This paper represents the model of Learning by Developing (LbD) in relation to collaborative and cultural learning within the world of service and product development. The background of this paper includes an interdisciplinary combination of service science, computer science, engineering and management science. The interdisciplinary combination involves researchers, learners, teachers and other participants connecting and integrating the three academic disciplines, professions, and technologies, along with their methods and perspectives, in the pursuit of a common goal which emphasizes results as a business value of products, services and innovations. The LbD model is clear and transparent; as such it can be adopted favourably by other sciences and Universities of Applied Sciences. The structure of the model is also easy to adapt and renew in case of changes, which mean that it can develop from the inside on the one hand, and produce innovations on the other hand.

Keywords: Learning by developing, progressive inquiry, collaborative learning, enriching value networks and internationalization.

Introduction

Learning by Developing (LbD) is a pedagogical and communal approach in which learning is linked to applied research and development projects and culture. It means learning expertise that arises from social interaction, knowledge and competence sharing, researching and problem solving of collective objects. The model emphasizes on cooperation and creating a ‘learning and developing’ culture and makes it possible to include and use various scientific perspectives and methods of learning, researching and developing in operation and action. The model represents a management and work philosophy and culture based on the production of shared competence and creativity. In our current developing culture there are genuine research- and development tasks; there are no ready-made solutions. The learning process starts by identifying the initial problem or strategic research object, analyzing and describing it, and selecting appropriate work methods. The model is not applicable for solving problems set in advance by someone else. Neither does it support the commissioned project principle, because the starting points are determined by the cooperating participants of the value network, often together with professional developers from research and development organizations. The objective of the work is usually not possible to define clearly in advance, but is specified throughout the development process. The process requires critical thought strategies and skills for justifying solutions and evaluating evidence. Work consists of a continuous problem-solving process, focussing on research, development and generating new competence. The end result is a creation, a new operating method, a model, a service or a product.

The Model of Learning by Developing

The overall mission of Universities of Applied Sciences consists of practical operations that integrate the three tasks; education, research and development, and regional development. The model of Learning by Developing (LbD) is procedural and proactive by integrating the learners’ everyday activities within the development of working life’s products and services, which is based on solving genuine problems as well as fulfilling strategic important development objects and creating new innovations.

The model’s theoretical foundations are solid; it is developed and built on considered analyses of chains of real operation by action research. The core competence produced by a University of Applied Sciences plays a significant role in developing the networked expertise, which is noted both in the model’s theoretical foundations and in its practical implementation. Networked expertise refers to competences that arise from social interaction, knowledge sharing, and collective problem solving. Learning by Developing (LbD) has a learning culture where proactive knowledge development and learning has for the participants and actors the following meanings:

1. to the learner it means growing up in a culture focusing on expertise that arises from social interaction, knowledge sharing and collective developing, it means growing up with a life style of a developer including proactive learning and personal knowledge management;

2. it means increasing the value of innovations for all cooperating participants; applied research and development create new knowledge, competence, innovations, service products and practices;

3. to the University of Applied Sciences it means changing its organizational and cultural role towards the cooperative community regarding the creation of new knowledge and expertise; this means that the University...
of Applied Sciences own development process enriches the expertise within the community and increases its role in the value network by being a cultural prime mover and a new actor who shares innovations within the network;

4. participants are trustworthy, appreciate each other and are equal; shared learning and shared leadership with flow and spirit arises from the participants’ internal motivation; own ideas and the creativity of the learners and participants are highly valued and not directly controlled by the management;

5. it emphasizes on working life’s authentic proactive product and service development work within its value network; it creates an operating model for improving the innovation cycle in a communal, national and international way;

6. it brings the demands for developing the authentic product or service into an innovative area considering the learning objectives of University of Applied Sciences;

7. it creates a structure for linking business competence with expertise concentrating on international development and builds foundations for an innovation-based entrepreneurial culture;

8. for the community and region it means that the mobilization of talent resources allows new ways for innovative knowledge creation;

9. various research and learning methods and developing practices can be used; it includes the ‘lifetime learning’ principle and values advanced communal knowledge; it contributes in creating new thoughts and objects for the regional development;

10. it allows the use of motivation- and evaluation methods from the point of view of: new innovation, execution value of the results, competence development, learning and the social effectiveness of actions; the main methods are self-evaluation, peer evaluation, group evaluation and value network response;

11. it changes the traditional role as a teacher towards the role of a guider or a coach in a partnership; trusting the participant produces professional growth where learners develop themselves facing different kinds of challenges during their development cycle while lecturers participate as researchers and developers being experts in their own fields and understanding the students’ learning process.

There are three tasks for Universities of Applied Sciences according the law: education, research and development, and regional development. LbD refers to a solid integration of the three tasks where learners, lecturers, staff and participants of the value network all participate at the same time. The learning, research and development practice meets the network’s strategic research objects and adds value to model. The model also contributes in creating value to the network by developing and spreading the new knowledge, new products and services, productive capabilities, and by implementing the innovations into practice.

LbD has its roots in the organization's shared value base focusing on learners and customers, reliability, community, openness, team spirit, social responsibility and innovativeness. The model has an innovative working and developing culture based on authenticity, partnership, experiential learning and research. It reflects its own contribution by the development projects meeting the development needs and objects within the value network.

Learning by Developing’s (LbD) theoretical background includes a combination of concepts, models, and innovative development theories and is a pedagogical approach which constructively develops the learning culture.


Engeström (1999) has studied innovative learning cycles in teams using the cultural-historical activity theory and the theory of expansive learning as a framework for his analysis. He emphasizes on the phase of knowledge creation where problems are formulated and analyzed in the first place. Expansive and innovative learning starts by criticizing, questioning and analyzing existing practices. Focusing dialectical tensions, contradictions, and within communal activities, these are usually ignored by approaches focusing on immediate empirical generalizations. The model is to be understood by analyzing more different elements in an expansive learning cycle, whereas innovative learning cycles do not follow any fixed order.

The basis of progressive inquiry is found in Kai Hakkarainen's unpublished doctoral thesis (1998). In the year 1999 Hakkarainen, Lonka and Lipponen argument that the pedagogical Progressive Inquiry Model (PI model) aims at
facilitating similar kind of productive practices of working with knowledge in education which characterizes scientific research communities and emphasizes on shared expertise and collaborative work for knowledge building and inquiry by setting up the context, using questions, explanations, theories, and scientific information in the cycle of deepening inquiry. The model describes the elements of expert-like knowledge practices in a form of a cyclic inquiry process.

Hakkarainen, Palonen, Paavola and Lehtinen (2004) explain the progressive inquiry process with its characteristics autonomy and self-regulation of the learning process; rather diversity and associated "creative chaos" than the pre-structured and strictly controlled instructional processes without any degree of freedom. The model captures certain essential aspects of the knowledge-creation process, such as the importance of questions and problems, deliberate work for knowledge advancement, engagement in deepening inquiry, and the socially shared process of inquiry. These are all essential aspects of productive working with knowledge and are routinely practiced within knowledge-intensive organizations.

Bereiter and Scardamalia (2003), both are strong advocates of student communities working together to become proficient in fields of knowledge. They introduced the concept of knowledge-building communities, where students learn to work with theoretical and practical concepts as objects. They advocate strongly that students become knowledge-builders and participate in the knowledge-building discourse. The focus is first on problems and depth of understanding; second in decentralized, open knowledge environments for collective understanding, and third in productive interaction within broadly conceived knowledge-building communities.

According to Hakkarainen, Palonen, Paavola and Lehtinen (2004) networked expertise refers to competencies that arise from social interaction, knowledge sharing, and collective problem solving and are embedded in shared competence of communities and organized groups of experts and professionals. Cognition and intelligent activity are not only individual mental processes but ones which rely on socio-culturally developed cognitive tools, these also includes physical and conceptual artifacts. Networked expertise is rational in nature. It is constituted in interaction between individuals, communities, and larger networks supported by cognitive artifact, and it coevolves with continuously transforming innovative knowledge communities. The approach emphasizes on the development of expertise, distributed cognition and shared expertise, collaborative and cultural learning, and inquiry-based learning processes.

The innovation developing approach (D) emphasizes aspects of social and service innovation generations, services development and services design process implementations. Developing covers design and developing work starting from proactive approach, future and innovation researches to creation of innovation and continuing to end of development process to outcomes like value of product or service with international execution. Learning by Developing covers lifecycles of product or service development and implementation processes and is rather an operational learning and developing culture than a learning or applied research method; it makes it possible to integrate various research and developing methods and is therefore rather a culture for development and learning and suite very well for development work in different sectors of expertise.

The Learning by Developing (LbD) name is significantly inherited to the development-based learning concept called REDLabs. The development-based integrative learning environment REDLabs (RED = Research, Education, Development) was established in 2001 and acts as a concrete operating and developing environment being a connecting point where education and the value network meet each other. REDLabs focuses on service development and is a genuine research and development environment for professionals.

LbD has a culture and community in which learners, the lecturers who tutor them, and experts from the value network cooperate in jointly agreed development initiatives. In this model, competence is applied to a genuine problem, which generates new competence to all the participants. LbD involves five principles: authenticity, partnership, experiencing, research orientation and creativity (Fränti & Pirinen 2006).

LbD stands for a development-based learning- and cooperative working culture. The operating model aims at developing a new kind of expertise, characterized by the ability to build networks and utilize multidisciplinary competence in finding solutions. Studying is multidisciplinary and even closer related to working life and the value network than before. This model is founded on the enriching common processes of the University of Applied Sciences and business communities. Business fields’ developing needs, strategic objects and problem situations are the starting point for proactive learning. Through the development projects, learners and participants have the possibility to acquire the latest expertise in their field.

According to the LbD model the concept of the integrative learning environment is further developed. Learning is connected to research and development activities and creates value to the network participants including the University of Applied Sciences. The integrative learning environment refers to a space and meeting place in the value network, a kind of creative problem-solving environment, in which representatives of the working life market, participants, tutors and learners meet and interact in a real, inventive and exploring interface. It is a common way and culture for people who like to be innovative, have the will to learn and like to develop something valuable.
Discussion and results analyzes

National evaluations have praised the innovative learning methods and future-oriented development at integrative learning environments. Learning by Developing (LbD) significantly influenced Laurea’s appointment as a centre of excellence in regional development for 2003-2004 and 2006-2007, and as a centre of excellence in education for 2005-2006.

Salminen and Kajaste (2005) have concluded the following evaluation team discussion: The evaluation team set up by the Finnish Higher Education Evaluation Council considered Laurea’s pedagogical learning model, Learning by Developing, to represent high-quality innovation efforts. LbD met all the quality criteria set by the council either well or excellently. The operating model describes traditional structures and views (e.g. curricula, learning environments, conception of learning) in a new way, from the perspective of authenticity. The curriculum based on generic competences, the open innovation environments, the focus on learners and phenomena, and the development of partnerships in employment sector development projects are functional and useful methods. They appropriately define the University of Applied Sciences’ being and duty as a producer of experts for the employment sector. The LbD model and its implementation are rooted in an orientation towards employment. The model considered the cyclical interaction between practice and research. The pedagogical principles also raise research and development competence profile and lead to the production of competence through target-oriented development projects. The integrative learning environment is conceived broadly from the perspectives of the workplace and network, the region, a science university and even an incipient internationalization. This adds credibility to the future significance of the pedagogical development work. The integrated pedagogical approach is based on participant and learner-oriented activities and focuses on future workplace skills. Thus it is excellent for contributing entrepreneurial elements to education at Universities of Applied Sciences. Also the joint creation of new kinds of innovation environments (e.g. development platforms, pilot factories and LivingLabs) is seamlessly integrated into the operating philosophy. Together, these characteristics may reform the cost structure of education as well as the creation of curricula, if innovations produced by learners are used as a basis for planning and instruction. Then the role, forms and focus of instruction will shift to be primarily those of a process facilitator and supporter. It can increase the integration of lecturers’ workflows and free resources reserved for instruction to be used in the development of learning processes.

In the LbD operating model, learners evaluate their own learning procedurally and assume responsibility for its outcomes. The role of lecturers changes in the learning process. Learners consider the pedagogical model to be well-functioning, which indicates that the principles have been integrated into practical work. The success of the model is also reflected in the learners’ enthusiasm and motivation, which are indications of creative and committed work. The evidence showed that although the innovative model is still in its early stages, it has been implemented simultaneously in several fields of study. It was also evident that the model is supported in the integration principles of the management system. This prepares the ground for future strengthening of communal and cultural processes, fostering the organization's broad-based commitment to the chosen model.

The LbD model represents a management and work philosophy based on the production of shared competence and creativity. The objectives given in the model – evaluation criteria for the usefulness of competence – may be difficult to define in advance. However, in setting their own targets, learners should know on what and how they will be evaluated in relation to the starting points and objectives of the learning process and to other participants, as they do in traditional evaluation concepts or using same type of evaluation methods than working life have in leadership best practices.

Other future challenges are to further refine the follow-up process, the modelling of operations and the spreading of tests and outcomes. This means that the criteria according to which the effectiveness of operations is evaluated, follow-up models and publication procedures must be developed and expanded. In addition more development is needed for the incipient international activities, both in the pedagogical model and as a natural part of the learners’ learning processes.

The operating model is clear and transparent. As such it can be adopted favourably by other Universities of Applied Sciences. The structure of the LbD model is also easy to adapt and renew in the case of changes, which mean that it can develop from the inside on the one hand, and produce innovations on the other hand.

LbD means cooperation with the employment sector to learn about the authentic developments and problems encountered at work. These are addressed in integrative learning environment’s research and development work. LbD systematically seeks answers to problems whose solutions require new knowledge. The core of the LbD model is formed by object-oriented work, which means that learning focuses on genuine development of the working life. Learning has a clear objective and takes place through the process of generating new competence.

R&D projects are one way of making learning object-oriented and managing the learning process. Lecturers, learners and employment sector’s representatives all participate in LbD from their own perspective. LbD signifies creative learning based on real life, an investigative approach and encounters.
Conclusion

After evaluation and discussions (2006–2007) can be concluded that when ‘forcing to learn’ ends, ‘real learning’ starts. Self motivation is the key factor of the success of the learner’s personal development.

Also can there be noticed that knowledge sharing is a core value for all organizations. Collaboration and cultural learning like Learning by Developing (LbD) including a variety of learning and developing methods are all promising steps in creating this value.

The challenge however involves the change of the role of the teacher; more guidance and coaching based on trust and equality is essential to produce professional growth. It is evident that learners get a certain level of challenge during their learning cycle. With a good level of guidance and coaching regarding the content and substance we have the possibility to develop something new.

Another substantial issue requires changes in the culture of leadership. The learning environment forms a framework in which traditional teaching practices are replaced with a more motivating approach. The main change from a controlling structure to a motivating knowledge and competence leadership model is a key factor for success. LbD leads to new kinds of learning environments by creating the necessary conditions for the generation of high-quality knowledge and competence. This includes structures where free thinking is possible and creativity allowed; a climate that supports dynamic development with a spirit and flow while improving cooperation and functionality of the value network including the creation of new leadership models for the community.

References