

A DIGITAL TOOL TO HELP WORK-ORIENTED PROJECT STUDIES IN HIGHER EDUCATION INSTITUTIONS

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Abstract

Development-oriented learning combines many things, such as project learning, problem-based learning, learning by development, learning by doing, experiential learning, and research. One perspective behind developing the Learning by Developing (LbD) Action Model has been the development of higher education students' future working life skills during their studies and the opportunity to network with companies. Through business cooperation, students can more easily find a job after graduation. The LbD was developed at Laurea University of Applied Sciences (Laurea) in the early 2000s and has been used as a pedagogical method for almost 20 years. The LbD pedagogy must be constantly developed and renewed to stay up-to-date and as a valid pedagogical method in a changing society. This article describes a digital tool in the design phase that would facilitate working-life-oriented project studies in higher education institutions. The starting point for the tool's design has been research conducted in three higher education institutions between 2019 and 2022 and practical teaching and learning experiences at Laurea according to the LbD model.

Keywords: *Learning by developing, higher education studies, students' experiences, project-based studies.*

1. Introduction

This article describes a planned project, the background of which is the need to develop a new digital tool to help lecturers, students, and project clients work on work-life-oriented student projects in higher education institutions. One starting point has been the pedagogical method of Learning by Developing (LbD) Action Model used at Laurea University of Applied Sciences. The LbD has been used as the primary pedagogical method at Laurea for almost 20 years. Through research and experience, information has been obtained that it would be good to use LbD as a tool that primarily helps lecturers plan, implement, and evaluate their work-oriented project courses. Information has also been collected from the students, and the students would also like more detailed guidance or a concrete tool to help them use LbD, which would help them better understand the development of their skills. The project clients are the third and most important in working on work-life-oriented student projects. Project clients are often only one time in various work-oriented student projects as principals, and they also need concrete instructions on how to operate in the projects and what their role is in them. This article describes what has already been planned and the background thoughts and theories behind the design of the new digital tool. The article also contains background information about the research conducted for computer science students, lecturers, project clients, and other practical experiences using LbD.

The starting point for the design of the new digital tool is firmly LbD, but the prerequisite for using the tool is not LbD pedagogy as such, but it is suitable for any work-oriented student project implemented in a higher education context. The subject of a work-oriented student project can be almost anything, i.e., it does not have to be related only to IT projects, even if the research behind it was related to IT projects of computer science students.

2. Learning by developing (LbD) action model

The creation of the Learning by Developing (LbD) Action Model is based on the University of Applied Sciences Act (2003/351) (Finnish Law, Act351/2003), which influenced the recognition of pedagogical change at Laurea. In the University of Applied Sciences Act, the tasks of universities of applied sciences were defined as pedagogy, regional development, and research and development work. These tasks

have been integrated into the new pedagogical LbD model at Laurea. The LbD was developed to support teaching and learning, regional development tasks based on the University of Applied Sciences Act, and creating innovations for companies as enablers of a new competency-based curriculum. (Raij, 2007).

The LbD includes research, authenticity, partnership, experience, and creativity as part of competence development (Raij, 2014). An essential part of LbD pedagogy is the importance of lifelong learning and its importance for students' future (Ojasalo, 2019). What is essential in LbD pedagogy is the jointly agreed roles of lecturers, students, and project clients, competence-based, and the perspective of working life development.

The LbD Action Model has been used extensively at Laurea since 2006, and it is a valuable way to teach higher education students new skills needed in working life (Raij, 2012). The LbD must be constantly developed and improved to keep up with the constant change. Using LbD as a pedagogical teaching and learning method requires careful familiarization and good instructions for all stakeholders.

3. Lecturers' and students' practical experiences and results from research

At the beginning of the LbD project, students familiarize themselves with the competence goals defined in the project. The competence goals are described in the higher education organization's study plan and the customers' definition of their goals. The client's goals support and deepen the goals set in the study plan, bring personal perspectives to the student's work and clarify the differences between development projects in different operating environments. In connection with several LbD projects implemented with students, it has become clear that students constantly reflect on their level of competence and why it should be developed in the subject area. Reviewing one's competence can be recognized by a quick thought: "This is easy; I already know everything related to this." or "Oh no, I do not understand any of this; how am I going to get through this." or "Well, I have to do this." At the beginning of the LbD project, the students should think about their current competence versus the desired competence as part of the curriculum to be completed. At competence development, students learn to think about how new competence can be used more widely, for example, in future career choices. The modified Binkley model presented in this article is suitable for identifying this process and supporting the setting of competence development goals (Binkley et al., 2012).

At Laurea, individual projects are implemented for business customers in the P2P (peer-to-peer) model of LbD projects. In these working life development projects, students form a team of 4-7 people, led by a project manager who is a student. The development of competence, therefore, extends to, for example, group dynamics, external and internal communication, teamwork, theoretical information processing, project expertise, method choices, problem-solving, presentation methods, and consideration of the unique needs of the operating environment and the actual subject.

The new digital tool would strengthen the students' understanding of competence development and its related factors. When implementing projects and assignments, the development of competence brought by failures and challenges and their effect on meta-competence and problem-solving skills can sometimes be wholly forgotten. The new tool would help students better recognize the development of skills other than those related to the substance itself.

As the students' competence develops and they participate in various LbD projects, they get a real-time perspective on the real competence needs of working life and can relate their competence to these. By examining these, students can plan their own goals for their future professional development and consider future potential employers based on cooperation. Clients get the same perspective on their future employees and their level of competence. Based on this, they can agilely highlight the factors needed for their studies on both sides. At best, the student can develop their competence systematically through various projects and find employment with one of the clients of the cooperation project. The client gets an employee who is familiar with the operating methods and gets an employee to fill the required competence gap.

One of the background factors for this article was a study carried out at Laurea, Robert Gordon University (RGU), and Haaga-Helia University of Applied Sciences (Haaga-Helia), which targeted computer science students, lecturers, and project clients. One of the goals of this research was to get information from different parties, pedagogy staff, lecturers, students, and project clients about what kind of development needs LbD has, in their opinion. One research question was used to collect information and suggestions on improving the LbD Action Model. The answers to this question were compiled from the answers of all the participants in the study. (Lintilä, 2023).

The lecturers had many suggestions for improving LbD, especially its use and familiarization. As suggestions for improvement, the lecturers hoped for clear and reasonable instructions for each party, i.e., lecturers, students, and project clients. The instructions must be very concrete, practical, and easy to use. Instructions were requested for different situations because client projects often differ, and study modules and subjects vary. Examples of good practices and best practices were also requested. The students hoped

for a deeper familiarization with the LbD model in order to better understand the ideology of LbD. The research also yielded many ideas from the project clients for improving the LbD model and better familiarizing the project clients. The most central finding of the research was that a clear and practical guide and tool is needed to implement and use LbD, which helps the understanding of the role of all stakeholders in pedagogy according to the LbD model. With the help of the research, many things have been found that still need development in the LbD model. However, most improvement needs are related to more precise and concrete instructions and a new practical tool with instructions for lecturers, students, and project clients. Developing a new practical tool has already started, but it is still in the planning phase.

4. Objectives

The new digital tool aims to help lecturers, students, and project clients. The tool is designed to have sections for each of these three stakeholders, which helps them better plan and implement their parts of the project's tasks from their perspective. Lecturers' tasks start before other parties because they are responsible for developing students' skills according to the curriculum. Lecturers have many tasks related to planning, study module implementation, and competence assessment. These tasks are not always the same in every project, but they are linked to the substance that the students are studying. Implementation methods also vary, which is essential to planning and implementing the study module. In addition to the customer project, the study module can include many other learning tasks, which must be planned, and what will be learned in the projects. In addition, the lecturers' task is to plan which assessment methods are included in the study module. The evaluation can consist of the lecturer's evaluation, an exam, assignments, project implementation, self-evaluation, peer evaluation, and customer evaluation. Before starting the study module, students must know how the study module will be evaluated. When designing the tool, many issues related to the lecturers' needs must be considered so that the tool facilitates the lecturer in working on a life-oriented project teaching.

From the students' point of view, the new digital tool must be such that the students can easily understand the process of developing their skills. Binkley's model has been taken as one of the background theories from the point of view of the development of students' skills, which has been supplemented (Table 1). To expand students' understanding, the model has different areas they look at and thus better understand what they should learn and how their skills develop. Concerning the different sub-areas, the table also has a division into the development of student personal competence, the development of team skills, the development of project work skills, and the development of competence made with working life. The tool also aims to help students understand better their learning during the study module and the work-life project. Competence objectives are defined in the curriculum, but students' competence often develops in many other subjects besides the competence objectives defined in the curriculum. The tool, therefore, helps students recognize the development of their skills in a broader area.

The role of project clients in work-oriented study projects varies a lot. The purpose of the new tool for project clients is to identify the client's role in each project well before committing to the project. In some projects, the client's role can be the typical role of the client, to whom the students regularly report on the project's progress, and the client guides the project's progress and tasks. In some projects, the client's role can be a mentor; in others, the client can be more of a teacher. However, the customer is always the one who tells the project's goals and related schedules. However, it is good for the customer to know the students' schedules in advance so that the project can be adjusted accordingly. It is usually also crucial for the customer to know what the students already know and what they are learning in the study module, i.e., the lecturer must also be able to tell the clients the competence objectives related to the study module and which of them are intended to be learned during the project.

Table 1. An outline of the learning process of a work-oriented project (Lintilä and Marstio, 2022, modified from Binkley's model).

Stages of the learning process	ME (What do I learn and what is critical at each stage)	My Team (teamworking skills)	Project (project working skills)	Working life context (working life skills)
Project kick-off and team grouping	Interaction with different actors Define your own learning goals. How will you reach them as well as the results the working life partner expects?	You get to know your team members and define together the learning objectives for the project	With your team, you will create a thorough project implementation plan You agree on roles and responsibilities within your team Critical: commitment	You get to know the working life partner and investigate backgrounds of the project and the expectations of the project partner
Building the knowledge base and framing the challenge	You learn about information search. Remember source criticism	Leveraging the strengths of different group members Critical: Even division of labour	Skills in project work and project management Critical: Coordination of the teamwork	You improve critical thinking skills
Problem solving and formation of solution (s)	Your problem-solving skills will evolve. You can enhance your creativity	Critical: Reconciliation of different perspectives and aspirations	Your skills in co-development and innovation will develop	You gain ability to apply theoretical knowledge to the working environment of the project partner
Presenting solutions and reflection on the lessons learnt	You reflect your and your team's activities and learning in light of the learning goals You develop your presentation skills	Critical evaluation of the solution to be presented Practicing the presentation	Elaboration of the project report	You are able to speak expertly in questions related to your field of education
Skills and competencies to be developed at all stages	You are able to identify your own competence. Your trust in your competence is strengthened	Development of teamworking skills	Project management skills in practice: how to have meetings, schedule work and agree on things	You gain ability and confidence to work with people from different backgrounds

5. Development methods

The new digital tool development project will be implemented in three phases. In the first stage, definition and planning are done using service design. Three universities of applied sciences from Finland have signed up for the project cooperation: Laurea University of Applied Sciences (Laurea), Haaga-Helia University of Applied Sciences (Haaga-Helia), and Southeast Finland University of Applied Sciences (XAMK). Based on the specifications and designs, a digital tool is implemented using agile methods in the second phase. After the implementation phase, the tool is tested and piloted in various project study implementations.

The division of work between the three universities of applied sciences is agreed upon during the project's planning phase. In the planning phase, issues related to the ownership and licensing policy of the new digital tool are also considered. Agreeing on ownership during the project's planning phase is essential because digital tools must be maintained and further developed. The rights to use the digital tool should be agreed upon at the very beginning of the project so that all parties know their rights to use the tool after publication. In the future, it is possible that the new digital tool can be expanded, and a commercial product can be created from it, which can be widely marketed worldwide.

6. Discussion

When applying a working-life-related project, the lecturer needs to articulate the student's role and the kind of competence that will be developed in the project concerning the content goals of the course without forgetting generic skills. A structured methodology requires all parties to have the ability to cooperate and tolerate uncertainty and incompleteness; there are no ready-made answers. A practical guide to being produced because of the proposed development project will surely be in demand.

Online courses containing large groups of students challenge the ways of implementing working-life-related projects. Along with lecturers' skills development, modern online teaching tools and collaborative learning methods have offered solutions for managing big groups. The next challenge and opportunity is the development of artificial intelligence and its utilization in learning. There are no ready-made answers in learning based on authentic working-life cases, and the assessment focuses on the learning goals and the development of competence in the learning process. Hence, using such tools as ChatGPT cannot replace a student's thinking and efforts in an authentic working-life project.

7. Conclusions

An authentic learning environment is a very up-to-date phenomenon in higher education, and technology provides tools to make it available online. Online degree programs require new skills in both learning and supervision. Competences acquired through working on life-related projects live in time and adapt to the challenges of a changing world. Learning is not oriented only to the substance of the studied subject but also to the generic skills needed in working life. The student accumulates, as if unnoticed, various meta-skills as a working-life project progresses: time management, organization, data management networking, group working, and creative problem-solving. These kinds of skills are in high demand in today's workplaces.

References

- Binkley, M., Erstad, O., Herman, J., & Raizen, S. (2012). Defining twenty-first century skills. In P. Griffin, B. McGaw & E. Care (Eds.), *Assessment and Teaching of 21st-Century Skills* (pp. 17-66). Dordrecht: Springer.
- Finnish Law, Act 351/2003.
- Lintilä, T. (2023). *Using the Learning by Developing Action Model – Case Study in Project-Based Computer Science Studies in Higher Education Institutions* (Unpublished doctoral dissertation, Robert Gordon University). UK, Aberdeen.
- Lintilä, T. & Marstio, T. (2022). Higher Education Working Life Projects Call for Guidelines. *INTED2022 Proceedings* (pp. 2609-2615). IATED.
- Ojasalo, K. (2019). Introduction – Learning by Developing in the open networked, digital world. In S. Juvonen, P. Marjanen & T. Meristö (Eds.), *Learning by Developing 2.0 - Case studies in theory and practice* (pp. 6-13). Helsinki: PunaMusta Oy.
- Raij, K. (2007). *Learning by Developing*. Vantaa: Laurea.
- Raij, K. (2012). *Summarising the basis of LbD for further development – review*. Vantaa. Laurealaisella väylällä.
- Raij, K. (Ed.) (2014). *Learning by Developing Action Model*. Espoo: Grano Oy.