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Educational Research, Development and Innovation Methods According to Innovation Pedagogy: An Example of Application, Case Indonesia

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Abstract:

The entire world recognises the importance of innovations. Companies rely on innovations when planning their future actions and when trying to understand how to create added value for their current and future customers. It is important for universities all over the world to find the means to change their education so that it better meets today's requirements for an innovative society. The aim of this paper is to introduce innovation pedagogy as the pedagogical approach for future universities and describe three concrete examples of the learning methods used in innovation pedagogy to train future innovators.

Keywords:

Innovation pedagogy, learning methods, hatchery, Learning by Teaching, project work

1. Background assumptions

Introduction

The entire world recognises the importance of innovations. Companies rely on innovations when planning their future actions and when trying to understand how to create added value for their current and future customers. The current wicked problems call for expertise from many different disciplines and professions. Innovations need knowledge and that knowledge very often emerges at the boundaries of different knowledge domains (Kairisto-Mertanen et al. 2007, 2009, 2010, 2011; Konst 2017).

Turku University of Applied Sciences is a multidisciplinary university situated in south-west Finland, in a region where one third of the entire workforce is employed by export-driven technology industries. To remain competitive in export markets, the companies in this field are required to focus constantly on renewing their processes and products, as well as on investing in research and development.

The changing environment and new requirements must be considered when planning education at the university level. During the past 40 years, there have been significant changes in Europe that affect the career market in different European countries. In general, the educational level of people has risen, digitalisation has influenced the everyday means of working, and the Internet plays a large role in workplaces. Alongside with globalisation, the boundaries of domestic and foreign markets have become obscure (Piilotettu osaaminen 2016.) It is very likely that there are going to be changes in the future and once our present students enter working life they will most likely find themselves in situations where the methods required to reach a goal are not carved in stone. Sometimes, even the goal itself will be left open (Oivallus 2011; Kairisto-Mertanen et al. 2012; Kairisto-Mertanen & Mertanen 2007; Konst 2017).

However, at universities, we still tend to educate students using traditional methods meant originally for a stable world, emphasising the learning of explicit knowledge. The constantly changing world calls for methods that are able to activate students in learning and include unofficial and exceptional situations.

Aim of the paper and method used

The aim of this paper is to first introduce innovation pedagogy as the pedagogical approach for the future university and then describe three examples of the learning methods used in innovation pedagogy in more detail. For the INDOPED project, the paper focuses on three selected learning methods of innovation pedagogy, named Project Hatchery (PH), Learning by Teaching (LbT) and Project Module (PM). They all belong to the Research, Development and Innovation Methods (ERDIM) created and developed at Turku University of Applied Sciences.

The idea in the INDOPED project was to apply learning methods used in Europe to boost and modernise Indonesian education. The described learning methods were presented for the Indonesian university partners participating in the project among other learning methods offered by different European partner universities. The Indonesian partners were free to choose what learning methods they wanted to start using when implementing the project.

The purpose of the paper is to give a general description of each of the mentioned ERDIM methods and explain how they have been developed, thus giving background information about them and increasing understanding about the articles written about their application in Indonesia. At the end of this article we very briefly reflect on our experiences and feelings about the results of the project. The actual examples of how the different Indonesian universities have been using these learning methods are described in this book’s various articles written by them.

2. Innovation pedagogy as the educational approach of the university

Basics of innovation pedagogy

The role of universities is essential for developing future professionals who have the capacity to think in new and innovative ways and who are able to create innovations that bring novel added value to their own organisations and to the customers of the organisation (Lehto et al. 2011; Putkonen et al. 2011). The role of the university in regional development requires that applied research be integrated into learning (Kettunen 2011). It is important to constantly develop learning and teaching to help the students in their personal growth and in their path towards expertise. It is a challenge to create learning situations where theoretical knowledge is constantly applied in practical contexts (Kairisto-Mertanen et al. 2009).

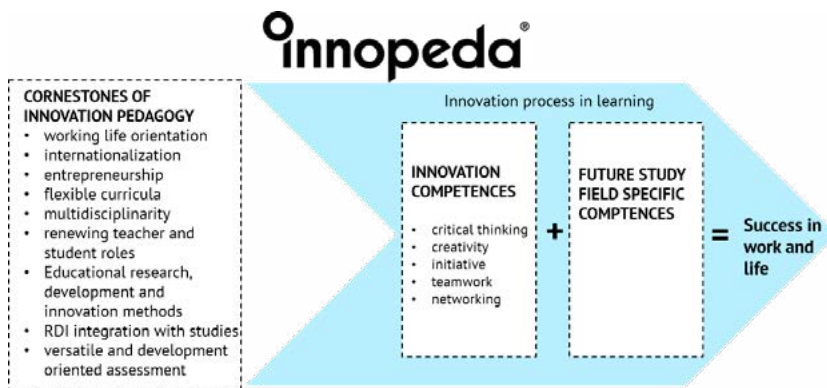


Figure 1: Innovation pedagogy, basic model © Liisa Kairisto-Mertanen 2018

Traditionally the role of education has been to provide knowledge-based readiness, and for it to be applied in practice only afterwards when the students enter working life. The aim of innovation pedagogy however is to start developing the student's innovation competencies starting at the very beginning of the first semester when they commence their studies. This is done by making sure that the students get a connection to real-life challenges and requirements while still studying (Kairisto-Mertanen et al. 2010; Konst & Kairisto-Mertanen 2017). Innovation pedagogy is a new strategic approach to learning and the innovation culture to be followed in the university.

As can be seen from Figure 1, the ultimate aim of innovation pedagogy is to make sure that the innovation process in learning is designed so that it includes elements that guarantee students will have opportunities to be successful in their future careers after graduation. Logically, it is important that students learn competencies belonging to the core of their study field but it is equally important to make sure that they learn to become active contributors in the different innovation processes they will face when working as entrepreneurs or employees. We call these learning outcomes related to the development of the innovation capacity innovation competencies. They include individual, interpersonal and networking competencies needed to produce innovative knowledge (Kairisto-Mertanen, Penttilä & Nuotio 2011).

Innovation competencies

The work of defining innovation competencies has taken several years and required three EU-funded projects: INCODE, INNOKOMPPI and FINCODA. The result of the work has led to the finding that innovation competencies can be described by five dimensions: critical thinking, initiative, creativity, teamwork and networking, as Figure 2 illustrates (e.g. Keinänen & Kairisto-Mertanen, in press; Keinänen & Butter 2017, in press; Keinänen & Oksanen 2017; Keinänen, Ursin & Nissinen, 2018; Marin-Garcia et al. 2013; 2016; Pérez-Peñalver et al., 2018).

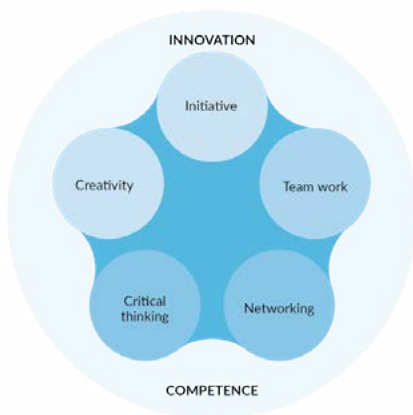


Figure 2:
Innovation competencies (Konst & Kairisto-Mertanen, 2018)

Cornerstones of innovation pedagogy

The cornerstones, or meta-innovations, presented at the beginning of the arrow in Figure 1 are essential requirements for innovation pedagogy to succeed. They form the basis of the everyday application of innovation pedagogy as they are enabled in the learning environment (Konst & Kairisto-Mertanen, 2018).

As Figure 1 presents, the cornerstones include ERDIM educational research, development and innovation methods that activate learning, versatile assessment methods applied by the faculty, RDI embedded in learning and internationalisation leading to a global perspective. Further, the cornerstones include flexible curricula, multidisciplinary learning and in the learning environment, as well as new approaches in teaching and learning (Kairisto-Mertanen & all 2010, Kairisto-Mertanen & all 2012, Penttilä & all. 2013).

3. Educational Research, Development and Innovation (ERDIM) methods

When thinking about learning we often immediately think about the methods used in its delivery. Innovation pedagogy is not only about the methods as it is a total approach towards organising education in a new way. However, when looking at the issue from an individual teacher's point of view it becomes obvious that the methods are the easiest starting point when starting to change how the students are being educated (Keinänen & Kairisto-Mertanen, in press).

When creating learning environments and planning learning methods it is good to bear in mind that sometimes learning in one type of setting is not accessible after the learner is moved to another setting. To avoid this transfer problem it has to be ensured that education and working include identical elements (Kettunen 2011, 2013; Illeris 2009).

ERDIM methods are developed to serve the purpose and the aim of innovation pedagogy. The cornerstones of innovation pedagogy create a learning environment where the methods are used to guarantee that the development of innovation competencies becomes possible (Kairisto-Mertanen, Räsänen, Lehtonen & Lappalainen 2012; Keinänen & Oksanen, 2017; Keinänen & Butter, in press; Keinänen & Kairisto-Mertanen, in press).

4. ERDIM methods used in the INDOPED project

Project Hatchery

Project Hatchery (PH) is one of the ERDIM methods developed at Turku University of Applied Sciences. As Figure 3 describes, it is an entire working environment including three different layers that offers studies for students coming from different study programmes and from different levels of academic studies (Kairisto-Mertanen, Räsänen, Lehtonen & Lappalainen 2012).

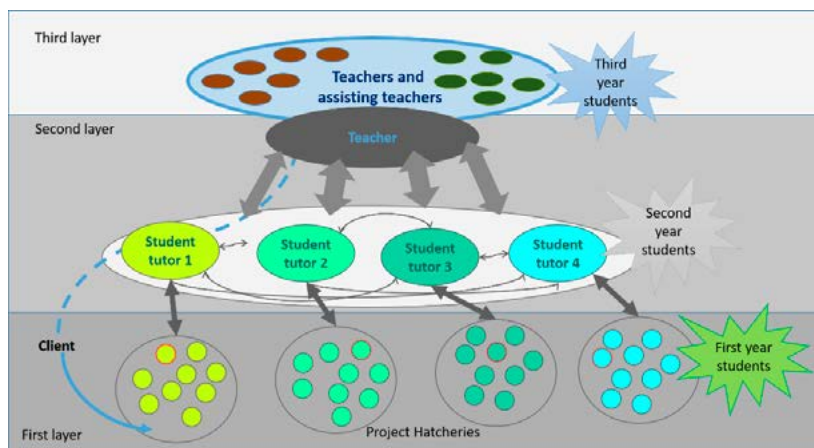


Figure 3:
Project Hatchery with its three layers

When Project Hatchery was started some ten years ago at Turku University of Applied Sciences, it included only the first layer presented in Figure 3, a five ECTS credit study unit delivered at the very beginning of the studies for first-year students. The idea was to make students from different study programmes work together in groups of 12 to 15 students towards a common aim, which they tailor during the working process by themselves. The groups get assignments that represent real-life cases, stemming from the enterprises in the university's network or from the research, development and innovation projects of the university. The aim is to combine real-life assignments, peer counselling and working in multi-disciplinary groups while including the international aspect in all work, and giving the groups plenty of room to design their own way of working.

The work includes the groups starting to create new ideas as they work with people who have versatile agendas and ways of thinking. It is very fruitful to be able to start bonding with students with different aims and learn how to turn problems and differences in interests into a creative resource base. Introducing this study unit usually also influences the general atmosphere in the environment, as it creates situations where different students start socialising and working together.

It is extremely important to discuss the goals together with the students at the beginning of the PH study unit. During the whole implementation of the Project Hatchery, it is important to make learning visible by reflecting with students on the desired learning goals, as new students do not always notice the progress they are making. The whole project is more about learning skills that produce innovation competencies and soft skills that very often are referred to as 21st century skills. We have to make the students aware of the importance of these learning outcomes.

There are scheduled meetings for the teams once a week, every Wednesday morning, but they are also expected to work outside of these hours according to a timetable set by themselves. The hatchery work also includes information sessions based on selected readings organised for the students on Wednesday mornings. These sessions include information about project work, how to write a project plan or prepare a poster, or how give a presentation.

The aims and outcomes of the study unit are defined to include learning how to tolerate insecurity, how to define aims and targets for one's own work, and how to effectively present ideas and make presentations. They also include learning to work in a critical research-based way, which requires one's own activity in teams and networks. Finally, through this process the students are expected to develop a creative and enthusiastic attitude towards learning and start taking responsibility for their future studies.

The concept of Project Hatchery is due to develop as a result of feedback gained from every implementation. After the first implementations we added a second layer, see Figure 3, to the concept and introduced a study unit meant for second year students who already had a first-year experience of PH.

The aim of this five-credit 'leading a team' study unit is to prepare the students to act as tutors for the Project Hatchery groups. The second layer studies include learning how to initiate group work, how to effectively lead the group through the forming stage to the performing mode, how to handle the storming stage and finally successfully get to presenting results and adjourning the team. It means that the student tutors learn about group dynamics, leadership and group behaviour in general. They get constant support in weekly meetings with their teacher tutor

who always has around four student tutors to counsel and coach. The role of the teacher tutors is mostly to help the student tutors; although when needed, they can be accessed by the Project Hatchery students as well.

The third layer in the Project Hatchery execution is meant for advanced students who find leadership and teaching positions interesting and who have plans to develop their skills in these. The students participating in the third-layer studies act as assisting teachers and this way have more responsibilities than student tutors.

A specially appointed faculty member is in charge of the execution of the entire environment. They organise the original grouping of the students, select the tutor teachers and tutor students, and are responsible for coaching the tutor students in the second layer. They also organise counselling sessions for the teacher tutors where special issues raised during the implementation can be handled. It is also essential to have one person responsible for the further development of the environment.

Learning by Teaching

In the Learning by Teaching method, university students act in the role of teacher training pupils or students from lower educational levels. Usually the students come from vocational schools, general upper secondary schools or comprehensive schools, but they can also come from the university level when the content to be learnt does not belong to their core studies. A good real-life example of using this method is when sales students act as teachers for engineering students and teach them the basics of selling.

In this method, students form teams of three to five and it is the teams' role to plan, organise and implement the complete training programme independently. The trainers have to start by understanding the learning needs of the target group, and then plan the content and schedule for the training, design materials to be used and finally implement the final learning sessions. The teacher's role in this method is to guide and give support and feedback to the teaching team.

Participating in a Learning by Teaching study unit is a very beneficial experience for any student. Having to teach something to somebody else usually requires the one who is teaching to have a deep understanding of the issue. Teaching also requires the preparation of materials and standing in front of other people, which means applying presentation skills. Students who have participated in this learning method usually report having learnt presentation skills as well as skills needed when dealing with unsecure and difficult situations.

Project Module

Project Module builds on the skills learnt in Project Hatchery. Project Hatchery is meant for students at the beginning of their studies and its main aim is to start developing their innovation competencies by introducing a student-centred way of working and increasing their responsibility towards their own learning. Project Module is for students who are capable of working on a project and have already learnt more about their future profession.

A group of students, coming from one or preferably different study programmes, work together as a team to solve a real-life problem as part of their studies. Because the problems in question are often quite complex, the scope of the module is 15 ECST credits, representing 405 hours of individual student work. As there is a whole group of students working on one problem, the amount of work allocated to the working life partner behind the assignment can be huge.

It is important to realise that in Project Module the students work independently on real-world cases coming from the working life partners and that there are no lectures unless specifically required by the students. The students must first learn to understand what they don't know and ask for a lecture or information about a specific topic. This way of working connects students with people from the industry and working life in general, as they are acting as tutors for the students working on the assignments. Each student team presents the results of their work four times during the implementation. First, they prepare a presentation about the project plan, and after that they give two mid-project presentations and one final presentation concerning the end results and documentation. When Project Module is implemented there are several student teams working on different projects. This gives a good opportunity for the students to learn from each other and we encourage them to connect with other teams.

5. Lessons learnt and conclusions

The aim of this article is to introduce innovation pedagogy as a new approach to be followed in the university and explain in more detail the three ERDIM methods introduced to Indonesian partners in the INDOPED project for application in their universities. This article describes the methods as they have been applied at Turku University of Applied Sciences, where they were originally developed.

Several Indonesian universities implemented the methods of Project Hatchery, Learning by Teaching and Project Module. The cases are described in detail in the following articles written by the corresponding Indonesian partners in the INDOPED project. The application shows that the methods are also applicable in these circumstances, which are so entirely different, both culturally and geographically, and it proves that all the parties benefit from this application.

Relying on new methods and new ways of delivering education requires courage and openness to new experiences from teachers. Implementing active learning models redefines the roles of the students and faculty members. At the beginning, the participating faculty must be prepared for extra efforts but then again the workload will diminish over subsequent years.

During the implementation, the methods were developed further, which is a requirement for continuous improvement and successful application. The Indonesian partners invented new additions, which increased the applicability of the methods in their different circumstances. It was rewarding to note that the use of the methods found new variations, which proves that ultimately students need similar kinds of activating practices on whatever continent they might be studying.

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