Framework and Culture of Proactive Competencies Learning
Learning by Developing (LbD)

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Abstract: - This study represents the Framework of the Learning by Developing (LbD) Model in relation to continuous collaborative and learning culture within the world of service, product development and industry. The background of this paper includes an interdisciplinary combination of service science, computer science, engineering and management science. In this study the design-science and constructive research question is: what are the constructions, models and implementations that contribute to the continuous collaboration development work in industry, education and service, activities which are included in the implementation of the Finnish University of Applied Science’s three statutory tasks of education, research and development, and regional development? The new proposition emphasizes proactive approach and includes the Framework of Learning by Developing (LbD) Model. In this context the term proactive approach means a situation by causing something to happen rather than waiting to respond to it after it happens. The theoretical background consists of Learning by Developing (LbD) related work, concept and short literature review. The proposed model are applied and tested in Higher Education studies during 2001 to 2008 at Laurea University of Applied Sciences at Espoo.

Key-words: - culture of learning, collaborative learning, enriching value networks and internationalization

1 Introduction
Learning by Developing (LbD) is a pedagogical and communal approach in which learning is linked to applied research, development projects, and culture. This means learning expertise that arises from social interaction, knowledge and competence sharing, researching and problem solving. The model emphasizes on cooperation and creating a ‘learning and developing’ culture. It also 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, work philosophy and culture based on the production of shared competence and creativity. In our current developing activities, there are genuine research and development tasks with no ready-made solutions. The learning process starts with the identification of initial scope or 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, where 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 research and development process. It means collaborative learning, coaching and guiding which emphasizes the principle that the results are evaluated but not formalized in advance. This allows for freedom of methods used in the innovation process.

This process requires critical thought strategies and skills for justifying solutions and evaluating evidence. The tasks consist of a continuous development process, focusing on research and generating new competence [2]. The end result is a new creation, a new operating method, a model, a service or a product and in best cases it is an executed global business.

Laurea University of Applied Sciences operates in the Helsinki metropolitan area, one of the most competitive regions in the world. Laurea’s strategic choice is to implement, develop and use Learning by Developing (LbD) as an integrative operational model. By utilizing LbD model, Laurea can integrate the three statutory tasks in integrative way, where students are in center of action [9].
2 Research Method
The subject of this work is to incrementally create new Framework Model and practices for more effective proactive learning at the University of Applied Sciences. It is imperative to use the design-science and constructive research approach [7].

In this study, the following concepts of constructive research are applied: (1) creation and execution of framework and cultural model, and; (2) evaluation of experimental implementation. Previously created and argued models are tested separately and in the proposed integrated Framework of LbD Model.

3 Literatures
The main theoretical background of LbD includes a combination of concepts, models, and innovative development theories. It is a pedagogical approach which constructively and incrementally develops into the presented framework of proactive 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 emphasized on the knowledge creation phase where problems are first formulated and analyzed. Expansive and innovative learning starts by criticizing, questioning and analyzing existing practices. The focus is on dialectical tensions and contradictions 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, as innovative learning cycles do not follow any fixed order. [3]

Hakkarainen, Palonen, Paavola and Lehtinen (2004) explained the progressive inquiry process with its characteristics autonomy and self-regulation of the learning process. The progressive inquiry process utilizes diversity and associated “creative chaos” rather 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 productively working with knowledge and are routinely practiced within knowledge-intensive organizations. [6]

Bereiter and Scardamalia (2003) 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 strongly advocate that students become knowledge-builders and active participants in knowledge-building discourse. The focus is first on problems and depth of understanding; second on decentralized, open knowledge environments for collective understanding and third on productive interaction within broadly conceived knowledge-building communities. [4, 5]

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 is not limited to an individual’s mental process but also relies on socio-culturally developed cognitive tools. These tools include 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. It also 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. [6]

Hakkarainen et al. (2004) stated that learning is constructed out of three perspectives. The first perspective is a metaphor for acquisition, conceptualizing learning as a process of transferring knowledge to an individual learner. The second perspective is a metaphor for participation, which emphasizes the role of social communities in learning and professional development. The third perspective is a metaphor for knowledge creation, whose aim is the purposeful generation of information and the development of related social customs [6]. Fig. 1 presents the three learning perspectives:

![Fig. 1: Hakkarainen, K., Lonka, K. & Lipponen, L. 2004, Three learning perspectives](image-url)
4 Related Work

4.1 The LbD Model
The LbD Model is procedural and proactive by integrating the learner’s everyday activities with the development of working life’s products and services. It is based on solving genuine problems as well as fulfilling important strategic development objects and creating new innovations.

Pirinen & Fränti (2007) argued that LbD has a learning culture where proactive knowledge development and learning has the following meanings to the participants and actors:

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

2. it means increasing the value of innovations for all cooperating participants in applied research and development. Creating 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, appreciative of each other and are equal. Shared learning and shared leadership with flow and spirit arises from the participant’s internal motivation. Own ideas and the creativity of the learners and participants are highly valued and not directly controlled or defined 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 to 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 evaluation methods are self-evaluation, peer evaluation, group evaluation and value network response;

11. it changes the traditional role of a teacher towards the role of a guide 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 student’s learning process;

12. it refers to a solid integration of the three tasks where learners, lecturers, staff and other participants of the value network all participate at the same time. The learning, research and development practice meets the network’s strategic research objective 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;

13. it 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. [10]

4.2 Developing Process of LbD
The Learning by Developing (LbD) name is significantly inherited by 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. It is a connecting point where education and the value network meet each other. The name parts indicate the sustainable and incremental integration of the three statutory tasks at the same time and in the same space. [8]

The LbD model further developed the concept of the integrative action and environment. Learning is connected to research and development activities and creates value to the network participants including the University of Applied Sciences. The integrative action and environment refers and focuses on analyzing the processes whereby new objects or activities are co-operationally created, whether in working life, living lab or learning environment. 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.

4.3 The Onion Model
Fränti & Pirinen (2005) proposed the Onion or co-operation model for the integration of LbD, regional development work, international co-operation and globalization.

The Onion model focuses on last known and updated knowledge and knowledge structures connected to the learning society. It emphasizes on social interaction and activities e.g. motivation, spirit and flow as structures for learning. It focuses on collaboratively created objects, elasticity, creativity, authenticity, equality and trust. Fig. 2 illustrates the Onion Model:

Laurea is an operator in regional development, and the regional development task is linked to the whole education task. In terms of international relations, Laurea enriches its area of operation with international top-level expertise and promotes its internationalization.

For learners, Onion model means increased opportunities and the inclusion of increased international interaction in studies. Laurea’s learners are equal participants in integrative learning environment development groups, which also include lecturers, partners and researchers. [8]

According to the Onion model, the network of integrative learning environments creates an enriching community of knowledge and practice. Innovation researchers emphasize the importance of people’s spirit and flow in innovation work. Innovations arise from individuals and their interaction. An “enriching community” means the interactive relationships that link innovative individuals together and to their region.

4.4 Elastic Objectivity Model
Pirinen (2008) proposed Elastic Objectivity which is especially desirable where the approach is innovation based and support for creativity is emphasized, it means elastic nature and meaning of objectivity as well as the meaningful balance of objectivity and subjectivity, it emphasizes that creative action makes trilogy interaction almost “available on demand” in early states of development work of innovations generation.

If the process target is to make and generate inspiration and innovations then objectivity’s nature should also be type of creativity supporting and flexible. Releasing objectivity allows free and resilient changes and individual’s modifications are valued in creative and perceiving phase of process [12]. Fig. 3 presents Elastic Objectivity as applied to regional and global development.

People’s motivation, spirit, flow, trust and commitments are emphasized in innovation generation work. The idea of elastic objectivity is that it keeps free innovation possibilities and spaces open, flexible, and up to date in knowledge to the participants.

Phenomenon of the Elastic Objectivity appears especially at the inception, the perceiving and the elaboration phases of new development activities (cyclic activities) and it obviously ends at the start of the specification phase of development process (linear activities). [10, 12]
4.5 Changing of Objectivity Model

Pirinen (2008) proposed the Changing of Objectivity Model which states that the nature of objectivity changes depending on and in relation to different perspectives. The model emphasizes on the role of different orientations. In the reactive model based orientation, only few innovations and new competences creation exist. In the problem-based orientation, basic idea and development objects are usually well known and defined. The traditional research questions and objectives are usually formulated and fixed. Elastic Objectivity is desirable where the approach is innovation based and proactive. Flexibility and resiliency of development objects are needed for allowing more motivation, spirit and flow as well as innovation power in cyclic innovation process. In innovative orientation, the accepted objects are rather types of modelling clay, flexible, dynamic or resilient than specified, defined or formal. The nature of the transformation is full duplex, e.g. the development orientation and its process implementation integrate cyclic innovation process with more constant and linear development process.

In the other perspective, the model presents development of new competences where the transformation variables are from reactive to proactive, from defined to elastic or resilient, from formal to flexible and from linear to cyclic and of course vice versa. This changing of objectivity also have crucial role in organisations management and leadership culture. The Onion model is one possibility and example to the applied innovation leadership model. Changing of objectivity is illustrated in Fig. 4.

5 Proposed Model

The new proposition is the Framework Model of Learning by Developing (LbD): it links culture of Learning by Developing (LbD) to orientations and transformation framework; it emphasis and practices “proactive in different way” (proactive, proactive’ and proactive”) perspectives of viable and new competencies learning; it combines and incrementally integrates the previous presented concept of Learning by Developing (LbD) and Onion, Elastic Objectivity and Changing of Objectivity models. The Framework Model of Learning by Developing is illustrated in Fig. 5:

The Framework Model of LbD includes model-based, development, research and innovation orientations. The project and problem-based orientations are included in the transformations between development and model-based orientations. The linking arrow represents full duplex transformation or action.

The middle part of the framework consists of LbD’s development-based culture. It orchestrates and performs transformations between different orientations. Interfaces of orientations are described and used in a similar way as in the Changing of Objectivity Model. The Framework Model’s implementation process is using the Onion Model in the space of integrative learning environment and living labs.

There are several different instances and cases in the Framework implementations, such as: representation of the nature of LbD culture where full duplex transformations are orchestrated [10]; representation of the cooperation and implementation model of Finnish academic dual model within public, industry and academic institutions [1]; construction model of Communities of Network Expertise [6] and Value Networks [12]; and linkage of the different orientations to proactive competencies learning.
6 Evaluation and Conclusion

Universities of Applied Sciences have huge potential and realistic possibilities to implement its statutory regional development task and other authentic societal and global challenges. The paradigm shift of education methods based on knowledge creation by researching, developing and learning is growing. The challenge, however, involves the changing of the institutional systems and roles and attitudes of the learners, teachers and participants [9].

Higher Education institutions can promote knowledge transfer through their international operations. The greater Helsinki Metropolitan Area is a genuinely international and multicultural innovation environment that has strong functional links to world’s top innovation regions and strategic alliances with the world’s top universities. The region should form an international community; this requires internationally attractive, innovative, LbD-based R&D projects and operating models for innovation environment [9].

Learners in higher education are motivated to improve their own research and development competences and international network gives new concrete prospects and possibilities to continue studies in global perspective [12].

National evaluations have praised the innovative learning methods and future-oriented development at integrative learning environments. Learning by Developing and internationalization work 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 [9].

Vyakarnam, et al. (2008) concluded the strengths and challenges from the learner’s perspective. Strengths identified includes: great employability, effective participation in authentic development projects, learners are at the centre of development work, highly experimental learning, raised aspiration, social skills, self confidence, personal responsibility for results, contact with companies and organizations, coaching learners rather than manage study events. The challenges are: system relies hugely on group commitment, motivation and coaching, how to reach scopes and objects and new up-to-date knowledge in a more systematic way, “learning themselves” takes much longer time than coaching and what is optimum radio of direct inputs and initiatives [11].

In our society and region, participants work increasingly involves the creation of new knowledge. The participants are required to develop competencies that allow them to work at the levels of the latest new proactive knowledge. The integrative constructions could contribute to teaching students and participants to use and construct artefacts and services for expanding their intellectual resources.

References: