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PEER REVIEWED ARTICLE

Technology enhanced learning in a higher education context

Building bridges by student empowerment and regional development

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ABSTRACT

The aim of this article is to describe how and to what extent an institute of higher education can support the learners and local actors in taking advantage of the new social networking services. The empirical data was collected from three educational pilot studies carried out in higher education contexts. According to our study, collaborative learning and student-entrepreneur cooperation increased the entrepreneur's social media capabilities and empowered students. Capabilities related to networking in virtual space proved to be more challenging, calling for a long-lasting cooperation and understanding of social networks.

Keywords:

Higher education, technology enhanced learning, social media, SME development

1. INTRODUCTION

Information technology has an ever-bigger role in everyday life and business. It is not only about knowing the technology, but also about knowing the logic behind knowledge-based, networked and global information society. The new ways of communication improve business productivity and competitiveness and open up new markets and business opportunities. In education, social networking services facilitate collaborative, interactive, and customized models of learning. The development of information society also involves threats such as a growing digital divide, diminished privacy and information security, and difficulties in adjusting to a new, more technical operating environment.

In Finland the Internet is most frequently used for communication, information searches, and following media. Internet-based social network services have become popular very quickly and this trend continues. In the spring of 2012 fifty per cent of Finns followed at least one social network service as registered members. Forty four per cent had made online purchases or placed

online orders. People also used the Internet to handle matters with authorities and access public services (www.stat.fi).

Along with the growing use of information technology in basic education, students enter university with higher expectations in terms of the uses of technology and corresponding pedagogies. The gap between student social media capabilities and higher educational practices broadens unless educational practices are reformed.

From the small and medium-sized entrepreneurs' (SME) point of view, the ability to use Internet-based social networking services is crucial for the success of SMEs. In spite of the growth of social media, most SMEs do not have a strategy for the medium. The reasons are obvious: lack of time, skeptical attitudes, and lack of skills. At the same time the young people are at ease with the modern communication technology and expect to be able to use it while learning and in the future workplace. Information technology is changing the context in many ways, opening new opportunities as well as threats. At the same time, the citizens and organizations are strongly embedded in their own communication and sociotechnical communication environments.

From the pedagogical angle, social media tools offer huge potentials for interactive and collaborative learning. Social media provides an innovative and open development platform, as well as an opportunity for facilitating interactive and collaborative ways of learning.

Due to the opportunities and challenges social networking services offer to both the educational institutions and local actors we found it necessary to study:

- To what extent an institute of higher education can support SMEs and other local actors to adjust and take advantage of the changes information technology introduces?
- How integration of social media into educational practices supports the collaborative dimension of authentic learning?

2. THEORETICAL BACKGROUND

Young people's lives are increasingly mediated by social technologies at home, at school, and in the community. Tapscott (2010) has indicated that the Net Generation (youth aged 12–30) considers technology a natural part of the social environment. Technology is reshaping the form and functions of school, work, and even democracy. This generation is also labeled 'digital natives' as opposed to those not born into the digital world (digital immigrants) (Prensky, 2000, pp.1–2). The digital age students learn differently from their predecessors. They are used to searching for and retrieving information

from the Internet and call for more hands-on, inquiry-based approaches to learning. Young learners are less willing to simply absorb what is put in front of them (Barnes & al., 2007). Tapscott (2010) refers to School 2.0 that responds to learning styles of the net generation by giving the teachers the role of facilitators rather than owners of information and applying social technologies and collaborative learning methods. Higher education students have adapted to the technological revolution, because they have been in contact with ICT since their childhood. However, the web-based technologies have only recently emerged on educational platforms.

Ubiquitous computing practically means that we must consider the whole society as an open learning environment. Information technology and informal, lifelong learning is challenging formal vocational education (Glenn, 2007). Education and learning are conducted in diverse places that are physical and virtual in nature. Communication capabilities and understanding the plurality of places is essential for all actors in a knowledge society and especially for educational institutions (Brooks, Fuller & Waters, 2012). Innovative use of information technology in open digital learning environments can empower students and working life representatives. Virtual empowerment in education takes place in the triological model of searching for information, communication in the communities of practices, and knowledge creation in connection with Web 2.0 (Oesch, 2007).

It is not possible to separate global and virtual networks from local practices. Places are gradually changing into coded places (Kitchin & Dodge, 2012). Ubiquitous Wi-Fi adds a virtual dimension to homes, classrooms, coffee bars and so forth. Coffee bars can easily become learning environments or classroom a Facebook wall according to each individual preference. Hybrid space contains affordances (Gibson, 1986) that enable us to work either virtually or physically. In education and business we must be aware of these new affordances, we need to evaluate these affordances with respect to our objectives and values; we need to have the required competences. Above all we should be prepared to design our practices by combining the strengths of both physical off-line place and digital on-line space in a flexible and innovative way.

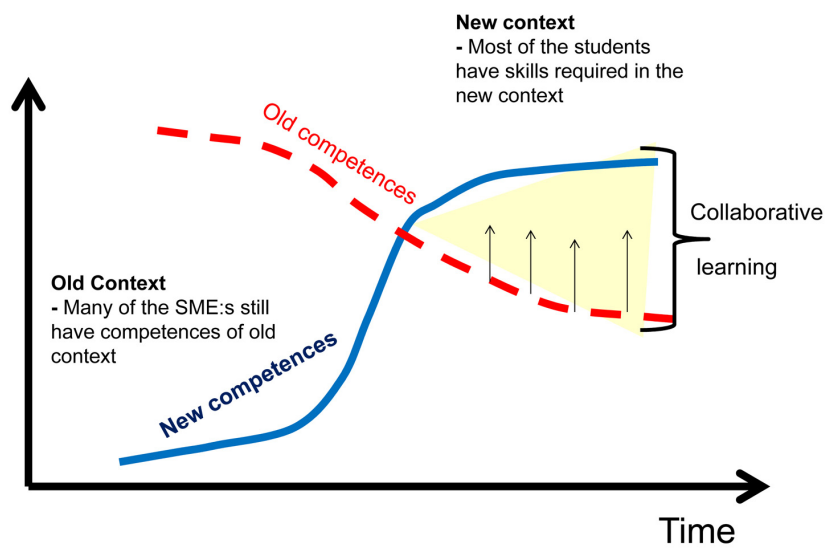
Information technology has played an important role in transforming business and communication. The new social networking services – especially social media – have enabled new ways of doing business. They allow companies to engage in timely and direct end-consumer contact and to add value to the customer experience (Durkin & al, 2013, p. 729; Kaplan & Haenlein, 2010, p. 67). In this manner they can empower the customer and the entrepreneur for mutual benefit (Durkin & al., 2010, p.730). In comparison with traditional communication tools, social media minimise the relationship costs and they offer higher levels of efficiency (Kaplan & Haenlein, 2010, 67).

The ability to make use of social networking services is not only relevant for large multinational companies, but also for SMEs, as well as for nonprofit and

governmental agencies (Kaplan & Haenlein, 2010, 67). For an SME normally operating on a local level, the creation and deployment of websites makes it possible to reach customers on a global level. At the same time the SME has a chance to learn about the customer's experience, knowledge, vision, and preferences, in order to define and sharpen the way in which the SME does business. (Durkin & al, 2013, 729).

Despite perceived benefits, the level of adoption concerning social technologies and e-commerce by SMEs is low (Durkin & al, 2013, p. 717; Jahanshahi & al., 2013, p. 858). This could be a result of barriers and constraints, such as poor Internet connections, deficient understanding of social networking services, and limited access to in-house expertise. (Jahanshahi & al., 2013, p. 858) In the case of Finnish businesses, the principal obstacles for adopting new social technologies can be related to attitudes (resistance towards change), structure (hierarchical organisation), information security (perceived risks), leadership (lack of commitment, lack of information), and technology (e.g. bad connections). In all mentioned categories the principal hindrance for adopting social technologies has to do with lack of knowledge and information (Survey carried out by Association of Finnish Advertisers in 2011, Ojala, Pöysti, 2008, pp. 87–92; Makkonen, 2013, pp. 41–44). Also, the entrepreneurs running a small company with scarce resources typically lack time to familiarize themselves with the new communication tools (Makkonen, 2013, pp. 41–44).

The relationship between virtual networks and physical place is active and dynamic. On-line networks may affect on-line place economically, socially and so on. Due to the digital divide, even the same geographical area may contain physical or off-line focused social practices and virtual or on-line focused social practices (Servaes, 1999). From the perspectives of the local actors and regional development, it is important to understand that local SME communication capabilities play an important role in this process, as on-line space is not only digital maps, but includes all kinds of place-related information produced locally or by people far away with no real connections to the place or its *genius loci*. This polarization creates a competence gap, which can be diminished by collaborative learning supported by local higher education institutions (figure 1).



(Sveiby 2012 ; Tushman, Anderson 1986)

Figure 1. Unequally changing communication practices and polarized sociotechnical communication environments as a development task for local universities

To proceed from a less advanced communication environment to a more advanced sociotechnical communication environment requires advanced communication capabilities. Educational institutions are very involved in improving communication capabilities, as they are responsible for educating new employees, but also for supporting regional learning and development.

According to Rogers (2003), people's attitudes and motivation regarding a new technology is a key element in its diffusion. Rogers's innovation diffusion process theory states that innovation diffusion is a process that occurs over time through knowledge, persuasion, decision, implementation, and confirmation. The model indicates that the first group of people to use a new product is called innovators, followed by "early adopters." Next come the early and late majority, and the last group to adopt a product are called "laggards" (Rogers, 2003).

What does it take to "get in" to the information society and not to be a "laggard"? Communication capabilities are the result of three different factors: access, competence, and motivation. The capabilities can exist only when all three conditions are satisfied. Possession of the necessary capabilities means that you have the equipment, the competence, and the motivation to use them (Viherä, 1999). As Universities of Applied Sciences in Finland must partake in regional development, information society skills and communication capabilities can be studied as embedded in collaborative educational process (figure 2).

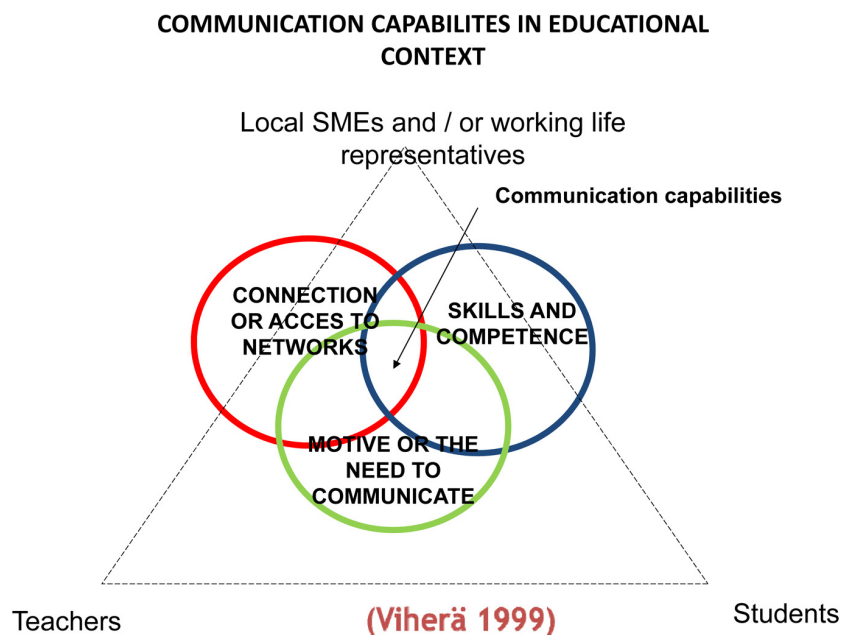


Figure 2. Communication capabilities embedded in collaborative educational process

2. METHODS

To answer our research question we used action research (AR), which enables us to understand a process of change, where the consequences of series of activities are being observed and analyzed (Eriksson & Kovalainen 2003, 193–194). Design-based research (DBR) could have been a research strategy instead of or in addition to AR, since DBR is widely used for studying and developing the theory and the practice of education embedded in real world context (Collins, Joseph & Bielazyc 2004, p.16; Wang & Hannafin 2005, p. 5). DBR is, however, a rather new research strategy and the concept appears complex and a bit blurred (Bell, 2004). Collins & al. (2004, p. 19) point out that, “*Design research is not aimed simply at refining practice. It should also address theoretical questions and issues if it is to be.*” Action research is based on practical problem solving and characterized by future orientation and close collaboration with the research object and the practical problem solving as part of the research process (Eriksson & Kovalainen, 2010, p.193; Hart and Bond, 1995).

In the educational context, action research involves deciding on a particular focus for research, planning to implement one or more activities or interventions, implementing them, observing, and reflecting the outcome and the process but also, if necessary, planning another round of activities (Costello 2003, p.5). Figure 3 shows how the basic action research model is adapted to our pilot projects as three series of actions taking place over time.

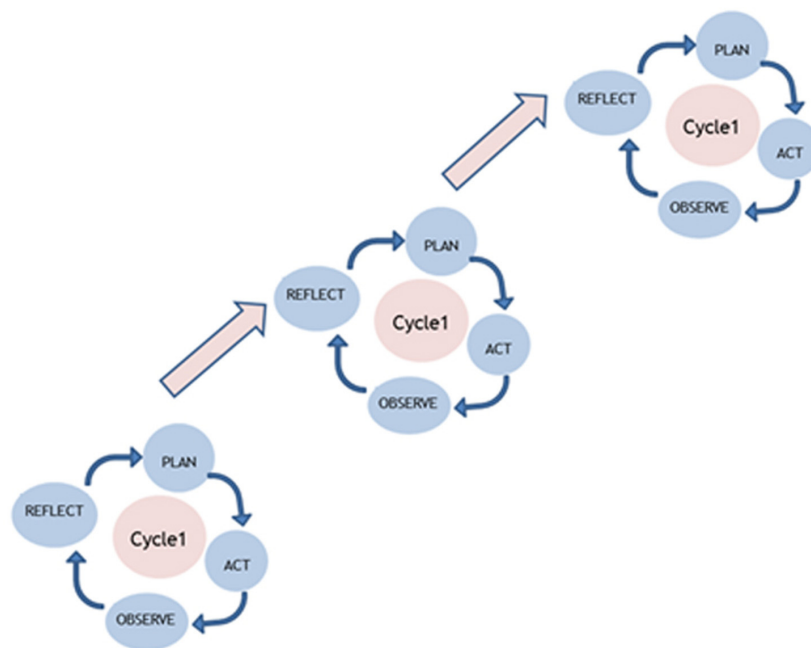


Figure 3. Research model for the piloting, based on action research model (Costello, 2003, p. 7)

Cycle 1: Basic and unconstrained skills: Technology enhanced learning

Cycle 2: Creative skills: SME development in the Web 2.0 space

Cycle 3: Understanding networks: Virtual Portal – Business Lohja

The three cycles consisted of three pilot projects carried out at the Laurea Lohja Unit between years 2009 and 2012. The pilots followed the Learning-By-Developing (LbD) pedagogical approach developed by Laurea University of Applied Sciences. The LbD (figure 4) is an innovative pedagogical model, which relates to project-based learning in an authentic learning environment.

To create a background for using the LbD model, it is worth presenting the problem based learning (PBL), which bears resemblance to LbD. PBL is an instructional model in which the students learn in teams, through facilitated problem solving. It can be defined as a set of learning principles based on cognitive, interdisciplinary, and collaborative learning (Hmelo-Silver, 2004, p. 235; Vyakarnam al., 2008, p.31).

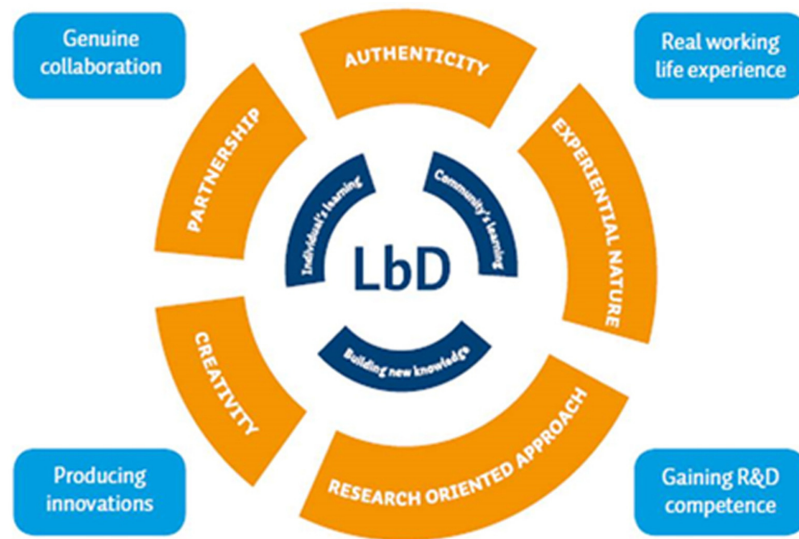


Figure 4 Learning by Development model

According to the principal developer of the LbD model, Katariina Raji (Raji, 2007, p. 26), the starting point of Learning by Development model is a genuine development project from working life, based on authentic partnerships between lecturers, students, and experts from the sector. Study by Taatila (2010, pp. 54–55) emphasizes the LbD model efficiency compared to the traditional classroom and textbook teaching methods. In the LbD model, learning is not restricted by the limitations of the curriculum, textbook, or exercise book. Instead, students complete a large proportion of their studies in real-life workplace development projects. LbD requires students to undertake projects, which originate from work life, with the aim of producing new ideas, practices, and solutions to existing problems. Phenomena and problems of work life and working places are examined with a research-orientated approach. The LbD model helps develop student abilities and to adapt to the challenges and opportunities in entrepreneurship. It is focused on competences and by applying LbD, Laurea can ensure that the students are capable of “doing things”; applying the theoretical knowledge rather than just dominating the theory itself (Raji 2013, p. 15).

Like in case of PBL, the LbD model implies a change in the role of the teacher who acts as a facilitator and learning partner, rather than the owner of the information. The role and the level of involvement of the teacher depend on the project characteristics. The roles may include being a pedagogue, regional developer, and/or a researcher and developer (Raji 2013, 10, pp.13–14). In the LbD model learning can be considered a tool to facilitate the achievement of the desired competences. (Taatila & Raji 2012, p. 840).

When comparing the LbD model with PBL there are certain differences, which justify the use of LbD in our case. Both models strive to break away from an artificial world of learning via textbooks and traditional lectures and are based on experiential learning theories. According to international assess-

ments in 2007 and in 2009, the LbD model is more pragmatic and client-oriented. The application of authentic situations is at the heart of the LbD model. Also, PBL is based on real world problems. PBL centers on curriculum, whereas LbD focuses on learning outcomes and is more student-centered. Also, in comparison with PBL, LbD has a stronger focus on research and development, with a broad concept of partnership and network (Raij, 2013, 15–16, Vyakarnam & al. 2008, pp. 30–33). The pilot projects of this study are good examples of the use of LbD, which at Laurea has established itself as a function in practice rather than solely a theory.

3. DESCRIPTION AND ANALYSIS OF THE THREE CYCLES

The data collected and analyzed relates to various courses on e-Business, Customer Relationship Management, and Business Basics, conducted in Laurea UAS Lohja Unit between years 2009 and 2012. The learners are bachelor students of business management. The objectives of the courses are described in the following:

- Business Basics (5 ECTS): The student understands the various dimensions and functions of entrepreneurship and business management and how to establish a company.
- e-Business (5 ECTS): The student understands the business opportunities of digitalization, especially for marketing and is capable of introducing a social media content strategy for a SME. This course formed part of a PLUG-IN-project, to be introduced in the context of Cycle 2.
- Customer Relationship Management (5 ECTS): The student understands the new dimensions of the company-customer relationship (co-creation, collaborative consumption, sharing economy, crowdsourcing) and applies them for CRM stressing the customer experience.

The courses were developed during 6 semesters with the participation of altogether 80 students and about 50 local SMEs. The data of this research was collected as part of Laurea's quality assessment system as well as from the student learning diaries kept in the form of blogs.

The cycles are presented in the following and then evaluated by SWOT analysis, which is a structured method for evaluating the strengths, weaknesses, opportunities, and threats of a project or business venture. SWOT analysis is a popular tool due to its simplicity and clarity. However, it lacks hierarchy and causality among the strengths and weaknesses (Coman & Ronen, 2009, p. 5677).

The three cycles were built in accordance with the hierarchical structures of communication capabilities according to Viherä (2012, p. 48).

Pilot 1	Basic and unconstrained skills (online banking, emailing, blogs, wikis, etc.)
Pilot 2	Creative skills (applying information technology to achieve strategic objectives)
Pilot 3	Understanding virtual networks, their influence and possibilities (virtual networks and virtual physical dynamics)

3.1. CYCLE 1: TECHNOLOGY ENHANCED LEARNING – BASIC AND UNCONSTRAINED SKILLS

Born roughly between 1980–99, the Laurea Lohja bachelor students represent the “Digital Natives”, whereas the university lecturers typically fall in the category: “Digital immigrants”, as they were mostly born before 1980 (Bennet et al., 2008, 776; Romero et al., 2011).

According to previous studies there are differences in the ways young people use digital technologies inside and outside the formal context of education. It may imply that the role of technology depends on the context; whether it is being used at home or for studying purposes (Bennet et al. 2008, p. 775). Although familiar with digital technologies, the university students do not expect them to be used in teaching (Bennet et al., 2008). In the high school they have conformed to fairly traditional pedagogies and rather humble interaction in class. To get some background information about the diffusion of social media among bachelor students, we made an inquiry at Laurea Lohja (n= 55 bachelor students).

According to the study, over half of the students know YouTube, IRC-galleria, Facebook, internet forums, wikis, blogs, Messenger, and email (figure 5).

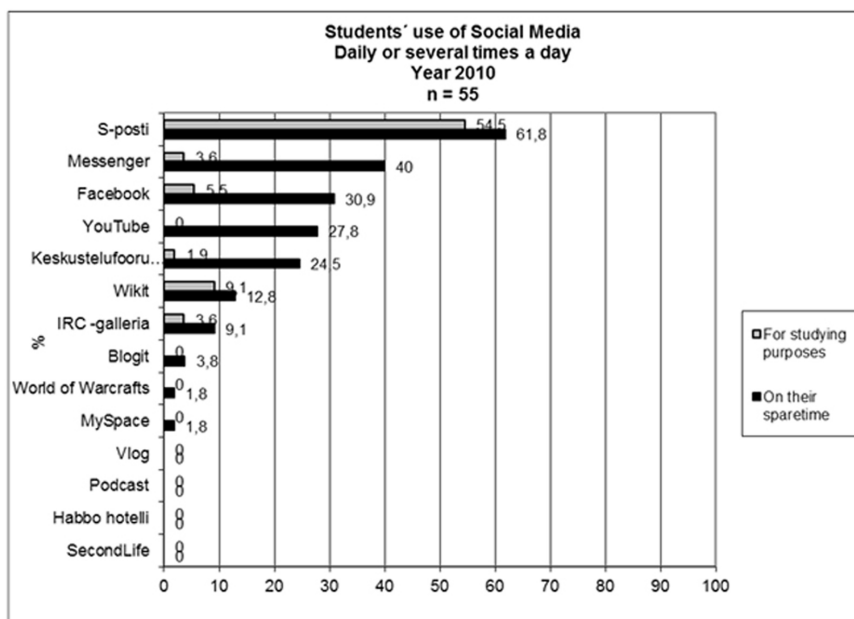


Figure 5 Student use of Social Media, year 2010

We have been testing different social media tools in the learning context since 2008. The piloting has comprised the following tools /learning environments: Google Drive, Wiki Platform, Twitter, blogs and Second Life virtual world (table 1).

TABLE 1. SOCIAL MEDIA TECHNOLOGY USED DURING PILOT ONE

SOCIAL MEDIA TECHNOLOGY	PILOT 1: TECHNOLOGY ENHANCED LEARNING.
Wiki Platform	During the courses on “Customer Relationship Marketing” Pbwiki.com was used for joint writing
Google Drive	During the courses on e-Business Google Drive was used by some students for joint writing instead of wikis.
Twitter	Twitter was used background channel during lectures related to e-Business.
Blogger	In all courses related to eBusiness the students kept learning diary in form of a blog.
Second Life	Laurea has built a learning environment in the Second Life virtual world including interactive exercises on entrepreneurship. As part of the course on Business Basics the learning took mostly place in Second Life – in an island designed and owned by Laurea Lohja.

Wiki Platform: Wiki is a website that allows users to generate, mix, and edit content within a shared and openly accessible digital space. In comparison with the internal learning platforms (e.g. Optima and Moodle), there are more possibilities to modify the visual presentation in a wiki and it is very user friendly. The first wiki-pilot was carried out in the Customer Relationship Management course, during which a group of students were asked to write an article about customer relationship management in a networked society. To gain background information the students interviewed three CRM experts. After that the students edited the content together. The wiki was found easy and convenient to use from the beginning. It was easy for the students to edit the structure of the article and their own text, but they hesitated when it came to editing the text of their friends. Thus, despite its ease of use, collaborative writing requires a lot of trust, commitment, motivation, and encouragement. (Kivelä, Marstio, 2009, p.128.)

Google Drive: Google Drive is a personal cloud storage service for digital content with a possibility for sharing and coediting the content online. Some students prefer to use Google Drive for joint writing instead of a wiki. In comparison to a wiki platform, the Google Drive has fewer possibilities for bringing in data in different formats. The students have preferred to use Google Drive if they have used it before and are thus familiar with it.

Twitter: Twitter is an online micro blogging and networking service that enables its users to send and receive short messages (up to 140 characters). It has been used as a background channel during a lecture. The student can use it to comment the contents of the lecture, to ask questions or to post a link relevant to the topic discussed. In another course, a twitter account was used to share links relevant to the topic of the course.

Blogging: In several businesses management courses the students were asked to keep a learning diary in form of a blog in order to write down their reflections related to the contents and learning environments of the course.

Second Life: Second Life (SL) is a virtual social world based on a free client programme. It enables its users to interact with each other through avatars. The technical aspects and usability are the major challenges for using SL. Laurea Lohja has created a learning environment in SL, a virtual island. Laurea has used Second Life for two purposes:

- as a learning environment: the Lohja island contains different interactive learning paths for the 1st year bachelor students (Business Basics course; entrepreneurship, Internet commerce, functions of a company).
- to learn the business models of virtual worlds: the students do “guided tours” in SL visiting companies and organizations present there. The objective is to observe how different products and services are projected in SL and what kind of business models and marketing tools are used there.

In the first pilot we wanted to build a bridge between the communication practices in spare time and related to education. We understood that there was unused potential in social media, which should be introduced and integrated into education. So the students were introduced to the various social media tools. Some of them were familiar to them, such as Facebook and the various Google applications, especially YouTube. Nevertheless, the use of these tools for formal learning purposes, as well as in business contexts was new to them.

The process started with the natural reservation and fear towards new things, which were overcome by the curiosity of trying out something new. This became evident from the students’ blogs, which were used as learning diaries during the courses. The hesitant students were mostly questioning the usefulness of the new tools in comparison with the actual ones already in use (face-to-face teaching, email and Optima- electronic learning platform used by Laurea). They questioned most the use of Second Life.

The introduction of the tools broke the routine of a typical lecture delivery, which in many cases implied more interaction, networking, and better communication during the courses. At the same time the lecturers had to put in extra effort in learning to use the new tools, modifying the lecture contents as well as the assignments. However, the most significant change and also a challenge for the lecturer was to re-think the learning process and to adapt a role of a facilitator rather than the person who has the knowledge and the right answers. The information is to be found with a couple of clicks. The first pilot is evaluated in table 2.

**TABLE 2 EVALUATION OF THE FIRST PILOT: TECHNOLOGY ENHANCED LEARNING
– BASIC AND UNCONSTRAINED SKILLS**

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> – Applications are easy to use (wikis) – Students' capability to apply Web 2.0 tools for learning purposes – Creativity, entertainment, collaboration, visualization, fantasy, functionality and networking – Applications provide added value from pedagogical point of view – The interactiveness of these tools gives a new dimension to distance learning 	<ul style="list-style-type: none"> – Calls for a change of perception towards teaching and learning; teacher's role as facilitator rather than the owner of knowledge – Students are not yet used to applying their social media related abilities for formal learning purposes – Technical challenges and limitations (e.g. virtual worlds) – Requires motivation and encouragement
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> – The social media tools offer a huge potential for interactive and collaborative learning (knowledge sharing, knowledge creation, networking) – A possibility to access a multicultural learning environment (virtual worlds) 	<ul style="list-style-type: none"> – Web 2.0 may be only a technological solution – May support technological determinism if it is seen as a substitution for face to face learning (not complement) – The tool may become an end itself at cost of the substance

3.2. CYCLE 2: SME DEVELOPMENT IN THE WEB 2.0 SPACE – CREATIVE SKILLS

Laurea Lohja has been encouraging the local SMEs to apply social technologies for business development and better competitiveness, since 2009, by inviting the companies to learn together with the students. After some experiments the concept took form as a PLUG-IN project (2009 – 2011). PLUG-IN sought to help the SMEs benefit from existing social technology on a strategic level as well as on their daily business activities. At the same time it offered the students an authentic learning environment, mingling them with actual and future entrepreneurs. The project was liaised with e-commerce courses, involving workshops with intensive student-entrepreneur cooperation.

At the beginning of each course, the students made an analysis of the current /planned marketing approach and channels of the participating companies. The current web presence was mapped. The following hands-on workshops were designed on the basis of the needs of the participating companies.

Focus was on the different user-friendly social media applications, such as Facebook, LinkedIn, blogging, wiki-platform, Twitter, and social bookmarks. Also, Search Engine Optimization, design of web pages and webstore management were covered in almost all courses. In the workshops the apprentice-journeyman model was turned upside down: The role of the students was to counsel and encourage the entrepreneurs to try new and free web-based tools for marketing and business development purposes.

While learning together with the entrepreneurs the students had a chance to peek into the everyday life of a business and to learn about different fields of business. The students kept a learning diary in the form of individual blogs. A virtual community (Ning) was established to serve as an open learning environment, containing the learning material, related, blogs, videos and pictures. This community brought the students to the same virtual space as local entrepreneurs, Laurea staff, and several social media experts from all over Finland (who also joined the community).

As a result of each course, the students elaborated a social media entry strategy for each entrepreneur. On each course, the presentation of the tailored strategies always facilitated an interesting discussion where the students and entrepreneurs were supplying each other with new ideas. Apart from a learning environment, PLUG-IN also fostered networking between the students and entrepreneurs as well as between the entrepreneurs

In the second educational pilot we were trying to build a bridge between student social media knowledge and communication capabilities and the poor capabilities of local SMEs. This required creative skills. So in the beginning of the process the students felt insecure and even perplexed about their role towards the entrepreneurs. They feared that they could not meet the expectations of the entrepreneurs. During the workshops it became evident that the students were able to encourage and help the entrepreneurs in using new technology. Thus, the students naturally adopted a consultative role and empowerment took place although some felt uncomfortable with this. While planning the social media access strategy together with the entrepreneurs, the students got a chance to learn about practical aspects of running a small or a micro-sized company. In some cases, the business ideas of the future entrepreneurs were developed further together.

The students and the entrepreneurs were organized in mixed teams. The outcome was very much dependent on the intensity with which the students and the entrepreneurs participated in the project. In some cases the expectations were not realized; in other cases the entrepreneurs were not willing to commit much time to working with the students. In other cases, the students had low levels of ambition or motivation towards the project. However, it was noticed that when working with entrepreneurs, the students were in general more ambitious than in a situation where they were working among themselves.

A comment from a student:

”First I was kind of scared of this project, but then I realized that there was nothing to be afraid of... Our role was more like a coach and we were able to learn a lot from the everyday life of the entrepreneurs and the challenges they face.”

The NING virtual community, which was established around the project, visualized the opportunities of networking among students, companies and experts in a concrete manner (figure 6). It is a triple-win situation. Between the face-to-face meetings, exchange of ideas took place in the virtual community, which also served as storage for documents, links, videos, and photos related to the topic.



Figure 6 Plug In (Töpseli) Ning community

Towards the end of the process a social media entry plan was developed for each company. In the follow-up interviews it became evident that most of the entrepreneurs considered the project very useful. Nevertheless, due to a number of reasons the plans were not put into practice. The biggest obstacle for the implementation was considered to be the lack of time. Some entrepreneurs were willing to hire a part-time “digital concierge” who would maintain and follow up the company’s presence in the various social media channels.

TABLE 3 EVALUATION OF THE SECOND PILOT: SME DEVELOPMENT IN THE WEB 2.0 SPACE – CREATIVE SKILLS

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> – Empowerment of the students as they were able to encourage and help the entrepreneurs in using new technology – Authentic learning experience together with SMEs; students gain tacit knowledge of doing business – Students acquainted with social media tools applicable to business – Openness of the PLUG-IN virtual community – The virtual community promoted competence-sharing and learning together 	<ul style="list-style-type: none"> – The entrepreneurs and the students were not always committed to the project – The future entrepreneurs did not always have the business idea clarified – Technological limitations of the SMEs (bad connection, outdated programs and applications)

**TABLE 3 EVALUATION OF THE SECOND PILOT: SME DEVELOPMENT IN THE WEB 2.0 SPACE
– CREATIVE SKILLS (FORTS.)**

OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> – Networking among the involved students, companies and experts – Virtual empowerment 	<ul style="list-style-type: none"> – Students inability to adopt the role of social media support person; facilitator – The entrepreneurs not introducing the recommended social media tools for a number of reasons (lack of time, lack of skills, does not consider them necessary)

Some comments from the participating entrepreneurs:

”The students helped me to establish a Facebook page which I am now using on a regular basis as a communication channel with my clients.”

”I have now started to use Twitter together with my partner. I will start using it as a private person but plan to establish a Twitter account for my company as well. This course has helped me to perceive how I can make use of the social media tools in my business.”

3.3. CYCLE 3: VIRTUAL PORTAL – BUSINESSLOHJA – UNDERSTANDING NETWORKS

The third pilot concerned networks and hybrid space. Networks are embedded in virtual space, which requires new kind of accessibility. According to Viherä (2012, p. 48), understanding the benefits of networking and the logic related to contemporary knowledge-based economy is essential, but challenging.

Before the Internet, accessibility required physical proximity. A place-based approach to accessibility is not satisfactory in a world where both consumers and companies replace and complement face-to-face contacts with technology-supported communication (Miller, 2010). Access turns out to be a complex assembly of physical proximity, virtual proximity, and social proximity.

Physical proximity generates tacit knowledge, but without sufficient connections outside the physical place, it may lead to isolation. Integration of physical proximity to virtual proximity generates hybrid space (Batty & Miller, 2000, 2), which is essential to generate tacit knowledge and social capital and open to enable knowledge creation and innovation.

The objective of the third pilot was to design a virtual portal for the recently established Business Lohja science park. It had been a long time vision in the Lohja region to build a local science park to get all public and private organizations as well as educational institutions that offer services to local entrepreneurs under the same roof.

Business Lohja was built in 2012 to improve the accessibility of companies and organizations offering business-to-business services to local SMEs. As part of the course on eBusiness, the bachelor students of Laurea produced the design of a virtual portal for the science park in collaboration with its stakeholders.

The pilot included face-to-face workshops, benchmarking study on other science parks in Finland and other European countries, as well as exchange of ideas through virtual environment (wiki platform). Collaborative design of the virtual portal was meant to bring together the organizations, which hardly knew each other at that point. The portal was meant to complement physical access with virtual access and form a virtual community of the organizations located in Business Lohja. It was expected that, there would be a shared vision with regards to the virtual existence of the science park at the end of the process.

As a result students were able to find out participating organizations' expectations as related to physical proximity and virtual portal. At the end of the project the students introduced several prototypes for joint virtual portal, but the final decision was left to the organizations.

It became obvious already at the beginning of the project that the social proximity of organizations was not at the level expected. Most obvious was the gap between private sector and public sector organizations. It appeared that the SMEs and Laurea were more agile and flexible regarding new ideas. Networking and operating together in virtual space calls for shared vision and new kind of communication capabilities. Lack of motivation and unequal ICT skills appeared to be an obstacle that students could not tackle.

It appeared that students could develop SMEs communication capabilities collaboratively, if the companies have already recognized new possibilities and they have motivation to develop their capabilities further. Introducing new possibilities and visions to heterogeneous, slightly networked organizations, requires intensive, and long-lasting collaboration.

As a result of the project, the Business Lohja organization decided to take on board the ideas produced by the students. The project will continue as a permanent process between the SMEs, public sector organizations and the students.

**TABLE 4. EVALUATION OF THE THIRD PILOT:
VIRTUAL PORTAL – BUSINESS LOHJA – UNDERSTANDING NETWORKS**

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> – Future orientation – Students as change agents 	<ul style="list-style-type: none"> – Lack of motivation related to collaboration – Cultural differences among partners – No shared vision – Emphasizing short term practical challenges
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> – Regional learning and learning network – From physical to virtual stretching activity space – Social capital and competitive advantages 	<ul style="list-style-type: none"> – Locally embedded organizations lose their possibilities if they do not see the advantages that integration of physical proximity to virtual proximity offers

4. DISCUSSION

In this article we have described three pilots by which we have studied how and to which extent a higher education institute can support local actors to adjust and take advantage of the changes information technology introduces and how integration of social media into educational practices supports the collaborative dimension of authentic learning.

Our findings support the idea that a higher education institute can play an important role in supporting SMEs in taking advantage of Internet-based social networking services. In terms of learning and regional development, we find that our second pilot was the most successful one. As a result of the student-entrepreneur collaboration it was actually possible introduce new practices to companies. Even if students already knew the social media (*basic skills*) they studied the opportunities it gives to business and SMEs’ together with SME representatives. At the process, student roles in the learning process transformed from participant to expert (*creative skills*) (figure 7).

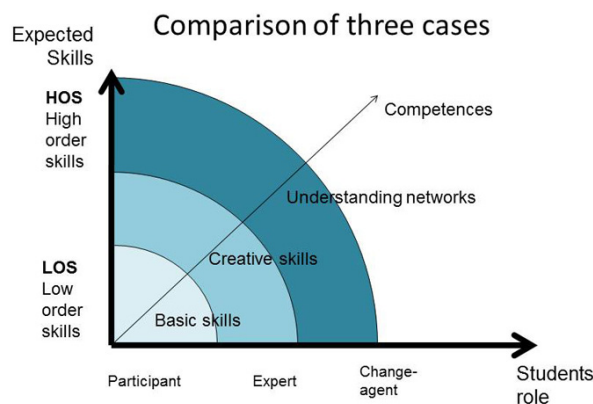


Figure 7 Comparison of three cases. (Adapted from Viherä, 1999 and Kay, Dunne and Huchinson, 2010)

Knowledge of networks and the integration of virtual access to physical access might offer the most indisputable competitive advantages for local SMEs, organizations, and partnerships in the long run. However, in our third pilot we realized that it takes time to motivate actors to see benefits of networking and virtual access attainable in the future (*understanding networks*). Despite of the challenges higher education institutes need to take the role of change agent. We can conclude that apart from the basic and creative skills, it is important that the students learn about the logic and operation of different networks and their virtual forms.

We also wanted to study if integration of social media into educational practices could support the collaborative perspective of authentic learning. We find that social networking services can be integrated in the LbD model, supporting especially collaborative learning and partnerships, but also fostering other dimensions of LbD, such as creativity and innovativeness. The combination of the LbD model with social networking services contributes to virtual empowerment, which takes place in the dialogical model of information searching, communication in communities of practices, and knowledge creation in connection with Web 2.0. In figure 8 the virtual empowerment is placed at the heart of the Lbd model.

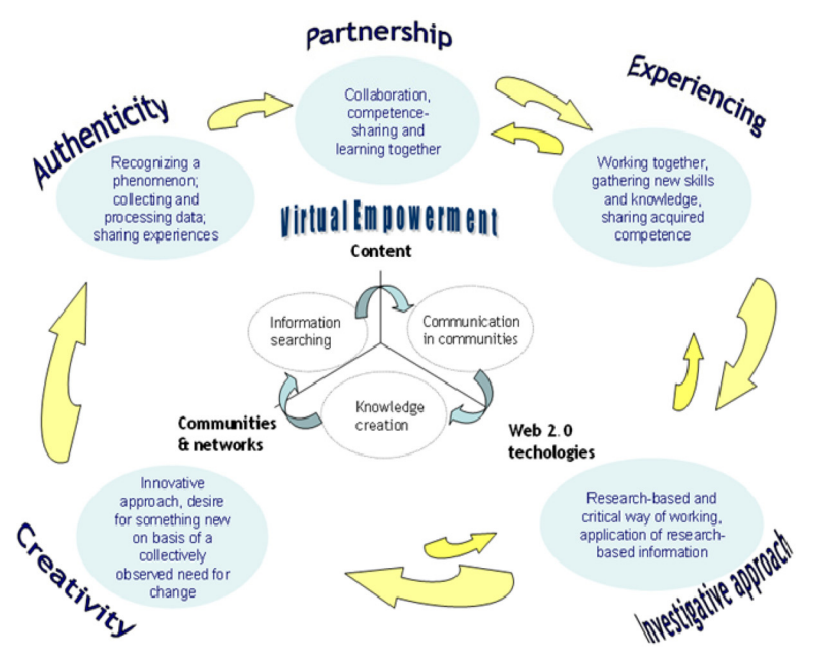


Figure 8 Learning by Developing and virtual empowerment

Today social processes in business and in everyday life are take place in physical places and in virtual networks. Wireless mobile technologies enable instant access and support collaboration and networking. We believe that in the long run education will also adjust to changes in society. A hybrid space including social networking services offers an open learning environment

supporting both formal learning in educational institutions as well as informal lifelong learning in SMEs (figure 9).

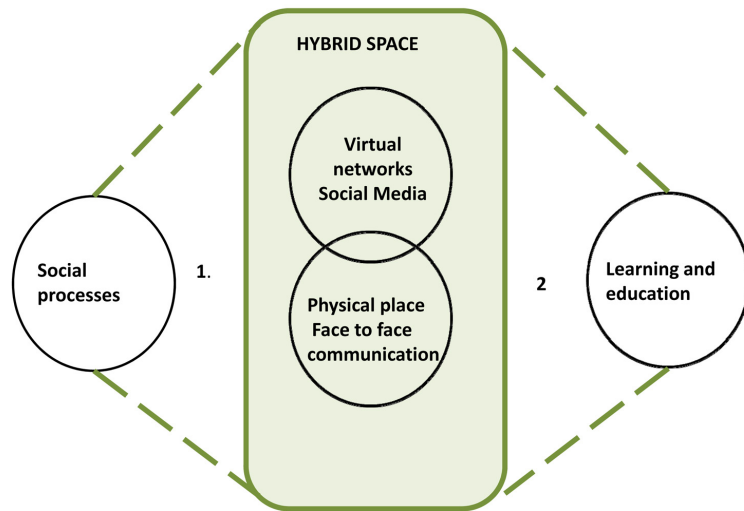


Figure 9. Hybrid space as open learning environment integrating informal and formal learning

LITERATURE

- Barnes, K., Marateo, R. & Ferris, S. (2007). Teaching and learning with the net generation. *Innovate* 3 (4). Retrieved from <http://www.innovateonline.info/index.php?view=article&id=382>
- Batty, M. & Miller, H. J. (2000) Representing and Visualizing Physical, virtual and Hybrid Information Spaces. In D. G. Janelle, – D. C. Hodge, (ed.), *Information, Place and Cyberspace. Issues iattyn Accessibility* (pp.1–14).Germany: Springer
- Bell, J. (2004) On the theoretical breadth of design-based research in education. *Educational Psychologist*. Retrieved from http://faculty.washington.edu/pbell/EPDBR_Bell.pdf
- Bennett, S., Maton, K. & Kervin, L. (2008). The 'digital natives' debate: A critical review of the evidence. *British Journal of Educational Technology*, 39, 775–786.
- Brooks, R. Fuller, A. and Waters, J. ed. (2012) *Changing spaces of education: new perspectives on the nature of learning*. Routledge.
- Collins, A, Joseph, D. & Bielaczyc, K. (2004). Design Research: Theoretical and Methodological Issues. *The Journal of the Learning Sciences*. 13 (1) 15–42.
- Comode, G. & Krishnamurthy, B. (2008). Key differences between Web 1.0 and Web 2.0. *First Monday*, 13, Number 6–2 June. Retrieved from <http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/viewArticle/2125/1972>
- Conan, A. & Ronen, B. (2009). Focused SWOT: diagnosing critical strengths and weaknesses. *International Journal of Production Research*. Vol. 47, No. 20, 15 October 2009, 5677–5689.
- Costello. P.J.M. (2003). *Action Research*. London: Continuum.
- Durkin, M., McGowan, P. & McKeown, N. (2013). Exploring social media adoption in small to medium-sized enterprises in Ireland. *Journal of Small Business and Enterprise Development*. Volume 20, Issue 4. 716–734. <http://halshs.archives-ouvertes.fr/docs/00/19/02/40/PDF/Dillenbourg-Pierre-1999.pdf>

- Eriksson, P. & Kovalainen, A. (2010). *Qualitative Methods in Business Research*, London: Sage.
- Glenn, J. C. & Gordon, T. J. (2007) *Education 2030*. Millennium Project for the American Council for the United Nations University.
- Gibson, J. J. (1986) *The Ecological Approach to Visual Perception*. New Jersey: Hillsdale. Lawrence Erlbaum Associates.
- Hakkarainen, K. & Paavola, S. (n.d). *From monological and dialogical to triological approaches to learning*. Retrieved from http://escalate.org.il/construction_knowledge/papers/hakkarainen.pdf
- Hart, E., Bond M. (1995). *Action Research for Health and Social Care: A Guide for Practice*, , Buckingham: Open University Press
- Hmelo-Silver, C. (2004). Problem-Based Learning: What and How Do Students Learn? *Educational Psychology Review*. September 2004, Volume 16, Issue 3, 235–266.
- Jahanshahi, A., Zhang, S., Brem, A. E-commerce for SMEs: empirical insights from three countries. *Journal of Small Business and Enterprise Development*. Volume 20, Issue 4, 849 – 865.
- Kaplan, A., Haenlein, M. (2010). *Users of the world, unite! The challenges and opportunities of Social* Retrieved from <http://www.sciencedirect.com/science/article/pii/S0007681309001232>
- Kay, J., Dunne, E. & Hutchinson, J. (2010). Rethinking the values of higher education – students as change agents. Retrieved from <http://dera.ioe.ac.uk/1193/1/StudentsChangeAgents.pdf>
- Kitchin, R. & Dodge, M. (2011). *Code / Space. Software and everyday life*. Cambridge: The MIT Press
- Kivelä, S. & Marstio, T. (2009) *Experimenting Social Media With Bachelor Students Studying Business Management*. In O. Kallioinen (ed.), *Learning by Developing – New ways to learn*. Publications D-7, Laurea
- Makkonen, M. (2013). *Barriers affecting social media adoption in Finnish tourism businesses*. Thesis, Degree programme, Savonia University of Applied Sciences. (in Finnish) Retrieved from http://www.theseus.fi/bitstream/handle/10024/68918/makkonen_marika.pdf?sequence=1
- McLean, R., Richards, B. H. & Wardman, J. (2007). The effect of Web 2.0 on the future of medial practice and education: Darwinian evolution or folksonomic revolution? *Medical Journal of Australia*, Aug 6. Retrieved from <https://www.mja.com.au/journal/2007/187/3/effect-web-20-future-medical-practice-and-education-darwinian-evolution-or>
- Miller, H. J. (2010). *Societies and Cities in the Age of Instant Access*. The GeoJournal Library 88. University of Utah: Springer
- Oesch, K. (2007). *Virtuaalinen voimaantuminen, Tapaustutkimus ammattikasvatuksen oppimisympäristön toimintaedellytysten ja tietokäytäntöjen kehittämismahdollisuuksista vuorovaikutteisen tieto- ja viestintäteknologian näkökulmasta* (In Finnish). Tampere: Tampereen yliopistopaino Oy – Juveners Print.
- Otala, L., Pöysti, K. (2008). *Wikimaniaa yrityksiin. Yritys 2.0 tuottamaan* (in Finnish). Porvoo: WW Bookwell Oy.
- Prensky, M. 2001. “Digital Natives, Digital Immigrants.” *On the Horizon* Vol. 9. No 5.
- Raij, K. (2007). *Learning by developing*. Vantaa: Laurea Publications A-58. Retrieved from <http://markkinointi.laurea.fi/julkaisut/a/a58.pdf>
- Raij, K. (2013). Learning by developing in higher education. *Education Sciences*, Issue II, 6–21
- Rogers, E. (2003). *Diffusion of Innovation*. New York: Free Press.
- Romero, M., Guitert, M., Bullen, M. & Morgan, T. (2011). Learning in Digital: an Approach to Digital Learners in the UOC Scenario. *European Journal of Open, Distance and E-Learning*. Retrieved from <http://www.eurodl.org/?article=440>

- Servaes, J. (1999). *Communication for development: one world, multiple cultures*. New Jersey: Hampton Press
- Sveiby, K-E., Grippenbergh, P. & Segercrantz, P. (ed.) (2012). *Challenging the Innovation Paradigm*. Routledge studies in technology, work and organizations. New York: Routledge.
- Taatila, V. (2010). Learning entrepreneurship in higher education, *Education + Training*, Vol. 52 No. 1 48–61.
- Taatila, V. & Raji, K. (2012). Philosophical Review of Pragmatism as a Basis for Learning by Developing Pedagogy. *Educational Philosophy and Theory*, vol.44, No. 8, 2012.
- Tapscott, D. (2010). Syntynyt digiaikaan. (in Finnish) Translation from the original edition: Grown up Digital, Porvoo: WS Bookwell.
- Viherä, M. (1999). *Ihminen tietoyhteiskunnassa – kansalaisen viestintävalmiudet kansalaisyhteiskunnan mahdollistajana*. (In Finnish) Turun kauppakorkeakoulun julkaisuja. Sarja A-1:1999. Turku: Kirjapaino Grafia Oy.
- Viherä, M. (2012). *We Make the Future. Communication Camps and Know-how-talkoot*. Helsinki: Kyriiri Oy. Retrieved from <http://issuu.com/tietotaitotalkoot/docs/vihera-we-make-the-future-internet>
- Vyakarnam, S., Illes, K., Kolmos, A. & Madritsch, T. (2008). *Making a difference*. A Report on Learning by Developing – Innovation in Higher Education at Laurea University of Applied Sciences. Laurea publications B-26.
- Wang, F. & Hannafin, M.J. (2005) Design- based research and technology enhanced learning environments. *Educational Technology Research and Development*. Volume 52. Issue 4. 5–23 Retrieved from <http://lopezlearning.net/files/19511441FenWangArticle-2.pdf> <http://issuu.com/tietotaitotalkoot/docs/vihera-we-make-the-future-internet>