as a research assistant. We wish to thank her especially for her praiseworthy contribution to the background work and the planning of the book.

At the end of each chapter, we present project descriptions written by our collaborating partners: Leenu Juurola and Leena Tornberg of the Museum of Technology write about developing the museum into a learning environment in the *InnoApaja* project. Pia Lempinen of the Media Center Saimaa accounts for the *Metakka ['Rumpus']* project and Heli-Maija Nevala for the *Liikkeelle! ['Let's get a move on']* project of the Finnish Science Centre Heureka and the city of Kalajoki. Antti Rajala of the University of Helsinki writes about a fourth-grade animal project as an example of dialogic inquiry and participatory pedagogy.

Katja Lembidakis and Olli Viding of the Vantaa Nature School describe their work on environmental education and foster-class activities. Nina Trontti of the Zoo School *Arkki ['Ark']* at Helsinki Zoo accounts for the activities of the school, and Satu Jovero presents the exhibitions of the Finnish Museum of Natural History. We wish to thank them all for their collaboration in enriching the contents of the book.

In finishing the book we received help from Ulla Paavilainen, language editor. The graphic design was planned and executed by Mari Keso, graphic artist. Many thanks go to both of them for highly professional work on our book. We also wish to thank the Ministry of Education and Culture for funding the Learning Bridges research project and making this book project possible.

In addition, our warm thanks go to all our other collaborating partners, adults and children. We have learned a great deal from you.

**Helsinki, Finland, November 2009**

*Kristiina Kumpulainen, Leena Krokfors, Lasse Lipponen, Varpu Tissari, Jaakko Hilppö, and Antti Rajala*

# The Learning Bridges research project

This book is an outcome of the research project *Learning Bridges: Learning and Teaching at the Intersection of Formal and Informal Learning Environments,* funded by the Finnish Ministry of Education and Culture. The project was carried out at the University of Helsinki in collaboration between the CICERO Learning network and the Department of Teacher Education. Its short title is the Learning Bridges research project (*'Oppimisen Sillat -tutkimushanke'* in Finnish).

The main aim of the project was to improve the quality of learning environments by developing new kinds of supporting bridges among formal, non-formal and informal learning environments. Special attention was paid to examining and developing the learning environments provided by comprehensive schools, museums, and libraries.

### THE PROJECT HAD THE FOLLOWING GOALS

1) to investigate, evaluate, and develop pedagogical approaches and models so as to promote collaboration in learning and teaching among schools, museums, science centers, and libraries

2) to build bridges connecting formal, non-formal and informal learning environments so as to enable the use of their respective funds of knowledge and social practices as shared resources

3) to investigate and develop multi-professional collaboration and on-the-job learning

4) to clarify the role of the social media and the possibilities they offer for supporting the participants' knowledge-building and their transitions from context to context

### THE FOLLOWING RESEARCH TOPICS WERE COVERED

1) learner agency, identity work, and learning transitions in and across different learning environments

2) the construction of interaction and collaboration among students, teachers, and other professionals within and across learning environments

3) the role of technology in mediating interaction, collaboration, and learning between participants and learning environments

4) pedagogical models and curricular recommendations for integrating different learning environments and the teaching and learning taking place in them

5) multi-professional collaboration and on-the-job learning

For its theoretical background, the project leaned on the sociocultural perspective. The methodological approach was an ethnographic one, and various methods of research, data-collection, and analysis were used. In analysing the data, micro and macro-level analyses were combined so as to describe the complex and evolving individual, communal, and organizational changes that take place within and across the different learning environments.

The outcomes and impacts of the project carry theoretical, methodological, and practical value. We carried out systematic educational research on students and their circumstances in situations where the learners were building funds of knowledge across different contexts. At the same time, we developed methodologies for examining transitions of learning at the individual, collective, and inter-organizational levels. In addition, we developed a pedagogy that pays serious attention to the learners' personal experiences and spontaneous actions as platforms for meaningful learning.

**Further information: www.oppimisensillat.fi**

### THE PARTNERS OF THE PROJECT

- Ministry of Education and Culture (financier of the project)
- Finnish National Board of Education
- Comprehensive schools in the Helsinki Metropolitan Area
- Museum of Technology and the *InnoApaja* project, Helsinki
- Finnish Museum of Natural History, University of Helsinki
- Zoo School *Arkki*, Helsinki Zoo, Helsinki
- Vantaa Nature School, Vantaa
- Heureka, the Finnish Science Centre, Vantaa
- Peace Union of Finland, Helsinki
- Vantaa City Library
- University of Oulu
- Nokia Inc.
- Fountain Park Ltd.

Teacher: I have something to say about that.

Roope: Teacher.

Teacher: Can any of you say why money might be made of wool and not paper, though it might be easy to make money out of paper with a copier?

[Roope raises his hand to answer the teacher's question.]

Kimmo: Roope, you're the chairman!

Roope: I know! It's more durable, because money circulates a really long time, I mean, you buy something from the store, you pay with money, and then it goes around, the store gives change to someone. So it's gotta be durable.

Roope: Saara.

Saara: I just don't see how money could be made of wool, I once cut in two one of those foreign bills I didn't need. And, I've cut a Finnish banknote too, and it wasn't durable at all. I just tore it, it's not durable at all.

Roope: Well it's not, like, that durable, but they say paper is more flimsy, so should they make money out of metal or something, so you'd need like a cutter or something to cut it into pieces?

Saara: Well, I don't have to believe that if I don't want to!

Teacher: No, you don't have to believe it. Maybe if someone gives you a really good explanation, then you might want to change your mind.

# 1. Funds of knowledge in the contexts of learning

This cultural capital, containing knowledge, skills, values, and attitudes, is far too seldom used as the basis for teaching and education[4].

## Funds of knowledge help us function in learning situations

We all have had moments in our everyday lives when we wished that we had a doctor or a revenue officer, or perhaps a plumber, as our family member, relative, or friend. Similarly, it is a relief to be able to call a friend and ask for help with a problem we have been unable to solve on our own.

According to researchers, funds of knowledge are local networks of cultural know-how created within different communities, such as families, in order to solve everyday challenges. These networks are flexible, dynamic, and reciprocal – they support our lives in changing circumstances[5]. Indeed, it is often the problems and significant changes in life – such as an addition to the family, or change or loss of job – that bring out the "invisible infrastructure" of the funds of knowledge we can lean on in our everyday lives. The concept of funds of knowledge can easily be expanded beyond families: to schools, workplaces, friends, and hobbies. In these connections, too, we find solutions to challenges together, share experiences, and learn from each other.

4 Kovalainen & Kumpulainen (2005); Rajala (2007)
5 Gonzalez, Moll, & Amanti (2005)

*We love the outdoors!*

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The extract shown above derived from a third-grade classroom community illustrates how experiences, knowledge, skills, and attitudes are shaped by different contexts of learning. Learning takes place everywhere – outside formal education, too. We learn at home, at our hobbies and clubs, and in circles of friends[1].

1 Bekerman, Burbules, & Silberman-Keller (2006); Ellsworth (2005); Manninen, Burman, Koivunen, Kuittinen, Luukannel, Passi, & Särkkä (2007); Smith (2006)

Learning environments outside the school, such as science centers, libraries, and exhibitions at museums, also offer more and more versatile opportunities for studying and learning – for developing our knowledge, skills, and attitudes. Indeed, our general knowledge is largely based on funds of knowledge built in diverse environments and communities[2].

2 Gonzalez, Moll, & Amanti (2005)

Although we are beginning to recognize the significance of different contexts for learning, the traditional formal education does not adequately recognize nor appreciate the cultural worlds of the learner. Many formal learning environments appear not to pay enough attention to the funds of knowledge students bring to school from other contexts[3].

3 Hubbard, Mehan, & Stein (2006); Resnick (1987); Sarason (1993); Tyack & Cuban (1997)

The term 'funds of knowledge' easily directs our attention to its intellectual side, but it may also be used to describe attitudes, values, and customs. Funds of knowledge are significant cognitive and cultural resources that enable participation and learning. They guide the actions of individuals and communities and offer frames of reference for both interpreting phenomena and innovating.

Funds of knowledge refer not only to the formal knowledge possessed by a community but also to the living networked resources, emerging through action, on which the community bases its practices, sometimes even without being aware of it. From this viewpoint, the classroom community can be regarded as a node in a web of information that is composed of diverse funds of knowledge[6].

## Learning in a community

According to an old saying, it takes a village to raise a child. This saying is a powerful illustration of the essential features of education and development. As held in Vygotsky's pioneering theory of intellectual development, our thinking and way of life are results of interaction with other people[7].

The sociocultural theory based on Vygotsky's ideas emphasizes the social and culture-dependent nature of learning. Learning is viewed as a holistic and dynamic process, in which the individual grows into the culture of the community, its values, practices, and artifacts. It is through participation that the individual learns to manage the tools of thinking and acting appropriate for the community. Indeed, the theory foregrounds the interaction between the environment and its artifacts and between the community and the individual. Competence, for example, is viewed as a matter of doing things together as part of the cultural practices of a community[8].

The relationship between the individual and the "community of practice" is reciprocal: the participation of the individual develops the community, and vice versa, the community develops the individual. When individuals participate in collective activities, they do not simply react to events but actively change and adapt them through their participation. The starting-point of participation in the community is activities that the members have jointly agreed on and take reciprocal responsibility for[9]. Also, the pursuit of "common affairs" continuously creates new means for shared activities: new practices, tools, concepts, and language. These shared practices and tools tie the members of the community together.

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6  Gonzalez, Moll, & Amanti (2005)
7  Vygotsky (1978)
8  Lave & Wenger (1991)
9  Wenger (1999)

From the sociocultural perspective, learning is a social process that reshapes itself continuously as individuals and communities act in various environments and spaces. In all, communities represent local ways of adapting to the demands set by their living environments[10].

At the same time as Vygotsky presented his theory of the social origin of thinking, Mikhail Bakhtin emphasized the existence of social diversity[11]. In communities, diversity manifests itself in the ways language is used and the world and its phenomena are interpreted. Bakhtin was especially interested in the diversity of spoken language, but his ideas can be extended to address the diversity and versatility of the funds of knowledge constructed in different communities. We all develop into individuals with our own hopes and needs, but as members of a community we form a village. We learn to integrate our diversity and to harness our funds of knowledge together. We learn that it is highly valuable to use tools developed by someone else, to combine different working methods, and to consider different points of view.

There are many practices in communities that cannot be learned simply by observing and participating. We need guidance and teaching. Composing legal documents, for example, requires diverse interlinked knowledge and skills.

The school is a community whose purpose is to offer learners opportunities to develop their knowledge and skills. However, one of the main challenges of the school is the fragmentation of knowledge and its separation from its actual context of use. There is the danger that the school gets too separated from the rest of the world and that the knowledge and skills learned at school will not connect with the learner's life. Schools should therefore make sure that they offer bridges that connect learning across contexts, including the funds of knowledge they contain.

Growing into a community takes time. Some routines can be learned in minutes and used in seconds, but they all have wider significance only if we can weave them into ensembles. It is relatively easy for us to learn to recognize what we want in different situations, but it is much more challenging to recognize our long-term role and will as members of the community. It is unfortunately too seldom that the school pays attention to the lifelong holistic development of our identities. The main focus is often on the contents of the curriculum as separate entities. The students learn many things and construct many meanings at school, but they do not necessarily learn to understand or appreciate the wider significance of learning for their lives outside the school.

10 Wenger (1999)
11 Bakhtin (1981)

Mom washes Dad's shirt in a lovely color of water!

# Does the school support the learner's identity-building?

How do moments turn into history? How do hour-long activities make up a day's program? How do small events chain up into great historical changes in the lives of individuals and societies? These questions are connected to the way we construct our identity. Identities are not built in a minute or an hour but over a long period of time and through repeating innumerable activities.

Our identity lets us and others know who we are. It is partly dependent on others, for the community sets limits to who we can be. Defining our identity is also a very individual process: what we have made of ourselves and how we see ourselves. Most of us have several different identities depending on where we are and who we are with. Besides these multiple identities, we also build ourselves a stable identity, which does not change essentially in different situations or communities.

We express our identity in the way we dress, choose our music and books, and via the friends and hobbies we keep. More than anything else, these practices reflect continuity: we do things regularly, and repetitions shape our identity. From the education-

al point of view, it is essential to consider what are the classroom and school practices that build and maintain our identities. Are they molded by stupid jokes or smart answers? Is doing equations part of our repertoire of identities? What about writing poems? Reading maps? Playing basketball?

Though our identity is constructed over a long period of time, stable attitudes, opinions, and even skills arise from the briefest of moments and the ensembles formed by them. In the extract of a classroom discussion presented at the beginning of this chapter, the students were able to display and combine the funds of knowledge they had acquired in different contexts of learning. The discussion helped them create continuity into their meaning-making and identity-building.

The appreciation of natural sciences, literature, or sports is not created only at school. To foster the appreciation of different domains of competence, the community must nourish students' identities throughout the school day and beyond. Indeed, the school should keep in contact with communities outside it, such as sports clubs or cultural

communities. At the moment, however, our curricula are not designed to facilitate such contacts. Instead of supporting learners' identity work and holistic development, many schools focus mainly on teaching factual knowledge.

## Pedagogical conditions of learning environments

A central and, in a way, even universal condition for a meaningful learning environment that supports the holistic growth of the learner is that it should help the learner construct a deep and diverse understanding of the phenomena under study. 'Understanding' includes knowledge, skills, attitudes, and values. Its central components are

- the development of thinking skills and problem-solving skills,
- the competence to argue, question, and explain information,
- the competence to seek, process, and evaluate information, and
- the competence and the skills to create information and to communicate it by different means.

For teaching to be culture- and learner-sensitive, the recognition and identification of each student's funds of knowledge is a prerequisite. The learning process should connect with the learner's world, experience, and funds of knowledge. It is also important to construct a working culture that promotes learning in a community. Difference should be seen as an asset, not as a challenge to be overcome. Each learner should be valued and permitted to speak freely. Only such a working culture can offer the learner social and cognitive support that is based on his/her strengths, resources, and motivation.

*I'm gonna beat you bad, Grandpa!*

Unfortunately, learners of different ages often work in learning environments without adequate support and equipment. The educational challenge here is to construct pedagogical working cultures that make the classroom community a place for active participation and learning. The skills of active participation and lifelong learning are important elements in the construction of a good life and wellbeing – for both the individual and the whole society. Education should make skillful use of the latest pedagogical and technological solutions in order to weave together the learners' funds of knowledge and those embedded in the learning environments. This supports our efforts to promote lifelong and life-wide learning.

## Points to ponder:

What does the notion of the ubiquity of learning mean to you?

Why should the learners' worlds and funds of knowledge be taken into consideration in the learning environment and its practices?

How can the learning environment recognize the cultural capital that the students have acquired in different contexts of learning?

Why should the learning environment nurture the construction of each learner's identity?

In what ways can the learning environment offer learners the opportunity of developing into active participants in their communities?

# The InnoApaja project: developing the museum into a learning environment

**Leenu Juurola & Leena Tornberg,**
**The InnoApaja project and the Museum of Technology**

A successful visit to a museum is a tempting, addictive, and inspiring experience, raising questions and generating answers. During the visit, the visitor constructs his/her own learning path through the exhibition. The goal of the *InnoApaja* project of the Museum of Technology is to develop the museum exhibition into a creative place of learning in which different learners of different ages can make active use of the experiences and information offered by the exhibitions as part of their own learning processes.

In the *InnoApaja* project, the museum as a learning environment is developed comprehensively. The physical learning environment has a pedagogical base: for example, the planning is embedded in creative and activity-based methods. The technological learning environment has been developed

to facilitate the construction and fusion of information. This effort is supported by the assessments of the learning paths. To enable explorative learning, the exhibition offers mobile research spots. Offerings under development include the mobile game TekMyst and the database *Innovaattori ['Innovator']*, which will deepen the learning path and facilitate follow-up work at school.

The contents and methods developed in the *InnoApaja* project originate from collaboration with experts in teaching, museums, and business life. The central idea is that a learning environment such as the Museum of Technology functions most productively as part of a network in which experts in various fields collaborate to create an ensemble that provides the learner with diverse learning experiences.

## THE GOALS OF THE INNOAPAJA PROJECT

- to develop a museum exhibition into an active, innovative learning environment
- to develop learning paths that support active learner agency
- to make the learning paths adaptable and transportable to other learning environments
- to connect the learning paths to the national core curriculum
- to arrange courses of continuing education for teachers and museum professionals so as to develop a mutually complementary network of learning environments

## THE RESULTS OF THE PROJECT

- three activity-based learning paths: *Magnificent machines* (grades 3–6), *Masterful materials* (grades 3–6), and *Illustrious innovations* (grades 7–9)
- mobile research spots enabling active learning in the exhibition
- scale-model kits and visualization devices to enrich the exploration of the exhibitions
- the game Illustrious Innovations to develop innovative thinking
- methods and results of evaluation (focusing on learning at the museum: the cognitive and the affective perspective)
- complete courses of continuing education for teachers and museum professionals

## THE LEARNING PATH OF THE MUSEUM GUEST

On an *InnoApaja* learning path, one needs to be able to combine and apply the information offered by the museum exhibition. The objects exhibited tell stories of the technology of the past decades and of today. They offer today's learners provisions for innovation.

The learning paths imitate the innovation process well known from business life, where supporting creativity and problem-solving skills is vital: How are needs and ideas refined into innovations? How does one help a creative team work productively and exceed its limits?

The *InnoApaja* learning paths begin at school already. The students are introduced to a problem-solving task: What could a novel amusement gadget for the phantom of the museum be like? Or a technological hit product of the future?

School groups examine the exhibitions from the perspective of simple machines, different materials, or innovations. To promote learning, the exhibitions have been equipped with activity-based exercises, scale-model kits, and research equipment. These scaffold the learners in familiarizing themselves with the exhibition and creatively applying their constructed knowledge towards creating their own innovation.

The learning path changes with the group. The tutor acts as the initiator and supporter of the process, but the students actively influence the nature of the innovation process. During the three-hour museum visit, it is the learners themselves that construct insights – the tutor's job is to make sure that the learners do not let themselves off too easy.

## FURTHER INFORMATION

http://www.tekniikanmuseo.fi (Finnish only)
http://www.tekniikanmuseo.fi/julkaisut.html (Finnish only)
http://www.minedu.fi/euteemavuosi/Esimerkkeja/
 innoapaja?lang=en

"Hey Teach! We're making you a test!"

# 2. Agency

I'm gonna be a circusist when I grow up!

## Agency is acting authoritatively and accountably

When participating, people do not just passively react to things or repeat old routines. When they face difficulties and challenges, they intentionally strive to change their social relationships, practices, and physical surroundings. For example, if they have to wait unreasonably long at the doctor's, few people will just sit there doing nothing. Most will probably get up and try to find out what is causing the delay. We are active by nature – we take part, and we act.

When acting in a community, we learn more than knowledge and skills. Participation also changes our understanding of our own self[12], who we are and, in particular, who we are in relation to others. We form an image of ourselves as agents with rights and duties and with thoughts, feelings, opinions, knowledge and skills that other people value or do not value. We also learn to act according to our commitments and the demands of the situation, to take initiatives, to oppose, and to give and receive help. Learning is not only a cognitive phenomenon, then: we not only know things, we also experience and do things, we exist[13].

The will to act, to experience, and to exist is called agency[14]. It is often associated with such characteristics as activeness, intent, participation, opportunities to choose and make a difference, voluntariness, and the skill and power to choose one's ways of action. Agency means an individual's or a group's feeling that I or we are doing things, making a difference, that things do not just happen to me or us. The experience of agency is thus of great significance for the shaping of a person's (or a community's) identity: who s/he is and who s/he wants to be.

Agency means an identity that has been formed through participation; it means that the person has learnt to act authoritatively and accountably[15]. It is integrally connected with a clear understanding of the available resources and their relevant use. One manifestation of agency is knowing who and where to ask for help and asking for it when needed. And the other way round, agency also means the ability to help others by spontaneously placing one's own know-how at their disposal[16]. The example situation at the beginning of this chapter, where students decide to arrange a test for their teacher, can be seen as a manifestation of agency.

Agency is often connected with a creative aspect, questioning and opposing matters regarded as self-evident and seeking unconventional ways of action. From the point of view of creativity and opposition to conventional matters,

12 Wenger (1999)
13 Packer & Goicoechea (2000)
14 Emirbayer & Mische (1998)
15 Greeno (2006)
16 Edwards (2005)

MIKÄ TUO
TURVALLISUUTTA?

WHAT MAKES US FEEL SAFE?
Hobbies    Close ones
Sense of community  Independence
Dad   Heart   Guards   Police   Home
Experience   Friends

many actions regarded as negative can be reinterpreted. For example, Yrjö Engeström's[17] studies show that cheating at a test can be seen as a manifestation of student agency. By cheating, one 'tests' the educational system and crosses a line. The students Engeström interviewed described cheating as a battle with their conscience, values, and fears. After cheating successfully, they usually do not feel that they have done anything particularly wrong; rather, they think they have beaten the unfair system of education and assessment.

From the sociocultural point of view, learning is more than mere acquisition of knowledge or an individual's know-how and expertise[18]. The sociocultural approach to learning takes into consideration the learner's whole life world, the situations it brings up, participation in these situations, interaction, and the tools used.

Initiatives, opposition, accountability (we are always accountable to someone), and giving and asking for help always have to do with interpersonal activities[19]. This being the case, then agency, too, can and should be examined as communal action; agency always develops, takes shape, and comes to fruition through interaction. It rises from people's motives, interests, plans and intentions, which are often of a communal origin or even part of the community: communities, too, have motives, intentions, and volitions. We can speak of collective and shared agency, where the agent is larger than the individual, such as a group or a community.

17 Engeström (2006b)
18 Säljö (2004)
19 Edwards (2005); Rainio (2008)



## Agency gives one a sense of efficacy

Agency can be regarded as an intrinsically important feature of human life. It gives one a sense of competence, ownership and commitment, a sense that one can really influence one's own and the community's matters and that it is worth trying to influence them. This is important, for one's sense of competence, for instance, is of significance for the length of time and the amount of effort one spends on striving to influence matters.

It is also important to understand agency as a societal phenomenon. It supports the values to which students should be brought up through education, and it also supports the attributes expected of employees in working life.

The changes in the age structure and the social services in our society relegate some matters increasingly to the responsibility of people's own agency, such as informal voluntary work. Voluntary work with the aged, for instance, calls for personal initiative and responsibility, in other words, agency. A significant manifestation of agency in our society is civil action: organizing different events, showing initiative, taking a stand and exercising an influence in various societal contexts. Civil action also manifests itself in demonstrations. Interestingly enough, that type of agency seems to be on the increase. In the Helsinki region, for example, the number of demonstrations has been continuously increasing in the past few years. These forms of agency graphically reveal its communal, shared nature.

In working life, people are expected to exercise agency in doing their jobs. Initiative, commitment, accountability, and creativity are part of almost every employee's job description, at least the unofficial one. The Kemijärvi movement was an excellent example of a strong desire to have a say on matters concerning one's own life. When the pulp mill was being closed down, the employees did not just wait passively to be laid off. They united to resist the closing down, striving to

The circus school sure has stood us in good stead!

they truly affect what is done and how it is done: who has the right to say what, and what are the consequences of saying it[22]. For example, if the contents to be learned are customarily not discussed in class but only handed down by the teacher, leaving the students the task of writing them down and learning them by heart, then the student's conception of her/himself as an agent will be different from the conception s/he builds if s/he gets used to discussing and questioning the issues and taking initiatives from early on.

In interaction, students are assigned different positions[23]. A student can be positioned (by the teacher, other students, or her/himself) as a passive receiver who acts on the teacher's initiatives only. Alternatively, s/he can take (or be assigned) an initiative position, in which s/he actively brings forth her/his own opinions and builds knowledge in collaboration with others.

From the point of view of developing agency, it is important to give public recognition at school to students' ideas whenever a student does or thinks of something significant. In this way the teacher

keep it going and to preserve their jobs. However, the demands of working life in regard to agency seem contradictory. On the one hand, agency is expected, and on the other hand, people feel that control is getting tighter and tighter: carrying out work tasks is assessed and monitored with a variety of devices.

Agency is also of great significance in children's life. The continually changing environments (the school, hobbies, the media) with their variable expectations and demands pose new challenges to the agency and competence of children[20].

Recent research suggests that more and more young people and smaller and smaller children seem to lack the sense of competence and agency and that more and more of them are even at the risk of marginalization. If we want to bring up children and young people who have a sense of being in control of their own lives and fare well in their lives, we must pay true attention to supporting the development of their agency. Only in this way can they grow into active agents who are in control of their own lives and believe in having a say on community affairs.

## Agency can be developed

To grow into agency, the student needs to be treated as an active subject, not just an object of upbringing or education. The development of agency requires opportunities to take initiative and make decisions[21] and see the effects of one's action in one's own life as well as in others'. Accordingly, the development of agency is crucially influenced by the kind of interactional culture prevailing at school, at home, and at the workplace. It is important that people's initiatives are noted and that

20 Bransford, Vye, Stevens, Kuhl, Schwartz, Bell, Meltzoff, Barron, Pea, Reeves, Roschelle, & Sabelli (2006)

21 Gresalfi, Martin, Hand, & Greeno (2009)
22 Greeno (2006); Gresalfi, Martin, Hand, & Greeno (2009)
23 Brown & Renshaw (2006); Greeno (2006)

can step aside, as it were, from the position of expert and share his/her authorship and expertise with the students. What s/he is doing in practice is making room for agency.

Accountability can be developed by including the students, workers, or (at home) children in the planning of the activities instead of just handing ready-made decisions from the top down. Another significant issue about accountability is who one is accountable to. At school, the students are typically accountable to the teacher for keeping up. From the point of view of agency, one should make sure that the children also share their know-how, are expected to justify their doings and solutions to one another, and to ask for and offer help. Such reciprocal agency is called relational agency[24]. One could say that developing agency at school calls for the creation of new kinds of teacher-student and student-student relations.

Agency is also connected to knowledge and the authority granted to it[25]. It is important to consider what sorts of knowledge, and whose knowledge, are regarded as important and significant at school. For example, what significance does the school grant to the knowledge that children acquire in informal learning environments outside the school, and how does the school make use of it? Now that knowledge has become more easily accessible to anyone, the teacher can no longer be the one who knows everything about everything. Children can become experts in their own fields of interest and know more about them than the teacher does. Can the information contained in textbooks, for instance, be called into question and if so, by whom, or is the textbook the authority that determines what is learned and done in the classroom? Putting it

rather pointedly, one could say that the textbook often seems to have crucial agency on matters of knowledge.

A child's experience and opportunities of agency are quite different from an adult's. Children have different rights and duties and therefore also different opportunities for acting. At home, the parents' approach to upbringing is of crucial importance for the development of the child's agency. Through their own action, they create the opportunities and set the limits within which the child develops her/his conception of her/himself as an agent. The development of agency requires that the child be truly listened to and that her/his ideas and initiatives be taken seriously and discussed together.

Apparent, or normative, agency needs to be distinguished from authentic agency. In normative agency, the person's acts comply with the norms given.

Children, for example, will take initiatives on matters that they know to be permitted and possible. They will rarely take initiatives that they know from the start to violate their limits and to have poor chances of realization. Children will not seriously propose that all the walls of the school be painted in bright colors, for they know that such an initiative is quite unlikely to be realized. People learn at a very young age to comply with norms.

To create something new or come up with a truly new idea, one needs another kind of agency. Authentic agency often means crossing and even breaking the required, given, and permitted[26]. It arises, for example, in situations where the expectations (e.g., rules or norms) conflict with the person's or community's own goals and meanings. In such situations the person (or the community) must try to figure out how to make the situation

24 Edwards & D'Arcy (2004)
25 Greeno (2006)

26 Engeström (2006b)

meaningful. The Kemijärvi movement, mentioned earlier, is a good example of this: its actions were authentic and unexpected and broke norms.

The development of agency is also crucially affected by the way we are talked about and talked to (as children, workers, or elderly people). Are there expectations of active agency, or are we talked about as objects of action? In a layoff situation, for instance, one may easily, and without noticing it, talk about the workers as objects to whom one can do various things without asking them or giving them a chance to display their agency.

Schools can promote children's agency by means of *participatory pedagogy* (see chapter 4), in which they are given the role of active thinkers and doers. On the other hand, it is the duty of the adult, as teacher or parent, to also provide and delimit a world of opportunity for the child to exercise her/his agency in. Agency is not a condition for action but an outcome of action and participation. Therefore anyone's agency, whether child or adult, young or old, can be developed.

# Agency gets us new cultural tools

It is characteristic of us humans to develop various sorts of tools to aid our action. Besides material tools such as various instruments, machines and appliances, we have also developed conceptual and discursive, or psychological, tools, which include concepts, models, and theories[27]. These cultural tools help us to solve physical and intellectual problems and to circumvent some of our biological restrictions, such as a limited memory, errors of deduction, and physical obstructions.

In addition, exercising agency almost invariably requires the use, sometimes even creation, of different tools[28]. For example, participating in a conversation and taking initiatives often require command of the concepts and modes of speaking used in the field in question. It is considerably easier to take an active part in a conversation about, say, gene manipulation if one knows the concepts and the mode of speaking. At the beginning of this chapter we talked about cheating at a test[29]. To do that, one needs to prepare one or more crib sheets. The sheets are both conceptual (the content) and material (the sheet itself) tools, by means of which one can exercise agency for the purposes of problem-solving. A communal, shared form of cheating could be realized by means of cell phones: in a test situation, one could exchange information pertaining to the test with a pal by means of text messages or email.

Today's most significant phenomenon in information and communication technology exemplifying agency is perhaps the social media, or Web 2.0. That means services based on content produced by the users, on participation, and on diverse interaction among the participants.

27 Vygotsky (1978)
28 Engeström (2005)
29 Engeström (2006b)
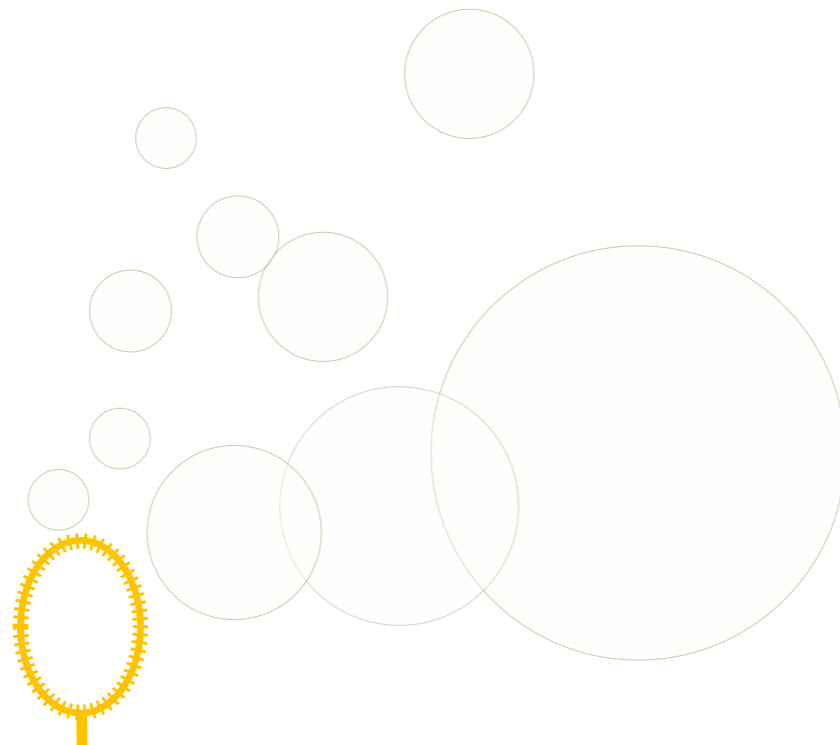
The most typical examples of social media are the blogs and the wikis, in both of which the users produce content, e.g., for the web dictionary Wikipedia and the video service YouTube. Non-official quarters, i.e., internet users, are often quicker to publish significant news than the traditional news agencies are; a good example was the 2004 tsunami in Thailand caused by an earthquake in the Indian Ocean. On the other hand, one sometimes gets the feeling that technology, as it becomes more and more complicated, is taking the active role of agent, starting to live a life of its own, and leaving us people just to react, passive and powerless. Such feelings must have been experienced by many of us who have tried, for example, to adjust the data security and internet settings of a computer or a mobile device.

## The ubiquity of agency

The agency of children or students can be promoted by varying the learning environment. As a physical environment, the classroom generates a certain kind of interaction: the teacher and the students have preconceived ideas on what can be done in class and what is the position of each participant. By taking the class out of the classroom the teacher can provide opportunities for new kinds of interaction and stocktaking, which would not necessarily be materialized in the classroom.

Outside the classroom, the students have better chances to display their own know-how, which would not necessarily come to its own in the classroom. Children learn things like the use of new technology considerably quicker than adults do, and it pays to make use of this situation by bringing laptops, cell phones, internet tablets, and other easily usable gadgets into play. Children are also quick

to learn and develop new ways of piggybacking technology, so that the use of gadgets is an excellent way of highlighting children's own expertise and agency.

## Points to ponder:

How could you help students feel that they are subjects of their own actions, i.e., agents?

How do you understand the claim *Learning is more than knowledge and skills*?

Why is it important to take students' initiatives into consideration?

What do you think of the claim *Students must be permitted to start new discussions and comment on one another's contributions*?

Why is it important to recognize the ideas that students come up with and to publicly acknowledge them?

# The Metakka project: media professionals promoting the development of students' media skills

**Pia Lempinen, Metakka project,
Media Center Saimaa**

In the *Metakka ['Rumpus']* project, students produce news about their own school. They get help in their news work from professionals of the Finnish Broadcasting Company (YLE), the school link of the newspaper Etelä-Saimaa, and a freelance journalist. The students produce the contents of the news on topics of interest to them, and at the same time they familiarize themselves with the technical aspects of news work. The young media reporters, mostly fifth-graders and sixth-graders, shoot news material with video cameras and edit it with an editing tool. The resulting electronic newspaper is compiled onto the *Lehtiverstas/Magazine Factory* platform produced by the Finnish National Board of Education. The school reporters write news texts and practice taking pictures to go with them.

The *Metakka* project develops students' media skills by having them simulate the authentic process of news work in ways that promote learning. Particular attention is paid to the skills of expressing oneself. Besides the form and content of news stories, the students acquaint themselves with the use of cameras, software, and the network environment. Content is always the chief point, but information and communication technology is also important as a tool.

In the news work, the dialogic inquiry model is implemented. At best, it offers encouragement to different learners; there are challenges galore for everyone, and the work brings out such skills in the students that sometimes go unnoticed in the day-to-day school work.

## The goals of the Metakka project

- to increase media education at school by creating practices of collaboration between schools and local media operators
- to provide teachers with a concrete model for realizing a media education project
- to instruct students to analyze, interpret and, above all, produce media content
- to instruct students to use appropriate tools and appliances in the production of media content
- to guide students to produce media content concerning their own milieu

## The outputs/results of the project

- the school's own television news broadcasts, supplemented with web pages produced for the YLE Radio South Karelia website, containing stories and pictures on the topics of the TV news
- electronic school newspapers
- supporting materials for news work
- a model of continuing education for teachers, in which they learn media skills together with students

## A role-differentiated division of labor steps up the work

There are four stages in *Metakka* work. First, there is a lesson on news, where the students get acquainted with the journalistic way of thinking by means of miniclasses and exercises. After the news class, the students have about a week's time to form the work groups, to cast the roles, to plan their topics,

and to personally contact the persons they have chosen to interview.

The actual news work is done during two days. On the first day, the material is gathered, that is, the interviews are conducted and the pictures and videos are shot. On the second day, the material is edited and finished into complete stories.

The final stage in the work is getting acquainted with the media house and compiling the TV news in the studio. The planning stage is the class group's own time, but in all the other stages, the participating media professionals and/or the experts of the Media Center Saimaa join the students.

For the TV news work, the class is divided into four telegram and story groups, with 3-4 students in each. They have already learned the roles of a news team in a news lesson held a week before the action days: the reporters, the photographers, the editors, and the net group. The reporters carry the main responsibility for the texts and the planning and conducting of the interviews. The photographers and the editors work in pairs at both the shooting and the editing stage. The net group has the job of documenting the work of the others by means of photographs and brief stories and broadening out the theme of their own work group's story or telegram by writing a story about it on the net. The main thing, however, is the joint planning of the group's work and everyone knowing what everyone else is doing.

Each group is provided with a designated responsible adult (a teacher, a media professional, or a Media Center Saimaa instructor), with whom the group will ponder, just before embarking on the gig, on the content of the story and the approach to be taken in the interview situation. There is also an adult tutor present when the students work on the story, giving technical or contentual guidance as needed.

The stories for the electronic newspaper, too, are prepared in pairs or small groups. In an interview situation one student may ask the questions, another may write down the answers, and yet another may be using the camera. When the story is written up at school, the group edits the text together and selects the best pictures to illustrate the story. During the two days, the small work groups find the time to produce several stories.

## Further information

Jimi: Look at all this pollen coming off!
[shakes a birch twig]

Mikko: Birch.

Roope: Pollen.

Jimi: Pollination.

Mikko: Hmm. Human pollination!

Jimi: Yeah.

Roope: Hey, they got it wrong in the book!
People can pollinate, too!

Jimi: Yeah, that's right!

Mikko: People can pollinate, too.

# 3. Moving across the boundaries of contexts for learning

The question of how the use of learned skills and knowledge in a new situation can be supported has exercised the minds of learning scientists for a long time. This question, about the transfer of learning[30], is one of the most crucial conundrums for our school system, as the school is supposed to advance the students' competencies to act in the world outside it. Recent studies on the transfer do not provide an unambiguous answer to the question: some studies conclude that it is possible to support transfer, while others disagree. Some researchers of learning have proposed that the concept should be dropped on the grounds that (despite best efforts), the phenomenon does not seem to surrender to conceptualization[31].

The situation presented above, however, can be regarded as a good example of transfer, as the boys are able to collaboratively interpret their observations in the light of the knowledge learned at school. Their interpretation of the situation results also in a critical stance towards the information presented in the book. Thus, the situation seems to concern a wider phenomenon than just the transfer of a grain of knowledge to another situation.

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30 According the classical definition, transfer occurs in a situation in which the learner's previous mental representations correspond to the representations required in a new situation. Though the newer definitions of transfer come close to the concept of transition, which is central in our thinking, we draw an argumentative distinction here in regard to the classical definition and its background assumptions about the nature of knowledge.
31 See, for example, Tuomi-Gröhn & Engeström (2003); Lobato (2006)

## Transitions require agency

The boys in the example encounter many different contexts for learning every day. During a day they take part in diverse formal, non-formal, and informal learning environments. They play together during school recesses and in the nearby park, visit the library, play games at each other's homes, chat on the net, pursue their hobbies, and go to movies and exhibitions with their families.

There are differences and similarities among contexts for learning in regard to what kind of participation they call for and with what kind of tools and with whom the participation takes place. These differences and similarities require one to recontextualize one's know-how to the demands of the situation and the environment. To take part, the boys in the example must know how to make transitions, i.e., how to match the knowledge and skills they have developed in different communities and situations up to the demands of another situation and community. For example, taking part in an internet chat calls for knowledge of popular and youth culture. At school, learning practices are often arranged so that taking part in a given lesson calls for command of the subject matter covered in previous lessons and in other school subjects. In such situations, participation is based on previously acquired know-how, which is recontextualized to the requirements set by the new situation.

The simplest way of describing transitions is through a situation in which the practices of two cultures alien to each other have features in common but also local differences. It is possible for members of either culture to participate in the practices of the other on the basis of previously acquired competence. However, the competence must be recontextualized to the new environment. A good example would be soccer, which is similar in Finland and Brazil[32]. A Finnish soccer player could easily take part in a game in Brazil even if s/he did not speak a word of Portuguese or the local rules were different from the Finnish ones. For another example, literacy and computer skills developed at home enable children to participate successfully both in and out of school.

Transitions do not occur by themselves but require agency[33]. In soccer and reading alike, the agent must recontextualize her/his competence to align with the affordances and constraints of the situation. The agent not only needs to remember individual pieces of information and carry them over to the new situation, but it is also vital that s/he perceives her/himself as an active and accountable agent. When making transitions, the person also transforms her/his identity. In this, s/he uses the sociocultural resources at her/his disposal. For example, the Finnish soccer player can use Portuguese-language soccer terms, local playing practices and equipment, and the social relationships of the new team when re-defining her/himself as a player.

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32 Lonner & Hayes (2004)
33 Greeno (2006); Beach (2003)

## Discussions tell us about transitions

From the point of view of transitions, it is important to notice that in the situation presented at the beginning of this chapter the boys juxtapose two situations that are temporally and spatially apart. Roope suggests that there is a connection between the lesson in which pollination was dealt with and the situation at hand. Mikko and Jimi recognize this, and thus the boys negotiate a meaning for their observation[34]. The discussion is a good example of how talk enables one to cross the boundaries of situations and environments[35]. It also shows graphically how the students positioned themselves as active and accountable agents by means of the juxtapositioning and took a critical stance towards the information provided by the textbook.

People draw similar parallels between different situations and funds of knowledge constantly. Conversations are full of intersecting references to previous discussions, experiences, information, and the wider sociocultural context. Different communities have their different ways and rules as to what sorts of parallels can be drawn in discussions. These ground rules[36] are part of the tacit knowledge that members of a community learn by participating in its activities. Indeed, some learning scientists posit that students bring to the school not only their own notions, e.g., views of natural phenomena, but also their communities ways of seeing and talking about things[37]. From the point of view of transitions, it is a challenge to learn to recognize the differences

34 Bloome & Egan-Robertson (1993)
35 Pappas et al. (2003); Engle (2006)
36 Edwards & Mercer (1987)
37 Edwards (1993); Roth (2008)

*Hey, it understood when I showed it where there's bread!*

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41

among different communities and their ways of talking and to take part in each discussion skillfully.

Students' ways of drawing example-like parallels, displaying their funds of knowledge, and talking about different phenomena are not always lucid or clearly stated but may be ill-defined, informal or strongly emotional and personal[38]. They may mix different ways of discussing and conceptualizing observations – the situations may often seem also downright wrong from the adult's or expert's point of view (for example, the boys in our example are forgetting that the effects of humans on the spreading of plants were discussed on the very next double page of the textbook). The parallels give hints of the discussants' ways of building bridges between previous experiences and observations through talk and of their ways of perceiving the similarities and differences between juxtaposed situations[39]. When these initiatives are met with appreciation, students are positioned and supported as active and accountable agents who make use of different funds of knowledge[40].

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38 Pappas et al. (2003)
39 Terwel et al. (2009)
40 Kumpulainen, Vasama, & Kangasalo (2003)

*I can make the whole world go round!*

## Transitions get support from flexibility and openness

The class of the boys in the example had carried out a dialogic inquiry project, during which the class examined Finnish forest ecology in depth. The guide of the local nature club, Osku, joined the project as partner in collaboration and expert. Under his supervision, the class gathered observations all through the year on the condition of a forest near the school. For making observations, Osku provided the class with fieldwork equipment and concepts and practices of nature enthusiasts. The students in turn presented their observations to members of the nature club and to a wider audience in a joint evening event of the school and the nature club.

In the example, Osku serves as a broker, a person providing the students (and the teacher!) with the opportunity to recontextualize their previous know-how to the demands of another community and environment. Osku can be seen as a translator between the school and the nature club, who is able "to speak the language" of both communities. Through his brokering the work of the class connects to the wider network of communities of practice outside the school in two ways: under his support, the class can participate in the activities of the nature club, and as an expert, Osku brings new cultural artifacts, tools and practices to enrich learning at the school.

Transitions are also facilitated if the object of activity is flexible and open to changes. This helps in matching up one's previous know-how to the demands of the new situation. For example, the joint evening event of the nature club and the school in our example served as a boundary object between the two communities[41]. Working for the joint event afforded both communities an opportunity to match up their previous competencies to the new situation. Openness to change concerns not only activities between communities but also activities within the community. The flexibility of the dialogic inquiry project carried out at the school enabled the class to make changes according to the interests and participation of the students.

Transitions can also get support from networks of different communites of practice. For this to happen, the affordances and constraints provided by the practices, artifacts and tools of the different communities must be sufficiently aligned. A good example would be the collaboration between the home and the school, which reciprocally supports the child in acting competently in different environments. For example, doing "everyday math" when going to the store or in a sports event, or various literacy practices can serve as situations in which the child learns to put skills acquired at school to use with her/his parents and other family members. Similarly, hobbies offer opportunities for children and adults alike to develop their skills as part of a wider network of communities of practice.

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41 Star & Griesemer (1989); Engeström (2004); Hakkarainen (2000)

## Domains of competence cross the boundaries of contexts of learning

Support for recontextualizing skills is also afforded by different domains of competence, tools, and environments. Here, domain of competence refers to an elaborate ensemble of practices and requisite tools, which connects groups and communities[42]. In the example at the beginning of this chapter, the domain of competence in question was natural science or, more precisely, biology.

The natural sciences deploy an elaborate assembly of different tools (for material and psychological tools, see Chapter 2), social practices, roles, and rules. Through these, researchers and different communities engage in examining and discussing the shared boundary object[43]. As a result of cultural-historical development, the tools and practices have been molded to be flexible enough to accommodate the many needs of the local communities and yet also to be robust enough to retain their own identity in between the different communities. For example, the architecture of laboratories follows a certain pattern. Though individual laboratories differ, the knowledge embedded[44] in the environment, the tools, and the practices helps the user adapt to the affordances and constraints provided by the new environment. In this way, the material and psychological tools relating to different domains of competence and different environments support transitions.

Domains of competence need not be thought of as academic disciplines only. Occupational safety, popular culture, and information technology, to name just a few, can also be characterized as domains of competence[45]. Like natural sciences, soc-

cer, for example, also entails many different roles (player, coach, fan, sponsor, sports writer), through which one can take part in the activities of the domain of competence with different tools. The difference between academic disciplines and other domains is that the former adhere to more rigorous standardizing criteria than the latter regarding the ways in which knowledge and competence can be applied in different contexts. Two backpacks and a tennis ball can easily transform into goal posts and a soccer ball in a park, but building a laboratory calls for a bit more effort.

From the point of view of transitions, the versatility of the practices and tools of a domain of competence and how it is valued in different environments are of the essence. Information technology is a good example of that: the IT skills learned at home and with friends enable one to act skillfully at school and at hobbies, for example, even if the software and hardware were different and were used differently. Similarly, the ability to read is valued widely in different environments and communities[46].

## The goal: a network of contexts for learning

Learning scientists often use a variety of concepts to talk about learning environments. They might say they are studying affinity spaces[47], for example, or supportive, open[48], hybrid[49], merged[50], or powerful[51] learning environments. What all these have in common is that the researchers' attention is focused on examining and developing one environment. Although it is important from the point of view of the school or the museum, for instance, to develop one specific environment, it is worthwhile to understand how different contexts for learning form a network and can thereby support the learner's or the community's active and accountable agency. The example at the beginning of this chapter is a good illustration of that.

In the example at the beginning, the boys positioned themselves as accountable agents able to interpret their observations in the light of what they had learned before and to take a critical stance on the information. At the same time, they recontextualized their skills in making observations on natural phenomena to a new situation. This was not just the result of the boys' agency but also of how their agency had been fostered by different people and communities. Through a dialogic inquiry project carried out at the school, the boys had had an opportunity to move between different communities and interact with experts in natural sciences. In this way, they were able to see what they had learned as part of their own lives, in which funds of knowledge built in different contexts of learning support, complement, and enrich one another[52].

A network of contexts for learning that supports agency will not come about without effort. Being an actor in the network calls for openness, flexibility, inclusiveness towards others, and the ability to see the changing object of activity from the other parties' point of view, too.

42 Nocon (2000)
43 Engeström (2006b)
44 Hutchins (1995)
45 Walker & Nocon (2007)

46 Walker & Nocon (2007)

47 Gee (2004)
48 Hannafin, Land, & Oliver (1999)
49 Pappas et al. (2003)
50 Bonk & Graham (2005)
51 de Corte, Verschaffel, Entwistle, & van Merriënboer (2003)

52 Lemke (1997)

### Points to ponder:

What does the concept *learning bridges* mean to you?

Why is it important to understand what knowledge, skills, and experiences are valued in a given learning environment, such as a museum?

How do you understand the claim *Instead of learning environments, we should be talking about a network of contexts for learning*?

# The learning project Liikkeelle! takes students to everyday learning environments

**Heli-Maija Nevala, Project Liikkeelle!, Finnish Science Centre Heureka**

We all have visions of learning and the school in the future. The project *Liikkeelle!* [*'Let's get a move on'*] aims at developing the structures and the work culture of the school towards supporting the current conception of learning. We need practical tools that work here and now and also take us towards a new culture of learning.

*Liikkeelle!* is a national project to develop learning environments, funded by the Finnish National Board of Education and directed to upper primary schools (grades 7-9) and grammar schools (grades 10-12). The project is to produce a model and tools for a learning project that implements dialogic, collaborative learning and starts off from the immediate surroundings of the school. Information and communication technology is to be used from pedagogical starting points.

## Pedagogical objectives

- to support collaborative and dialogic learning
- to attain closer collaboration among the school subjects and between the school and the community
- to diversify learning environments and promote learning in authentic environments
- to develop the use of information and communication technology in teaching
- to narrow the gap between the school and young people's everyday life
- to support young people's participation in society

By means of the project model we strive to reshape the work culture of the school and to support collaboration at different levels. In carrying out the project, the school can collaborate with local and regional experts, public authorities, politicians, and local communities, to name just a few. Besides the traditional channels of participation, the project will try out a social network service as a meeting place for young people and adults.

## The results of the project

The learning project *Liikkeelle!* will generate a model of a learning project for upper primary school and grammar school. It will take the students and teachers out of the classroom, into everyday learning environments.

To support the schools in carrying out the project, we will devise an internet service that offers

- a project model and instructions for project administration
- methods and project billets for different subjects, inter-subject collaboration, and the collaboration of the school with other actors
- a social network service and a map base, which will provide for building up and distributing knowledge and for interaction between the school and its partners in collaboration

The internet service will be at schools' disposal from the academic year 2010–2011 on.

## The everyday environment as a starting point of learning

In the learning project *Liikkeelle!* the contents and motivation for learning are found in the everyday environment. The immediate surroundings of the school are examined and evaluated from the points of view of different disciplines and arts, the individual, and the society. The common factor is the interaction between humans and the environment. How do we influence our environment? In what ways does our everyday environment influence us and our wellbeing?

The points of view have been divided into three themes:

- *Environmental studies* examines the environment from the point of view of natural sciences
- *A plunge into everyday life* charts our everyday environment, e.g., through cultural geography, psychology, and art
- *Society, that's us* examines historical change in the environment, societal decision-making, and means of making a difference

Each school selects the themes and their contents from its own starting points: What points of view are topical in our community, in our everyday environment, in the experiences of our youngsters? How does the project *Liikkeelle!* support learning pursuant to the curricula of different subjects?

## Further information

The website of the project (in Finnish) is at www.liikkeelleym-paristo.fi
Tiina Hyttinen, Project Coordinator: tiina.hyttinen@kalajoki.fi
Heli-Maija Nevala, Project Designer: heli-maija.nevala@heureka.fi

## 4. Dialogic inquiry and participatory pedagogy

Teacher: Why was it that your opinion did not carry so much weight in the group?

Benjamin: It's a bit like in some movies and programs, the group had main characters and sidekicks. The main characters called the shots, what we'd do, where we'd go, when and why. The others were just bystanders.

The nature of the classroom interaction is crucial for both learning and the development of agency. Consequently, one of the teacher's most important tasks is to foster the kind of interaction that develops the learners' authority and accountability.

In the above example, a fourth-grader describes his experiences of working in a group of four. He feels that two members had more influence than the others on the group's interaction and decisions while the other two stood by. The situation is a good example of the way students can receive and take different positions in classroom interaction. The student gives an apt description of his experience by means of the concepts of *main characters* and *sidekicks*, learned from movies. He did not regard his position as a sidekick in the group as satisfactory and meaningful.

## From teacher-centered to participatory interactive practices

Research has shown that classroom interaction is often very teacher-centered[53]. The teacher speaks with one student at a time and evaluates the content of the student's answer publicly. A background assumption is that there is just one correct answer to the teacher's question and that the teacher knows it. This may lead to dialogues that are short and, especially on the part of the students, contentually barren, as the teacher talks most of the time and asks most of the questions. The students try to come up with the correct answer, competing for turns. The position of the students may be restricted to remembering ready-made facts or mechanically applying what has already been learned.

Teacher-centered instruction has its place, and lecturing, for example, when done skillfully, can greatly inspire students and foster their thinking skills. But the school also needs interaction that emphasizes learner agency and initiative instead of the mere absorption of ready-made contents.

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53 E.g., Alexander (2008); Mehan (1979); Leiwo et al. (1987)

The teacher can engage the students by widening their possibilities for action and raising the expectations of their participation. Students should be taken seriously as interlocutors who contribute to the creation of meanings and can also develop into experts within the class.

Through mutual interaction, students can expand their positions further: they can comment on one another's contributions and initiate new discussions and topics. Taking a stand on others' contributions develops students' active listening skills: they need to convince not only the teacher but also the other students. For his/her part, the teacher can share responsibility by letting one of the students be the chair and asking for the floor by putting up his/her hand like the students.

Changing the seating arrangement or the rules about the use of classroom space can also diversify student participation. Expectations of participation will vary considerably depending on whether the students are seated in rows facing the teacher or whether they can see each other. It is also worth considering whether the teacher should sit among the students and who should have the right to move around in class or write on the blackboard.

Students' opportunities of showing initiative are also affected by the learning practices of the classroom. For teaching to be successful, it is essential that the students commit themselves to their studies and take an active part in the interaction. Their engagement and motivation can be advanced by opportunities of creating knowledge on their own and having a say in the choice of contents. Consequently, students should be given opportunities for dialogic inquiry, i.e., chances of taking part in defining the problems to be dealt with, addressing them, and solving them. There are several methods of doing that, including the Progressive Inquiry Method developed by Kai Hakkarainen, Kirsti Lonka and Lasse Lipponen[54] and the method of Fostering Communities of Learning developed by Ann Brown and Joe Campione[55].

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54 Hakkarainen, Lonka, & Lipponen (2004)
55 Brown & Campione (1996)

## An explorative attitude enriches the student's relationship to knowledge

It is not only the interactive practices of the class that restrict the students' positions. According to research, teachers mostly base their teaching one-sidedly on textbooks[56], in which the material to be learned is cut and dried. For each learning situation, the teacher just selects a suitable bit, such as a chapter in the book. As a result the domain in question is learned only piecemeal, not as a unity. Furthermore, textbooks often present information in a simplified form, which may facilitate the acquisition of the learning point but offers a picture of the phenomenon in question that does not correspond to the polyphonic and complex reality[57].

Following the example of the library could alter students' relationship to knowledge. When students are allowed to seek and use sources of information that interest them, their relationship to knowledge is enriched. Knowing a school subject or another domain of competence includes a notion of what information is available on it, where it can be found, how it can be used, and what are the consequences of using it. Sources of information supplementary to textbooks may include newspapers and magazines, non-fiction books, and experts outside the school. Nowadays, ICT and virtual networks make various sources of information widely accessible. For example, students can independently contact experts via email.

In supporting agency, it is important to take a dialogic and problematizing approach to information. Textbooks and other texts used at school ought to be interpreted and criticized. It is well worth the while to inure students to making comparisons among the pieces of information contained in different texts and noticing that sources of information may be contradictory. When the students form a dialogic relationship to information, they learn to use it as an instrument of thinking instead of just taking it in as presented, with no questions asked.

56 Miettinen (1990)
57 Engeström (1991)

By making versatile and critical use of sources of information, students learn to understand that knowledge connects to wider discourses outside the school. Also, when they get to use their knowledge in diverse situations, students will realize that knowledge is bound to many different contexts. Students' work can be published, and they can exhibit it to different audiences, such as schoolmates, parents, or groups outside the school.

At school, student agency can be supported by showing appreciation of their experiences and giving them opportunities to make use of the knowledge and skills they have acquired elsewhere. Also, students' own experiences and observations from diverse environments outside the school, such as hobbies and time spent with their families, can be used as sources of information. Crossing the boundaries of different contexts of learning will also open up the school towards the students' everyday life.

Students will find it easier to share their own experiences publicly if the teacher does not hide behind a formal role. If the teacher is willing to open up, the students will follow suit. In some Finnish elementary schools, for example, teachers have visited students' homes in connection with their evaluation discussions and have thus got to know the students and their parents better. In this way, matters belonging to the students' lifeworlds have become shared knowledge, which has helped the teacher to plan the teaching so that it deals with matters that are central from the point of view of the students' everyday lives[58].

When school knowledge and students' own knowledge are utilized side by side, the students learn to understand the value of their own experiences for disciplinary ways of thinking. They learn to recognize suitable ways to communicate in different situations and to skillfully combine school knowledge with everyday speech and text genres[59]. Scientific reasoning should not displace

58 Gonzalez, Moll, & Amanti (2005)
59 Kumpulainen, Vasama, & Kangassalo (2003)

everyday reasoning; rather, different forms of reasoning can live parallel lives in school discussions, complementing each other and enriching the interaction[60]. In this way one also promotes the students' agency and their competence to make transitions among different contexts of learning.

## Accountability generates productive interactions

Widening the students' positions requires, however, that the teacher makes sure the interaction is productive and in line with the educational objectives, i.e., that the teaching deepens the students' knowledge of the matters to be learned and deals with the core questions of the domains of knowledge.

What kinds of student work are valued depends on the knowledge domain, skill or art, and the context. The outcome need not necessarily be anything concrete: it can be an insight gained during a discussion, for example. It is important to notice that one cannot force creative productivity; one can only create favorable conditions for it. To combine student authority with accountability, the teacher needs good professional skills. What it boils down to is the unresolved contradiction, inherent in education, between student agency and teacher control[61].

60 Kaartinen & Kumpulainen (2002);
Pappas et al. (2003)
61 Bruner (1996); Rainio (2010)

One way to overcome the problem is to guide the students to evaluate their own ideas and those of their classmates. That way differs from traditional instruction, in which students are accountable only to their teacher for what they say and how they take part in the interaction. One can negotiate with the students, for example, on the sorts of ground rules for talk under which the discussion would be likely to be productive and conducive to learning[62].

Discussions are often guided by implicit ground rules anyway, and thus agreeing on the rules will help the class community become aware of the community's own way of talking and thus develop class discussions to better fit the current objective.

When the ground rules are negotiated with the students, one can also guide the students to see to it that they are complied with. The ground rules should favor so-called exploratory talk. It is a high-quality way of thinking together, in which the participants take a critical but constructive stance on each other's contributions. Opinions are justified, and they can be openly challenged. One can also bring tentative ideas to the discussion[63].

The appropriate ground rules for talk vary according to the domain of competence in question. It has been noticed, for example, that the use of exploratory talk is productive particularly in mathematics and science[64]. In the natural sciences it is

part of good deduction to support opinions with evidence based on either observations or literature[65], whereas in the arts one can place more emphasis on the artistic experience. Collective creative writing may call for ground rules that do not emphasize exploratory talk as much as playing with ideas and accepting them uncritically[66].

In work that crosses the boundaries of school subjects, different ways of thinking can be combined, compared, and collided with each other, so that the students see how the issues and ways of thinking associated with different domains of competence connect with each other. In this way, students' understanding of the phenomena dealt with can be enriched. Furthermore, alongside the knowledge pertaining to the school subjects, the discussions should axiomatically emphasize the students' own experiences and the know-how they have acquired outside the school.

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62 Dawes, Mercer, & Wegerif (2000); Dawes & Sams (2004); Dawes (2008)

63 Mercer & Littleton (2007)
64 Rojas-Drummond & Mercer (2004); Mercer et al. (2004)

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65 Engle & Conant (2002)
66 Vass (2004); Rojas-Drummond et al. (2006)

## Collaborative learning calls for support from the teacher

Collaborative learning methods develop authoritative and accountable disposition in the students. When given responsibility for controlling the interaction, they will get more varied experiences of interactional situations and the positions associated with them.

Most of the time, however, small group activities will not go as expected. The students will not necessarily stick to the topic, or the discussion may be unproductive. The art of discussion must therefore be taught, and agreeing on the ground rules for talk is one good way of doing it.

Another factor that may become problematic for interaction is the power relations among students, as shown in the example at the beginning of this chapter. Though it is often thought that peer interaction is inherently more equal than interaction between the students and the teacher, there may be power relations arising among the students in the group that hinder the learning or participation of some students. Exploratory talk, for example, does not self-evidently guarantee opportunities for all students to participate in the interaction equally. Part of the group may be carrying on an explorative discussion while others just follow it passively or do something else. Furthermore, not everyone's contributions are taken up or listened to.

The example presented at the beginning of this chapter comes from the Learning Bridges research project, in which an attempt was made to systematically influence the mutual interaction of elementary school students. For example, during the experiment the teacher took up the concepts of *main characters* and *sidekicks* that a student had used in an interview. The teacher and the students had a discussion on how they could achieve a situation in which all the students in the class could be main characters and no one would always be a

*Rules for class discussions 2009*

*Everybody gets to speak.*

*We speak kindly and politely.*

*We help if somebody doesn't understand.*

*We respect others and their views.*

*We ask for reasons.*

sidekick or bystander. On the basis of the students' suggestions, the class created a main character's role model, for which the following properties were suggested:

## Main characters

- act for others' benefit, too
- are centers of attention when they talk
- talk about a topic as much as others do
- allow others to be main characters, too
- reason, try to come up with good ideas, give their opinion on others' ideas
- see to it that everybody learns
- make decisions together with others
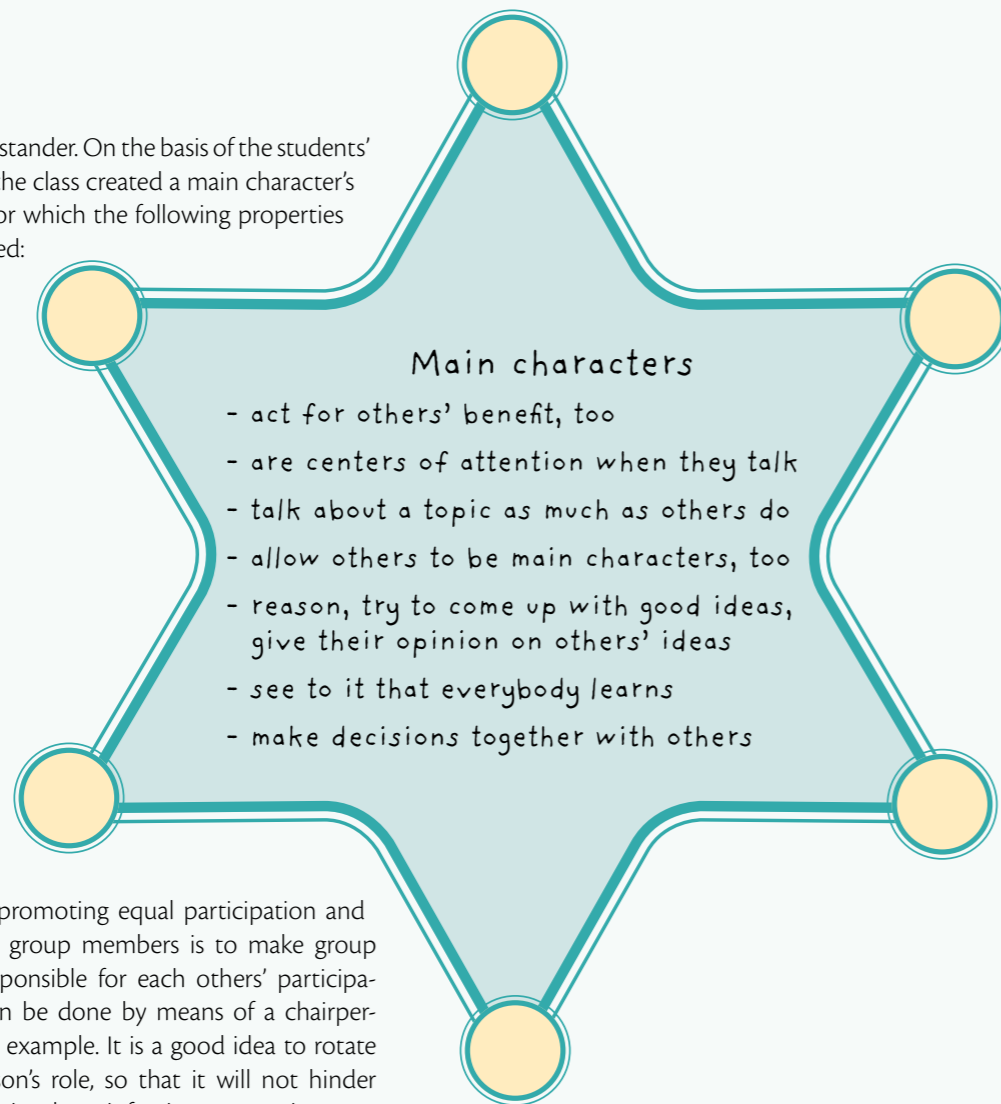
One way of promoting equal participation and agency of all group members is to make group members responsible for each others' participation. That can be done by means of a chairperson's role, for example. It is a good idea to rotate the chairperson's role, so that it will not hinder anyone's learning by reinforcing or creating new power relations among the students.

It is important to pay attention to the chairperson's role by raising the question of what good leadership is like. A student chairperson may delimit the discussion inappropriately, narrowing other students' positions. It is possible, however, to generate an engaging kind of leadership, which allows everyone to participate and initiate[67]. That can be done, for example, by encouraging the students to pay attention to who are the main characters of the group in any given situation.

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67 Richmond & Striley (1996); Rajala (2007)

Superteacher knows everything!

# Authority and accountability build learning bridges

Treating students as authoritative and accountable agents will advance their competence and inclination to see the concepts, working methods, and funds of knowledge as resources that can be applied, questioned, evaluated, and molded. It is also a question of what the students learn to seek in learning situations. It is important that they connect the knowledge and skills they are learning to what they have learned before and ponder on the significance of knowledge instead of just trying to get through the current task assigned by the teacher.

Authority and accountability are prerequisites for the students' being able to put the knowledge and skills they have learned at school to use in their lives outside the school[68]. When they can do that, their learning environment expands temporally to include both past and future situations. In this way, dialogic inquiry and participatory pedagogy can support students' life-wide, lifelong learning.

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68 Greeno (2006)
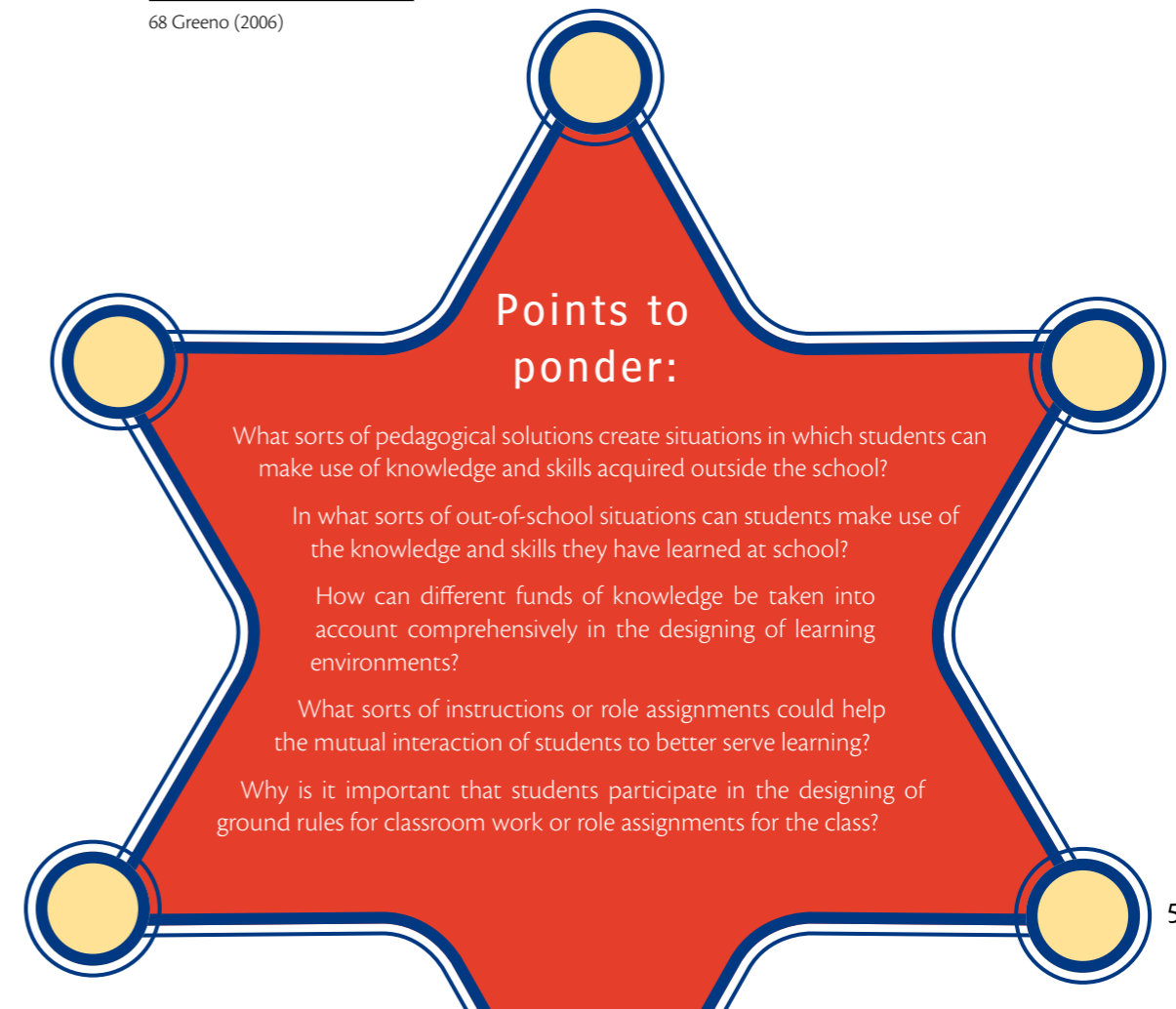
## Points to ponder:

What sorts of pedagogical solutions create situations in which students can make use of knowledge and skills acquired outside the school?

In what sorts of out-of-school situations can students make use of the knowledge and skills they have learned at school?

How can different funds of knowledge be taken into account comprehensively in the designing of learning environments?

What sorts of instructions or role assignments could help the mutual interaction of students to better serve learning?

Why is it important that students participate in the designing of ground rules for classroom work or role assignments for the class?

In the fourth-grade animal project, the students acquainted themselves with the ecology of animals by means of dialogic inquiry. The project aimed at building bridges between the school and other contexts of learning.

### THE OBJECTIVES OF THE ANIMAL PROJECT

The objectives pertaining to the contents and the working methods:

- The students learn dialogic working methods and facts about the ecology of Finland's wild animals as specified in the curriculum.
- The students see the project as an integrated entity and perceive connections among the matters learned.
- The students make fluent use of the knowledge and skills acquired outside the school and understand that the matters learned connect with wider discussions outside the school.

The objectives pertaining to interaction:

- The interaction among the students develops so as to serve their learning better.
- All students take part and benefit from the interaction.

### THE REALIZATION OF THE ANIMAL PROJECT

The project was started by making acquaintance with the scientific classification of animals and hiking through two nature trails. After that, the students formulated research questions.

During the project, the students worked collaboratively in small groups, and the teacher tried to influence their mutual interaction. A good model for that is provided by the Thinking Together approach developed by Neil Mercer's research group, by means of which the students are taught so-called exploratory talk (see Chapter 4). In addition, the students took turns to serve in various roles supporting the work of the group.

The students sought information on their research questions in a variety of sources, and they were encouraged to make use of the knowledge they had learned outside the school, e.g., from their parents or the nature programs on TV. The excursions, too, provided answers to their research questions.

### GOING OUT OF THE CLASSROOM: A BIRD-WATCHING EXCURSION

Of all the excursions carried out during the project, the best remembered one is the bird-watching excursion to Lammassaari Island, which stood out from both regular classroom work and the other excursions. This showed up, for example, in the rhythm of the action: the students ate their lunch provisions, played, observed animals, and discussed their findings in natural alteration. The activity was spontaneous and enthusiastic, being more like leisurely observing nature than going to school.

The excursion crossed the boundaries of different contexts of learning. The guide was a familiar bird enthusiast, who let the students use his telescope to observe the sights opening up from the bird-watching tower. In addition, the students carried binoculars and picture books of birds taken along from home, which connected their learning to their everyday lives and objects in their homes.

Besides acquiring knowledge and skills, the students got to experience a day as bird watchers. They got a glimpse of the way enthusiasts move about in the wild, make observations, and talk about them. Perhaps some students started to see bird watching as a possible hobby. That was suggested by the fact that some of the students took their families on a bird-watching excursion to Lammassaari later on.

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# The fourth-grade animal project: an example of dialogic inquiry and participatory pedagogy

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# 5. Multi-professional collaboration

Multi-professional collaboration means the collaboration of experts from different professional fields who work together in order to reach a common goal. This way of working together is indispensable in today's society if one wants to solve problems emerging in different domains of the society (such as working life, science, and cultural practices)[69]. Connecting the school with out-of-school contexts of learning offers many ways of doing multi-professional collaboration; the collaboration between the school and the museum is a good example. Within municipalities there are also wider opportunities of collaboration, e.g., between education and the cultural services, or by concentrating on collaboration of different cultural institutions among themselves and with schools.

69 Lehtinen & Palonen (1997); Hakkarainen, Lonka, & Lipponen (1999)

The *Gateway to Finnish Culture ('Kulttuurin laajakaista')* program[70] is a good example of what has been achieved by means of collaboration between national cultural institutions and schools: the results of the collaboration benefit not only the workers of the cultural institutions but also students and teachers. The website offers learning material on the Finnish cultural heritage that meets the requirements of the national curricula for the upper grades of comprehensive school, grammar school, and basic vocational education. The material relates to different school subjects and cross-curricular themes. Classes can visit various cultural institutions and use the book on our national cultural institutions *('Kansalliset kulttuurilaitokset')*[71] as background material for the visits. They can also make use of the web pages of the cultural institutions, which include assignments linked to the curricula of different school levels.

70 The website (http://www.kulttuurinlaajakaista.fi/) is accessible in Finnish and Swedish.
71 Itkonen & Kaita-vuori (2007)

In a corresponding manner, the *Culture Path ('Kulttuuripolku')* program[72] developed and realized in the city of Kuopio has pooled the expertise of different actors[73] to promote people's all-round well-being by means of culture and art. The program offers teachers support in the planning and realizing of goal-oriented cultural education. It comprises eight paths that are based on the curriculum of the city and have been designed for the needs of different grade levels and different subjects or cross-curricular themes.

72 The Culture Path is part of the ensemble of programs Active childhood and youth, realized in the city of Kuopio jointly by the educational services, cultural services, and the Center for Leisure-time Activities
(see http://kulttuurikasvatus.kuopio.fi/kuopion-koulut-liikkeelle). It is coordinated by the Center for Cultural Services in Kuopio in collaboration with the educational services.
73 The realizers of the Culture Path are the cultural institutions, the Eastern Regional Center for Dance, Children's Cultural Center Lastu, many cultural associations, private culture activists and educational institutions, and the city schools, with their students, teachers, and principals.

The paths have been named the Library Path, the Art Path, the Museum Path, the Media Path, the Environment Path, the Dance Path, the Music Path, and the Theater Path. For teachers, a handbook has been written for the culture paths pertaining to basic education *('Opettajan käsikirja perusopetuksen kulttuuripoluille')*, and teachers are offered projects, training courses and seminars, which are hoped to bind them to becoming active users of the paths.

# Practices of collegial and multi-professional collaboration

By collaboration we mean conscious goal-oriented action in which the object is shared and the activities concerning it have been planned jointly[74]. Within organizations, that means the sharing of expertise. In research, the phenomenon has been approached through concepts such as shared expertise and socially distributed cognition. These concepts refer to a process in which people share or pool intellectual and other resources pertaining to expertise, knowledge, or the goals in order to achieve something together that they are unable to achieve alone[75]. In other words, people with

different professional skills and experiences pool their expertise in order to solve problems or reach a common goal.

Collaboration may be collegial or multi-professional. By collegial collaboration we mean collaboration among people who have similar educational backgrounds or work in the same profession. One example is collaboration of teachers within a school or across schools. Multi-professional collaboration is collaboration among people of different professional groups, such as teachers' collaboration with experts from different professional groups – e.g., special education teachers, school welfare officers, school nurses, student counselors, or psycholo-

gists[76]. In the field of student welfare services, for example, multi-professionality within the school community has already become established as standard practice.

There is a need to develop practices of collegial and multi-professional collaboration between the school and outside organizations, institutes, and communities, too. The possible partners include societal service providers (such as health care and social services, museum, library, culture, and physical exercise services, the police, and the fire department)[77] plus various societies, institutes, and non-profit associations (such as the church, music schools, sports associations and clubs, child welfare organizations, and parents' associations) that arrange activities such as clubs, camps, and leisure activities.

From the school's point of view, the easiest events to arrange are visits from the partners to the classrooms during the lessons, so that the representatives of the organizations or institutes can present their activities and the matters and values they find important (e.g., nature conservation or equality). During the school day, classes can also make field trips to science centers, museums, galleries, libraries or other organizations, institutes, communities, enterprises, or perhaps to the outdoors. However, visits often call for negotiation with other teachers if they last longer than a normal class period. If joint planning is required, teachers (class teachers in particular) can often take part in it only after the school day, and by then the partners' working hours may be over already.

74 Savonmäki (2007)
75 Oatley (1990); Hakkarainen, Lonka, & Lipponen (1999); Hakkarainen (2000)
76 Honkanen & Suomala (2009)
77 Krokfors, Hakala, Vitikka, & Mylläri (2009)

Some recommendations for collaborative action between the school and outside organizations have already been mentioned in the national core curriculum. The core curriculum for basic education[78] makes mention, among other things, of home – school collaboration, student welfare services, and club activities at school. The curriculum embodies the idea of integrating different learning environments with schoolwork, particularly in environmental studies, natural history, biology, and geography, but classroom work can be extended to other learning environments outside the school in the teaching of any school subject.

There are various actors that organize different after-school activities. These activities are essentially hobby-like and voluntary, which contributes to students' motivation to take part, learn, and feel that they succeed. The feeling of success is particularly important for students who may not always experience it in regular schoolwork. It is of value that the activities be kept hobby-like and not made too school-like – children need to be given room and opportunities to develop their skills according to their interests without their performance and learning being constantly evaluated.

78 National Core Curriculum for Basic Education (2004)
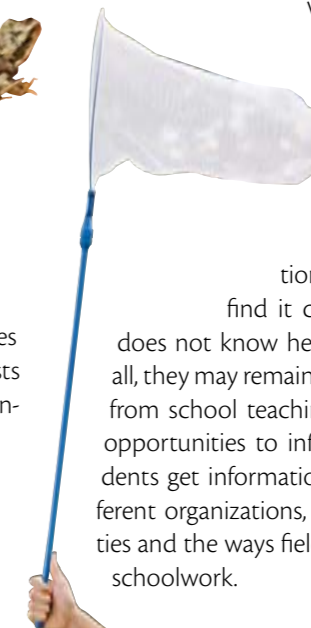
It is of importance that agents working in different organizations value the knowledge and skills acquired in other learning environments and encourage students to display and use their know-how in new situations, even if they sometimes find it challenging. If the teacher does not know her/his students' hobbies at all, they may remain completely disconnected from school teaching. The teacher has great opportunities to influence the ways the students get information on the activities of different organizations, institutes, and communities and the ways field trips are integrated with schoolwork.

# Models for planning and carrying through a field trip

## The model of individual work and of collegial collaboration

There are many ways of planning and carrying through a field trip[79]. The most common way is for the teacher to plan a field trip alone, aiming at systematic use of it as a learning environment. The *model of individual work* is based on the teacher's advance information on the destination and his/her pedagogic outlook and experience.

But teachers of different classes can also pool their expertise by planning and carrying through the field trip in collegial collaboration. In the *model of collegial collaboration*, teachers make use of each other's expertise and experience, e.g., the subject teacher's expertise in biology or history and the class teacher's or class-subject teacher's knowledge and skills. The advantage, besides the sharing of expertise, is that the same field trip can be used to serve several different lessons or the implementation of cross-curricular themes.

Both models are based on the notion that the teacher is responsible for the planning and implementation of instruction regardless of the learning environment. As a result of this line of thinking, the expertise and experience of the staff of the destination and the specific educational artifacts and holdings it may have will pass untapped. That is usually regrettable, for teachers do not necessarily have in-depth knowledge of the exhibitions and other funds of knowledge offered by museums, for example, or of the potential of the exhibitions to serve as learning environments.

The program of a field trip can also be planned by a representative of the destination, either alone or in collegial collaboration. In that case it would be desirable that the planner or planning team also have pedagogical expertise, so that the field trip could serve as a meaningful learning environment. When one wants to plan and implement visits, activities, and exhibitions that meaningfully promote learning, both contentual and pedagogical expertise is called for. For example, museum pedagogs or lecturers can serve as intermediaries between the school and the museum, for they have expertise in both pedagogy and the contents of the museum exhibitions. In the ideal case, the museum pedagog would already take part in the planning of the exhibition in collaboration with other museum professionals[80].

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[79] The different models and practices have previously been discussed in Tissari's (2008) article.

[80] Tissari (2008)

## The model of multi-professional collaboration

In the *model of multi-professional collaboration*, the museum is developed as a learning environment by making use of the expertise of the different professional groups in the museum staff and, possibly, that of professionals working in other organizations also. Multi-professional planning can be done in collaboration within the museum or among the different organizations. The planning team may include invited members, such as teachers or representatives of other interest groups.

Many museums[81] have pre-planned different service packages for field trips from schools. These packages are based on a script drawn up in advance and, often, on collaborative planning by several agents. If the planning of the services has made use of the expertise of different professional groups, the model applied is one of multi-professional collaboration. The various service packages differ, for example, in the extent to which they can accommodate the wishes, needs and interests of the visitors.

A service planned by the museum usually poses little demands on the teacher. The museum pedagog is responsible for planning and carrying out the visit, and the goals and contents of the exhibitions, conducted tours, workshops, and learning paths are often directly linked to those of the national core curricula. In practice, the teacher just orders the service (e.g., a conducted tour, a workshop, or maybe a learning path) from the museum, and a representative of the museum (e.g., a museum pedagog) serves as a guide and supervisor of the work of the students or other visitors.

Museums have made the ordering of a visit easy for teachers: the desired service can be ordered by means of an electronic form or by telephone. In some small communities, the museums have even drawn up a visiting schedule for the local schools and classes.

Many museums also offer ready-made learning assignments to help the teacher integrate the museum visit to the school teaching, both before and after the visit.

The museum pedagog and the teacher will not necessarily engage in multi-professional collaboration during the museum visit. The museum pedagog will naturally carry through the guiding or workshop in a professional manner in accordance with the script. But the script may not have any room for interaction between the teacher and the museum pedagog or the teacher and the students. Thus the interaction between the museum lecturer and the teacher is often very slight, both before and during the visit. Even so, the visit may be quite successful and inspiring for the students.

If the teachers stay or are left completely in the background during the visit, they will not necessarily take part in the supervision of student work and learning during the visit at all. If the teachers do not even attempt to link the visit to their teaching, the visit may remain unconnected with other activities of the students at school or out of school.

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[81] The outcomes of multi-professional collaboration include learning paths (e.g., in the *InnoApaja* project of the Museum of Technology) and culture and museum paths with learning materials (e.g., the Gateway to Finnish Culture program, the Culture and Exercise Path ('KULPS!') of Espoo, the Culture Path of Kuopio, the Culture Path of Turku, and the Art Arc of Tampere).

At any rate, the teacher has the expertise and diverse opportunities to support student learning, for s/he knows his/her students better than the museum worker does and is able to link the themes dealt with during the visit to classroom work by means of instructional discussions and learning tasks and by making use, if possible, of the funds of knowledge offered by the destination. It is worthwhile to use the teacher's expertise to advance student learning – also on field trips.

### The model of distributed expertise

When the representatives of the destination and the teacher(s) plan and carry through the visit together, we can speak of multi-professional collaboration between different organizations. In such cases, a suitable pedagogical model could be found in the *model of distributed expertise*[82]. It is based on the idea that all members of a learning community – the experts from the various organizations as well as the teachers – have expertise in some aspect of the subject matter. In practice, the person supporting and guiding student learning on a field trip can also be the teacher, not only the museum pedagog. In the planning and carrying out of a field trip, the teacher's partner in collaboration can also be a representative of the firm or association,

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82 Brown, Ash, Rutherford, Nakagawa, Gordon, & Campione (1993)

a library worker, a museum pedagog, a nature school teacher, or the teacher of another class.

One advantage of the multi-professional collaboration model is that the teacher can influence the planning and implementation of the visit before, during, and after it. For example, the teacher can talk to the museum pedagog beforehand about the established practices and group-work routines of the class, which can then be used during the visit. It would be a good idea for the museum lecturer and the teacher to also agree on the goals and practices of the visit and on the roles, responsibilities, and tasks of the different agents at different stages of the visit.

It is worthwhile to orient the students to the field trip beforehand, e.g., by means of learning assignments. During the visit, the teacher can give support to the students' group work as the need arises. Afterwards, s/he can make reference in her/his teaching to matters studied at the museum and support their integration to the subject matter studied in depth in the class by means of different exercises and written or electronic sources.

A field trip can be interactive and dialogic. By means of progressive inquiry or collaborative learning or dialogic teaching, for example, one can attain diverse and natural interaction – both within the class and among the students, the museum pedagog, and the teacher. The field trip can be planned to follow the model of progressive inquiry, for example, if the partners have the time, will, and resources to do the planning together.

The planning and carrying out of a field trip in multi-professional collaboration sets great demands on the time and the will of the teacher and her/his partners in collaboration to develop their established practices. It is worthwhile for the teacher to have the students participate in the planning, so that they can have a say about the contents of the field trip: they can access web pages, for example, to acquaint themselves with the topic beforehand. The teacher can also convey students' wishes to the partners in collaboration.

# Challenges of multi-professional collaboration

### Collaboration calls for valuing and sharing different sorts of expertise

The challenges of multi-professional collaboration are largely the same as in any collaboration. Multi-professional collaboration calls for recognition of the strengths of the partners, valuation of different competencies and, simply, the will to bring out different points of view and goals and to carry on negotiations about them. The main starting points can be considered to include the following: setting a common goal, reaching a common intent, valuing different competencies, observing equality, and dividing the basic tasks (see, e.g., the Handbook of student services *'Oppilashuollon käsikirja'*[83]).

The strength of multi-professional collaboration is in the possibility it allows to the partners to make use of each other's material and intellectual funds of knowledge. By intellectual funds of knowledge, we mean mainly the different sorts of expertise that people have. Indeed, the key aspect of multi-professional collaboration is recognizing and acknowledging the partners' expertise and sharing the different professional skills, knowledge, and points of view.

Naturally, the funds of knowledge of an organization cannot be completely open – for example, competition, the operating rules and culture of the organization, and ethical rules and norms set limits to openness.

### Collaboration calls for crossing boundaries

The sharing of expertise and multi-professional collaboration often call for crossing the boundaries of organizations or professional groups. The need

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83 Honkanen & Suomala (2009)

to cross boundaries may arise, for example, from the major challenges of an organization or the problems of the society being so complex that the expertise of a single organization or professional group will not suffice to solve them.

Similarly, the integration of different learning environments requires collaboration across organizational boundaries. The partners bring along the expertise of their organization, professional group, field, or discipline, so that the collaborative activity benefits from knowledge and viewpoints from different domains of competence.

### Collaboration calls for the will and ability to negotiate

The goals of the partners in collaboration may be different and, at best, enrich the collaboration with different viewpoints and contents. One of the main challenges is negotiating for a common purpose and goals, the object of collaboration, and ways of working together. Joint planning of the activity may be particularly challenging if the partners' basic professional education, approach to work,

and manner of working are different[84]. Multi-professional collaboration may also be hampered if the partners are used to working very independently and autonomously.

The teaching profession has traditionally been regarded as a very autonomic one in Finland. However, the teacher's work also includes collegial collaboration, and home-school collaboration is another indispensable part of it. The importance of multi-professional collaboration is also increasingly recognized nowadays, and the school is described as a multi-professional working environment[85].

### Collaboration calls for time, resources, and support

The workday of the collaborating partners is often busy, and the time and resources for collaboration may seem hard to find. It is therefore important that collaboration be perceived as a valuable enhancement. It absolutely requires the support of the management, colleagues, and the culture and practices of the organization. It also affects the contents, quality, and amount of the work done and the spreading of new practices and models of operation within the organization. The challenge is in consolidating the new modes of operation and continuously developing and diversifying the collaboration.

### Collaboration needs bridge-builders and pedagogical leadership

One focal challenge of multi-professional collaboration is in using funds of knowledge in a pedagogically meaningful way. For example, the museum pedagog's notion of learning and its guidance may differ from that of the teacher. It is worthwhile to accommodate and pool the different viewpoints if the end result is a field trip that promotes learning and participation at many levels and in many ways.

The joint task of the partners in collaboration is to support the students' learning process so that they may come out with a meaningful learning experience. If the goals of the partners in collaboration are very different or contradictory, the students will find it hard to understand what is being pursued. Krokfors[86] and her colleagues regard after-school club activities as one possible mediator between the school and other organizations. Similarly, a museum pedagog or lecturer can mediate between the museum and the school, or a teacher between the museum pedagog and the students. Bridge-builders are needed, for they can operate at the interfaces of different expert cultures and help members of different communities understand one another.

Ultimately, it is the teacher who is responsible for teaching in accordance with the curricula and supporting and evaluating student learning. S/he is also responsible for integrating the resources of different learning environments to schoolwork as regards his/her class or the subject s/he teaches. This requires the teacher to have pedagogical leadership skills in addition to the ability and will to collaborate.

### Moving on from short-term experiments to long-term partnership

The carrying out of multi-professional collaboration may constitute just a short episode temporally but may still be of great significance in a problem-solving situation[87]. However, an individual experiment (e.g., the planning of a field trip) is not enough to lead to long-term development, consolidation, and expansion of the activities. Moving on from short-term experiments to long-term partnership is a challenge[88]. We can speak of partnership only after successfully building permanent operative

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84 Honkanen & Suomala (2009)
85 See, for example, Kasurinen (2009)

86 Krokfors, Hakala, Vitikka, & Mylläri (2009)
87 Savonmäki (2007)
88 The characteristics, challenges, and criteria of partnership have been analyzed, among others, by Engeström (2006a).

structures and cultures within or between organizations. Long duration of the collaboration will facilitate the consolidation and spreading of new modes and models of operation. In this way multi-professional collaboration may also have wider effects on the operating culture and practices of an organization or community.

## There is a wide range of services available to schools already

At the beginning of this chapter we introduced two cultural services that have already become established. Similar services for schools have been developed through collaboration of many organizations in many other communities, too. For example, the European Social Fund and the Finnish National Board of Education have granted funding to different projects for developing learning environments. In these projects, models of action and working methods are developed that support learning both in and out of schools.

However, not all activities need to expand into national or regional projects. An individual teacher, too, can take the initiative and establish contacts with other teachers and representatives of different learning environments and negotiate for opportunities of collaboration. The collaboration can also be small-scale: for example, the teacher can negotiate with the museum pedagog in advance about her/his possibilities of influencing the planning and carrying out of the museum visit and about her/his role during the visit. Similarly, cultural institutions can send their staff to schools in their neighborhood to give information about their services and opportunities of collaboration. The possibilities of collaboration and networking are limitless.

### Points to ponder:

What experts outside your organization could take part in planning a learning environment or supporting and guiding the processes of studying and learning?

How could different experts take part in supporting and guiding students' processes of studying and learning?

What sorts of pedagogical approaches and models would you find suitable for planning and carrying out a field trip?

How could multi-professional collaboration benefit you and your organization?

How could multi-professional collaboration be best developed and supported?

# Environmental education and foster-class activities at the Vantaa Nature School

**Katja Lembidakis & Olli Viding, Vantaa Nature School**

The Vantaa Nature School, founded in the fall of 1991, was the second nature school to be founded in Finland. It has influenced the mission and practices of many other Finnish nature schools. In turn, Finns have adopted their model largely from Sweden, where nature school activities are considerably larger-scale.

The forms of activity at Vantaa Nature School include foster-class teaching, courses, and guided nature walks. Foster-class activities have been found to be a good way of realizing environmental education, for the method allows a better and more suitable instruction than once-off visits would.

During the foster-class year, four nature walks are carried out, and the students prepare for them by means of advance assignments. Dealing with the topic continues in class after the visit. In this way, learning will be not a once-off visit but a process, so that the visitors can focus on the nature school program, observing and experiencing the nature during the proper nature school day and continuing work on the topic in their own school.

For the teachers, 3–4 training sessions are arranged during the foster-class year. They familiarize themselves with the theory and practical arrangements of the teaching days and get supporting material on the topics to be dealt with.

During their foster-class year, the students and teachers of the class gradually acquire a mode of working different from their familiar classroom work. Besides, our aim has been to arrange follow-up activities for the foster classes after the year, with the immediate surroundings of their own school as the learning environment and their own teacher taking responsibility for the teaching package under the supervision of a nature-school teacher.

## THE GOALS OF FOSTER-CLASS TEACHING

In the nature school, the students learn about nature *in situ*, with research studies, stories, games, and riddles as their learning aids. The goals are derived from the national core curriculum for basic education and general models of environmental education. In the selection of teaching methods and equipment, the ease of use and adaptability have been the guiding principles. The programs can be integrated into several school subjects.

The objectives of a foster-class year at the Vantaa Nature School are the following:

- to enrich the students' personal relationship with nature by offering them experiences and information about it
- to help people realize that they are part of nature, completely dependent on it yet affecting it
- to teach the functioning of nature's delicate system by means of activity-based teaching
- to train teachers by giving them tips on using the immediate surroundings as a learning environment

The target group of the foster-class year comprises both the teacher and the students. To the teacher, the year offers an opportunity of in-service training and workplace learning both theoretically and concretely, together with his/her own teaching group. It is hoped that the learning outcomes of the foster-class year might become standing practices and spread through the school.

## ACHIEVEMENTS OF FOSTER-CLASS ACTIVITIES

Previous studies on foster-class activities are few and far between. However, at the end of each year, the Nature School collects extensive feedback in order to refine its operations.

For the students, the foster-class year

- adds to their knowledge of natural history and Finnish culture, teaches them new working methods and how to move in the outdoors, develops their motor skills, molds their basic values, and strengthens their emotional bond with nature
- strengthens their personal relationship with nature, increases their readiness for independent hiking in the woods, and enriches their conception of nature (Katajainen-Hakala, 2003)
- also supports special-education students' learning through its action-based methods
- strengthens the class spirit

Teachers, for their part,

- get to rehearse what they have learned before, acquire new working methods, get practical ideas for teaching various topics, peer support from other foster-class teachers and/or their own teaching partner, and the courage to take their students outdoors
- are interested in foster-class activities (Koski-Lammi, 2008)

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# 6. Thoughts on future curricula

I will be the world's best swingist, I'll swing up to the skies!

# Does the curriculum support the educational mission of the school?

It is by promoting learning and know-how that a society is developed. The goal is to foster active agency among the citizens. Basic education has been called the society's tool for generating educational capital. Its tasks have been considered to include both the conveyance of the cultural heritage from generation to generation and the maintenance and advancement of such knowledge and skills as are considered necessary for the society. The school's duties are also considered to include the generation of new culture and the renovation of ways of thinking and acting. In this line of thinking it is a great challenge to develop the contexts of learning so that they might support interaction, learning, sharing and building knowledge and skills in the best possible way.

According to the prevailing sociocultural perspective, we should consider learning to cover all contexts, and when planning teaching, we should be thinking in terms of using different learning environments, materials, and tools as part of the school's working methods more than before.

The knowledge and skills dealt with at school do not necessarily touch upon the students' world of experience, societally significant discussions, or the individual in any concrete way. The students may be endowed with the role of an outside observer of sorts. Such a role does not match with the image of an active learner emphasized in the current perspective on learning. In the future, the school's notions of knowledge and skills must be examined critically, both at the level of the curriculum and as knowledge and skills of the teacher and the learning community.

According to the modern conception, education (Bildung) is a creative process, in which humans mold and develop themselves and their cultural environment. The modern conception of education also embraces the idea of topping the current state. This means that in the educational process the individual reaches for progress, which, however, cannot be closely defined in advance.

When drawing up a curriculum, one needs to consider whether its task is to be a steering devise of teaching or a teacher's tool. If the steering properties come to the fore, the curriculum will emphasize supervision and control, tests and measurements. Then again, if the guiding principle of the curriculum is that it should support the teacher's own pedagogy – and work as the teacher's tool – then the curriculum will focus on creating the preconditions for open and situative action. At its best, the curriculum as part of the steering mechanism will look after educational equality and the internationally recognized high quality of our schools and, at the same time, provide the teacher with the tools to support the students' learning processes in diverse and flexible ways.

The Finnish school is already in the process of moving over from teacher-centeredness to student-centeredness. The steering system is striving to provide flexibility and freedom to both the division of teaching hours and the drawing up of national and local curricula. The intention is to develop the framework of teaching hours in such a way as to enable the best possible way of implementing a pedagogy that combines school learning and everyday learning better than before. We need a curriculum that resolutely supports

the student's active learning processes, knowledge formation, and command of diverging learning environments and funds of knowledge.

In its most common pedagogical sense, education (Bildung) means becoming human. There is a reservation, though: one does not become human without upbringing and education. In the modern educational sciences, to be educated is primarily perceived as a pedagogical principle, not as an ability or feature of the individual. Education (Bildung) as a process of a student is an open potentiality that may come to fruition in quite different ways, depending on the shape the student's experiences take.

In the Bildung process, the school's task is education above all. When defining the educational task, one must take a stand on whether the task is to be seen primarily as conveying the cultural heritage and ensuring continuity or as a tool for changing the prevailing conditions.

The school's pedagogical mission in the educational process is largely a question of civic education: the school should turn out citizens who are able to function in the society and, at the same time, also manage to contribute to its development. In this regard one has to consider whether the civic skills the school conveys to students are based on the challenges of the current and the future society or on the cultivation of traditions. Between these two, we must be able to find a balance, a platform on which the school can be developed.

# Learning takes place everywhere

In drawing up the core curriculum, there has been talk about the school opening up to the society. There is an increasing tendency to see the school as part of the neighborhood, or rather, to append the immediate surroundings of the school to its activities. From the point of view of lifelong learning, this means that the operation of the school could be extended from basic education to different hobbies and after-school activities. The school could quite well be a local center connecting different groups to one another.

In these changing circumstances, how could we characterize the pedagogical upbringing that arises from the school's educational task? From the student's point of view, to be educated has been understood as a dialog between the self and the society. From the point of view of schools, education is a pedagogical task that will not be taken care of by accidental environmental influences but requires focused and purposeful pedagogical guidance and interaction between the pedagog and the student.

Pedagogical guidance, or instruction, takes place in the school environment, which refers to the unity in which all school activities take place. Instruction is thus a considerably wider event than the teaching of the contents of a given school subject. In Finnish school traditions, the school environment means the general and the subject-specific objectives of the curriculum. From this point of view, instruction can be understood to encompass all school activity that is connected with the objectives. At school, the educational task is carried out by means of teaching.

Apart from traditional schoolwork, children and young people learn, study, and are taught outside the school, in connection with different hobbies and clubs and in the midst of friends. Their world of experience encompasses many sorts of places and occasions for learning. The life world of today's children and young people is much wider than before, and the social media in particular have brought a new dimension to learning. In educational research, the learning that takes place outside the school is described as informal learning, as opposed to the formal education offered by the school.

Learning takes place everywhere. The formal education provided by the school is one part of the ensemble on which the shaping of our children's world view rests, but today most of children's learning experiences already come from informal learning and everyday experiences. The school must recognize the situation, and as a formal educational institution it has the duty to try and integrate formal education and informal learning into a unity that helps the child develop in the best possible way.

## A pedagogy for putting informal learning to use

The school opens up to the surrounding society through new contexts and actors. Besides physical learning environments and the adults acting in them, virtual environments and the skills and tools they require are developing at an increasing rate. For a digi-native, i.e., a student born in the 1990s, it is easy and natural to study in virtual environments – much easier than for adults. The acquisition of knowledge, participation in knowledge creation, and the sharing of knowledge in different virtual environments are natural activities for digi-natives. When an implement or a tool, perhaps an open virtual network, becomes a part of knowledge formation, the task of the school must be refocused again. A critical attitude towards sources and ethical issues becomes ever more important.

In environments outside the school, students acquire knowledge and skills of kinds that current school teaching does not necessarily give them enough chances to use. Unnecessarily sharp boundaries, even contradictions, have arisen between school learning and informal learning. For schoolwork and students' interests to meet, the teaching must increasingly draw from the students' world view and from outside the school. It should not delimit learning and studying only to action that takes place in the formal school environment and is based on contents defined by the school. For students to perceive their studies as meaningful, the learning environments and the school pedagogy must be able to respond to their needs and objects of interest in a relevant manner.
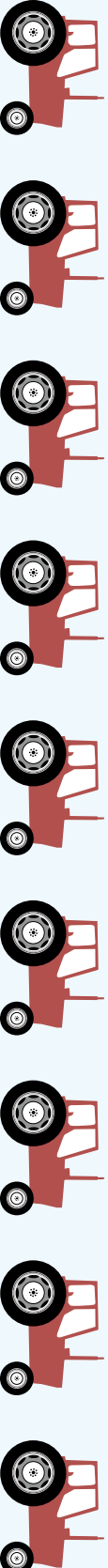
The strive to bring the students' world of experience and social reality closer to school pedagogy is referred to as a pedagogy for putting informal learning to use. Such a pedagogy emphasizes different studying environments outside the school and different learning materials and tools as central

parts of the curriculum. Museums and science centers are good examples of informal learning environments. For young people, the various blogs and wikis on the internet function as important places to study and build knowledge.

For ten years already, researchers in education have been talking about the significance of a pedagogy that puts informal learning to use, for such a pedagogy has been found to influence student commitment and motivation. A pedagogy that puts informal learning to use is in fact implemented in schools all the time, but it is often seen as an add-on of sorts and not linked to the objectives of the curriculum in a structured manner. We must find virtual ways and environments for action that network teachers and schools and by means of which open learning processes attaching to the curriculum can be developed.

At the curricular level, the pedagogical objectives and principles of the school are currently very much narrower than the contentual ones. One could even say that our basic education rests on the product line of thinking, which emphasizes cognitive learning achievements. In the teaching plans, learning processes are described considerably less than contentual objectives. The school's upbringing task does not show at all clearly, especially in the subject-specific objectives and contents and the criteria of their evaluation: they show a strong emphasis on the contentual mastery of the subject.

Placing more emphasis on the educational task of the school calls for focusing the objectives and the implementation of teaching somewhat differently. When one wants to emphasize the pedagogical task of the school and the supporting of learning processes, one will emphasize different learning environments, materials, tools, and working methods in the curriculum. Such an approach works better in enabling one to take informal learning into consideration in the pedagogy. It also brings out the school's task to educate in the best way. Future curricula should offer the tools for planning learn-

ing processes as well as teaching the subjects. In this way the school's task of education (Bildung) could be realized, and the school could bring up active future citizens with strong abilities, skills, and models of operation to develop themselves and their culture.

## The pedagogical management of multi-professional collaboration

Opening learning environments offer a splendid opportunity to use the continuously increasing knowledge, the associated skills and tools, and shared knowledge creation of a kind that was not possible before. In the future, the teacher will not even be supposed to master all the knowledge and skills that the students learn at school. Indeed, the school's traditional manner of operation is changing. At the future school, there will be not only teachers and students plus student service personnel and assisting staff working. The school will attract experts of different fields to multi-professional collaboration. The school's formal education and teaching will look to open, non-formal, and informal contexts of learning for partners in collaboration.

Opening up calls for conscious development of the operation of the school. Pedagogical multi-professional collaboration poses challenges to the teaching profession and the abilities attached to it. The teacher must be capable of directing pedagogical multi-professional collaboration in the light of the curriculum and the educational objectives and the educational (Bildung) task of the school.

The comprehensive planning of multi-professional project work is an interesting future challenge to the opening pedagogical communities. The teacher must have the skills to direct and guide that work in a goal-oriented manner. Traditionally, pedagogical management has been associated with the administration of the school. As a teacher's activity, however, it means the management of opening and diversifying pedagogy. The teacher needs a flexible curriculum as a tool enabling her/him to develop the working methods of the school. There must be opportunities for flexible planning of both subject-specific and project-based thematic work.

## Points to ponder:

What sort of curriculum would make it possible to plan participatory learning processes?

What use is it to recognize the value base of the curriculum?

How could the subject-divided curriculum be extended in the direction of learner-centeredness?

What do you think of the claim *The curriculum should take a stand regarding the nature of learning processes?*

What sort of curriculum would work best as the teacher's tool?

# Zoo School Arkki: experiencing animals

**Nina Trontti, Zoo School Arkki, Helsinki Zoo**

A lion's roar invites people to explorations. Wild animals fascinate people: the Helsinki Zoo has half a million visitors a year. In urbanizing environments, zoos function as show windows of nature's diversity and work for the preservation of endangered species.

At the Zoo School *Arkki ['Ark']*, students explore endangered animals and acquaint themselves with their habitats. About 50 class groups study at the zoo school every year. At the beginning of each term, teachers can book a zoo school day for their class.

The teaching at the Zoo School *Arkki* is based on seeing wild animals, examining various illustrative material, such as skulls and coats, and the open, sense-quickening learning environment. The roaring of a lion, the leap of a snow leopard, the antlers of a caribou, and the sight of the young of animals are always memorable experiences. The experience may lead to a change in the individual and thus alter the student's everyday practices: "The desire to cherish the nature swells up."

The theme of the four-hour-long teaching program is endangered feline carnivores, the behavior of animals, or the adaptation of different species to winter. The structure of a zoo school day is always the same:

- a teacher-led presentation
- an independent study done in group work
- an animal tour led by students; the tour may be video recorded, so that it supports the instruction in articulacy and the mother tongue.
- writing up a protection message, e.g., "We learned that poaching is illegal", or, to support the art instruction, the message may comprise a disarming drawing of a lesser panda.

## Zoo School Arkki offers building blocks for environmental consciousness

The chief objective of the teaching at the zoo school is to lead students to observe animals and acquire positive experiences of animals. In the teaching program *A day as an ethologist*, the students observe the behavior of animals by means of an ethogram. After working in small groups, they present the results of their study to each other on an animal tour. (Environmental and natural science studies for the lower grades)

In the teaching program *In the footsteps of tiger protectors*, the students examine animal coats and skulls. They also rehearse the nomenclature of the world atlas and make closer acquaintance with the Amur region and its animals and landscapes. (Biology and geography for the lower grades)

In the *Easter Island Schoolchildren's Conference*, students on the upper grades hear expert information on diversity, acquaint themselves with the species represented at the zoo, and prepare positive nature conservation messages at workshops, e.g., by means of music, drama, and cartoons. (Biology and mother tongue for the upper grades)

## The conservation slogans, videos, and theme weeks of the Zoo School Arkki

Self-formulated slogans inspire students to seek answers to problems of conservation. The zoo school day is recorded into a short video, which adds to the significance of the group's research results.

The program of action for a theme week is always planned for specific grade levels, e.g., the *Frog Week* for the youngest students (preparing poison arrows and doing habitat-hopping) or the *Predator Week* for students on the upper grades (photography and orienteering by means of GPS devices).



## The open zoo

Zoo pedagogy responds to the challenge of open learning environments by supporting experiential, action-based, and dialogic learning. To support teaching practices, the Helsinki Zoo is preparing a strategy of environmental education based on its own objectives and the teaching recommendations of the European Association of Zoos and Aquaria (EAZA).

The teaching objectives of the Zoo School *Arkki* take into consideration the effective objectives of basic education and grammar school education, especially regarding the teaching of environmental studies, biology, and geography. The teaching also supports such cross-curricular themes of basic education as "human growth" and "responsibility for the environment, wellbeing, and a sustainable future."

In the future, the Zoo School *Arkki* will work out a designated teaching program for every grade-level. Besides the traditional devices for nature study, the students will also use up-to-date media of research and observation, such as GPS devices. The themes of the programs will be picked from among the annual conservation projects of European zoos.

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www.korkeasaari.fi/opetus

# Finnish Museum of Natural History: the dynamic dinosaur

**Satu Jovero, Finnish Museum of Natural History**

The Museum of Natural History underwent a thorough transformation in a renovation completed in May 2008. The exhibitions were re-planned with learning and the joy of discovery in mind. Can one learn in a museum unawares? Where is the pleasure to be found? If people enjoy the exhibitions, learning will take place inevitably – regardless of age.

The thread of the exhibitions has been woven around themes and unities arising from the National Core Curriculum. The central themes include evolution, adaptation, and diversity. The guided tours and workshops reinforce the message by offering clear points of contact to the day-to-day work and teaching contents of the school.

*The History of Life* exhibition, with gigantic dinosaurs, takes the visitor to a speeded-up time trip 4.6 billion years back. The guided tour acquaints the visitor with the origin and development of living organisms and the great innovations of life and intermeshes smoothly with teaching in the upper grades and grammar school. With young people in mind, a special "shadow exhibition" has been prepared to connect history and today's word in a humorous way.

The guided tour *A Crab X-rayed*, directed to the lower grades, ponders on which ones of us have a spinal column and what we need it for and what bones tell us about the locomotion and nutrition of animals.

The nature displays of the *Finnish Nature* exhibition offer a unique opportunity for learning to recognize species and to perceive correct proportions. The exhibition also provides abundant food for strengthening "nature literacy" and the ability to draw conclusions from tracks.

Those hungering for action can roll up their sleeves in the *Track laboratory* (to be booked separately), in which they not only do research but also print a tracking sheet to be taken along to nature trails.

## The many objectives of the museum visit

Most of the hour-long guided tours offered to schools have been designed to support the informational objectives of the curricula, whereas special groups mostly favor workshops, in which information and hands-on work are combined in suitable proportions.

Sometimes a shared experience may be more important than the informational objective. A more entertaining and informationally lighter general tour will inspire and stimulate but will only scratch the surface.

One of the main objectives of the Museum of Natural History is to arouse interest in nature and the natural sciences. A visit should act as a springboard to life, the real one waiting outside. The "fleeting freeze shots" of the museum, overflowing with the abundance of species, do not fully correspond to reality, of course. That is why one must go outdoors to sense how the processes of nature function and what a fresh heath forest smells like.

## The objectives of the activities

- to bring and illustrate new points of view to the learning of the contents specified in the curricula
- to give teachers energy and stimuli for support in their work. Teachers, too, are entitled to occasionally indulge themselves by just listening to the guide.
- to also give ideas, e.g., by means of network and shadow exhibitions, for spontaneous explorations both in and out of the museum

## Survival or extinction? – future challenges for the guided tours

In the future, the museum intends to dish up for the public the whole straight flush of natural science – geology, plants, and animals – in an easily approachable and enjoyable form. The Helsinki University Botanic Garden and the Geology Museum will open up many new opportunities for learning.

It is often easy to tell students about individual species. The challenge is in getting people to understand integral processes, phenomena, and laws of nature that affect all of us every day.

## Further information

Oh my, he sure has white teeth.
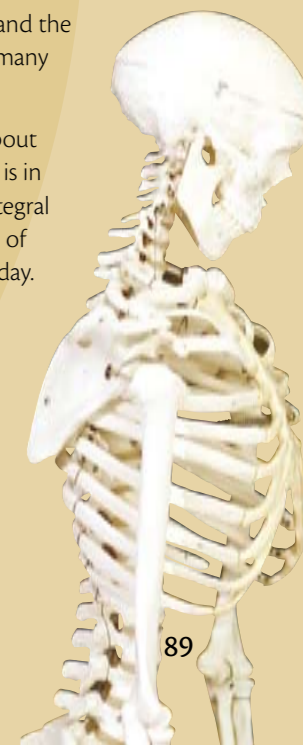
# Recommendations for developing learning environments

### National coordination

To promote the improvement of learning environments, a national coordination center should be founded to function as a resource and support for municipalities, schools, and cultural institutions. The center could bring together and network actors in the field nationally and internationally, distribute up-to-date information on development activities in the field, and put learning materials and pedagogical solutions at everyone's disposal.

A user-centered internet service maintained by the coordination center could promote interaction and sharing and creating ideas among the actors and inform them on training sessions in the field.

### Municipalities

Municipalities should support the networking and regional cooperation of schools, morning and afternoon clubs, and cultural institutions by creating a municipal *Development Strategy for Learning Environments.* To support the strategy work, a steering group should be appointed.

The strategy should define the ways regional networking and cooperation are to be concretely supported at the municipal level. It should also clarify the connections of the strategy to the steering of other municipal-level action, such as the realization of the quality criteria for basic education and the National Core Curriculum for Basic Education.

### Schools and cultural institutions

Schools and cultural institutions should attend to the realization of the municipal *Development Strategy for Learning Environments* by appointing an organization-specific Learning Bridges task force, which should concretize the strategy to an operational level and supervise its realization.

The task force should be composed of the organization's own workers and representatives of learning contexts outside the organization. Each organization should appoint a person in charge, a so-called Learning Bridge Builder.

### Curriculum work

The curriculum should give proper consideration to the ubiquity of learning and the importance of integrating it. That should be in evidence not only in the general part of the curriculum but also in the subject-specific objectives.

The curriculum should give recommendations on pedagogies, learning materials, and tools by means of which the ubiquity of learning can be integrated into teaching. That is to be made possible by lowering the subject partition of the curriculum. The curriculum could give recommendations on integration among the subjects, but it should avoid rigorous steering of the contents and keep the amount of compulsory content reasonable.

### Learning materials

Besides using textbooks, schools and teachers should make versatile use of learning materials produced by cultural institutions and civic organizations, for example. National and municipal support should be available to projects that compile learning materials produced by different quarters and inform teachers and schools about them.

### Annual plans and strategies

The annual plans of schools and the strategies of cultural institutions should make use of the suggestions of the Learning Bridges task force, e.g., to define the outside organizations with which they will engage in collaboration during the year in order to accommodate the ubiquity of learning.

### Teacher education

The theme of developing learning environments should be strongly tied up with teacher education by offering teacher educators and student teachers the skills to advance the field in their own work.

# The main concepts

**Agency**
refers to an identity that an individual (or a community) has formed through participation when they have learned to act authoritatively and accountably.

**Authentic agency**
often means seeking and opening up new things, crossing and even breaking the required, given, and permitted. It arises, for example, in situations where the expectations (e.g., rules or norms) conflict with the person's or community's own goals and meanings. In such situations the person (or the community) must figure out how to make the situation meaningful.

**Boundary object**
is a focus of action shared by two or more different communities. It is sufficiently flexible to be used by both (or several) communities and to still retain its identity. A boundary object can be material (a physical object) or cognitive (a concept, model, or theory).

**Cognitive tools**
include concepts, models, and theories – in other words, the different conceptual tools that we use together with material devices (e.g., pen, paper, and technical devices) to cross the biological boundaries of our species.

**Collegial collaboration**
refers to collaboration among people having a similar education and/or working in the same profession. A case in point is collaboration among teachers within a school or across schools.

**Dialogic inquiry**
In dialogic inquiry, the learner forms an active relationship to information. Different sources of information are used in diverse ways, viewed critically, and compared with one another.

The learners are also given a say in the process. They do not absorb knowledge passively but get to influence the questions to be examined and contribute to the knowledge-building.

**Domain of competence**
refers to an elaborate ensemble of practices and requisite tools, which connects different communities of practice.

**Embedded knowledge**
is considered to comprise the cultural-historical knowledge and skills that are contained in objects, concepts, and practices (for example, knowledge of the lever arm is essential for the use of excavators, cranes, scissors, etc.).

The use of knowledge embedded in tools calls for tacit knowledge, which can be appropriated only by participating in the activities of a community and using its utensils. However, the use of utensils does not require an understanding of their operational principles; the mere skill of using them is enough.

**Formal, non-formal, and informal contexts of learning**
Formal contexts, such as schools, offer teaching based on the curriculum and the goals set therein.

Non-formal contexts include the services and functions of museums, science centers, and libraries. In such contexts, the learning attained varies from goal-oriented work to informal, unplanned learning.

An informal context of learning can be any space or location outside formal education. Highlighting the significance of everyday experiences for learning, the definition of informal learning comes close to the idea of lifelong learning.

**Funds of knowledge**
Cognitive and cultural contents and tools that form local networks of cultural know-how are called funds of knowledge. They enable participation and learning by both the community and the individuals acting in it.

**Identity**
is an individual's or a community's conception of him/her/itself. It takes shape, and changes, in interaction between the individual and the community.

**Multi-professional collaboration**
refers to collaboration among people who belong to different professional groups, such as teachers' collaboration with experts from other professional groups. Multi-professional collaboration can be carried on both within and across organizations.

**Normative agency**
means that the acts associated with agency comply with the given and permitted norms. Children, for instance, will take the initiative on matters that they know to be permitted and possible.

**Participatory pedagogy**
gives learners the opportunity to position themselves as agents. They are taken seriously, and they can influence the course of the interaction, e.g., by bringing topics from their own worlds to the interaction.

In participatory pedagogy, the teacher also tries to make sure that no mutual power relationships are formed among the learners to interfere with their learning and participation. The learners can be given responsibility for promoting each other's participation.

**Position**
In interaction, people can be positioned as having initiative or being passive, for example, depending on how they are treated and how their action is responded to.

**Relational agency**
Reciprocal agency in which one shares one's expertise spontaneously and responsibly by asking others for help and offering them help is called relational.

**Shared expertise**
refers to a process in which people with different areas of expertise, professional skills, and experiences pool their expertise in order to solve problems or reach a common goal.

**The sociocultural perspective on learning**
In the sociocultural perspective, learning is seen as a process of gradually deepening participation, during which the individual achieves a central position in the community and learns to use its material and cognitive tools in her/his action. Learning, then, concerns both the development of one's thinking and changes in one's position and way of being in the world.

Besides individuals, communities can also learn. This is seen as an expansion or transformation of the practices of the community.

**Transition**
Learners make transitions when adapting knowledge and skills acquired in different communities and situations to the requirements of another situation and community.

**Ubiquity of learning / Contexts of learning**
Learning takes place everywhere. Different environments offer different opportunities of learning, which vary from learning according to pre-planned goals to completely spontaneous, unplanned learning.

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At the moment, Kumpulainen heads two consortium projects funded by the Academy of Finland: *Virtual Intelligent Space for Collaborative Innovation (VISCI)* research project examines collaboration and creativity in networked digital environments, and *Towards children's efficacious agency in formal and informal contexts (AGENTS)* research project examines factors both promoting and hindering children's efficacious agency in the formal and informal contexts of childhood.

**Leena Krokfors, Doctor of Philosophy in Education,** is Professor of Education, with special reference to teacher education, at the Department of Teacher Education, and Vice Dean of the Faculty of Behavioral Sciences at the University of Helsinki. She heads the Centre for Research on Teaching (CRT), and her research interests are in the paradigms of teacher education, especially the theory of research-based teacher education, teachers' pedagogical thinking and reflective learning. More recently, her research work has concentrated on methodological questions in the analysis of formal education and informal learning, collaborative interaction and social knowledge creation in multimedia-enriched learning environments and the use of digital video technology in educational settings.

At the moment she leads several research projects. The most important are the *Multimode Pedagogy for Research-Based Teacher Education* project *(MORE)*, which studies the applications of research-based teacher education and flexible teacher education programs, the *InnoEdu, Education with Innovation* project, which is part of the transdisciplinary consortium *InnoSchool* studying the pedagogical concepts of the school of the future, the *Learning Bridges* research project, which studies the opening learning environments and student agency in them, and *Video Observatory*, which is a collaboration network at the Faculty of Behavioral Sciences aiming to research, develop, and evaluate the possibilities of new multidisciplinary video observation research.

Leena Krokfors has written several textbooks, both scholarly and schoolteaching-oriented. She is a popular teacher educator.

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**Varpu Tissari, Master of Arts in Education,** works as project coordinator and researcher in the *Learning Bridges* research project at the University of Helsinki. She has acquired diverse expertise in planning, implementing, evaluating, and researching environments of teaching and learning during her work at the University of Helsinki since 1995 as a researcher, coordinator, and planner in different research and development projects (such as *Learning Bridges, MATIS, MOMENTS, Finnish Euro-Delphi, HelLa, KasVi,* and *Vokke*).

Tissari has also worked as an instructor at the Open University and in the continuing education projects of the Media Education Centre at the University of Helsinki. Her research interests include the pedagogical, social, and cultural practices of planning and implementing learning environments, the development of these practices, and the practices, challenges, and models of collegial and multi-professional collaboration.

**Jaakko Hilppö, Bachelor of Arts in Education,** is a future class teacher. During his studies, e.g., from working on his Master's thesis and as a research assistant in the *Learning Bridges* research project, Hilppö has acquired experience in researching and developing different learning environments.

Hilppö has worked as amanuensis of class teacher education at the Department of Applied Sciences of Education, University of Helsinki, and has shared the responsibility of planning, developing, and coordinating the degree program. His research interests are directed to understanding children's everyday learning practices and their participation in different learning environments.

**Antti Rajala, Master of Arts in Education,** is a trained class teacher. He has advanced his expertise in learning environments through working as a teacher and as a project researcher in the *Learning Bridges* research project. Rajala has also been active in civic organizations involved in educational work. His research interests lie in the peer interaction of elementary-school students in various learning environments and pedagogical models by means of which teachers and other educators can support students' participation and the development of agency in them.

# Authors of the project descriptions

### Chapter 1   *InnoApaja*

**Leenu Juurola, Master of Arts in Education,** works as project manager for the *InnoApaja* project at the Museum of Technology. Her responsibilities include the coordination of the project, the planning of the contents of learning units, the development of training programs, and network projects.

**Leena Tornberg, project specialist, Master of Arts,** is responsible for the evaluation and research cooperation of the *InnoApaja* project, the integration of the project into the planning of exhibitions, and the development of Swedish-language activities (second official language in Finland).

### Chapter 2   *Metakka*

**Pia Lempinen, Master of Arts,** works as an instructor in the educational use of information and communication technology at Media Center Saimaa. Her duties include organizing training courses for teachers and running media education projects in Lappeenranta schools.

### Chapter 3   *Liikkeelle!*

**Heli-Maija Nevala, Master of Arts, subject teacher,** works as project planner in the *Liikkeelle!* ['*Let's get a move on*'] project at the Finnish Science Centre Heureka.

### Chapter 4   The fourth-grade animal project

**Antti Rajala, Master of Arts in Education,** is a class teacher and worked as a project researcher in the Helsinki University project *Oppimisen Sillat* (*'Learning Bridges'*). He is writing a doctoral dissertation on dialogic and participatory pedagogy.

### Chapter 5   Vantaa Nature School

**Katja Lembidakis, teacher of geography and biology,** works as a teacher at the Vantaa Nature School. Her main duties are the planning and implementation of teaching and the organization of courses directed to educators.

**Olli Viding, biologist,** is a teacher at the Vantaa Nature School and also its executive director. His main duties are the organization of activities at the Nature School and sharing the teaching load.

### Chapter 6   Zoo School *Arkki*

**Nina Trontti, Master of Science, subject teacher,** works as environmental educator at the Helsinki Zoo, *Korkeasaari*. Her main responsibilities are the activities of the Zoo School *Arkki* and the development of nature school programs and programs directed to other school groups.

### Chapter 6   Finnish Museum of Natural History

**Satu Jovero, Master of Arts in Education,** works as an educational curator in the Finnish Museum of Natural History, which is part of the University of Helsinki. Her main responsibility is developing guided tours and services directed to schools.

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Learning takes place everywhere. We learn in libraries, at our hobbies, in museums, educational institutions, and relationships. But what sorts of bridges could we build for learning?

*Learning Bridges – Toward Participatory Learning Environments* offers perspectives, based on the latest research, for bridging the gaps between different contexts of learning. The book describes ways for teachers, library workers, museum pedagogs, and other professionals interested in developing learning environments to support students' participation and growth into authoritative agents. It also reviews models and practices of professional collaboration and, in particular, the opportunities offered by multi-professional collaboration to support learning at the intersections of different learning environments.

Besides theoretical research, the book also presents concrete development projects. It concludes with recommendations to practitioners and policymakers in education. It is also suited for a textbook in education studies, teacher education, and vocational further training in various fields.

The book is an outcome of the research project *Learning and Teaching at the Intersection of Formal and Informal Learning Environments* funded by the Finnish Ministry of Education and Culture. The project was carried out at the University of Helsinki in collaboration between the CICERO Learning network and the Department of Teacher Education.

learning bridges

CICERO LEARNING

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