Developing innovation pedagogy approach

Abstract

Purpose

The purpose of this article is to discuss the concept of a pedagogical strategy called innovation pedagogy and examine how it has been and will be developed. The paper is an overview of the latest development of the innovation pedagogy approach. It provides a discussion of the changes in innovation pedagogy and, more generally, in higher education, including the changes in educational aims and involving a sustainable future as the priority in all education.

Methodology/Approach

The research methodology is based on action research, participatory observation and on the experiences of the authors of the development process, which has taken place in one Finnish university of applied sciences during the last decade.

Findings

The implementation of innovation pedagogy requires time, participation of the whole educational community, and management commitment. The study describes the results of the development work and states that the educational goals require consideration of values, processes and structures.

Limitations

Because of the case study setting and a specific cultural context, there are limitations to the generalizability of the findings.

Originality/Value

Focusing on the development of the concept of innovation pedagogy helps to understand how education development takes place gradually and how it can simultaneously aim to respond to the demands of a sustainable future. This study extends approaches on research in education and innovation pedagogy.

Background

In Finland, universities of applied sciences were established at the beginning of the 1990s to support regional development, while traditional research universities aimed to generate new universal knowledge through basic research. Universities are complementary in their respective areas of strength and both sectors have their own profiles. Compared with universities, studying at a university of applied sciences is more practically oriented; universities of applied sciences educate experts for various positions in working life. Universities of applied sciences are usually multi-field and regional institutions of higher education. They are regional because their aim is to support regional development and promote cooperation between universities of applied sciences and companies as well as other working life organizations. They are usually multi-field, because multi-field units are considered able to create new competences to serve the needs of the changing working life. In addition to their educational duties defined by the Finnish educational policy, universities of applied sciences conduct research and development work, which aims to serve instruction and supports working life organizations.

Pedagogical solutions at universities of applied sciences have widely been discussed during the whole lifespan of the Finnish universities of applied sciences. The pedagogical approaches adopted by traditional research universities were not regarded as appropriate for universities of applied sciences. The pedagogical approaches of traditional research universities often follow principles created in the 11th century when the first universities were born. The enormous changes in the world since have had very little impact on the practices followed in the academic world. As a result of the close collaboration with working life and the aim of producing graduates who are well prepared for the tasks there, it became a necessity for the universities of applied sciences to develop their own pedagogical approaches.

The concepts of learning and teaching at universities of applied sciences are based on shared assumptions on how learning takes place. Generally, learning is viewed as a constructive process in which knowledge is not transferred to the learner but learners must create their own thinking models and learning strategies. As learners, students constantly build on their previous knowledge and skills. Therefore, they have an opportunity to contribute to the contents of their own studies via individual study plans in the framework of the degree regulations. Other key elements in pedagogy at universities of applied sciences include learning processes and professional growth. Students progress in their studies through a variety of different learning processes and paths, gradually developing themselves to skilful experts. They build their knowledge along with the changes taking place in working life, participating in several networks, developing the working life and thus expanding their understanding of reality (Cobo 2013; Thomas & Brown 2011; Barnett 2004; Nonaka et al. 2000).

Turku University of Applied Sciences (TUAS) started the development of the innovation pedagogy approach in 2006 to provide competences needed in working life and to promote innovations and regional development (Kettunen, 2009, 2010, 2011). Two years later, the first Finnish innovation strategy was launched, and a great deal of responsibility was given to universities of applied sciences in order to generate innovative graduates to meet the needs and expectations of working life. Additionally, it was obvious that something – a skillset called "soft skills" – had to be made a new priority in higher education. For those seeking employment, it was no longer enough to possess only traditional, study field specific competences. Traditionally, the educational system had provided knowledge and skills that were adapted to innovation processes only later in future working life environments. Innovation pedagogy started from this challenge and offered an approach for supporting the development of students' so-called innovation competences from the beginning of their studies. The challenge in the early days of innovation pedagogy was to explore which the requirements were for graduates for them to become innovative players needed in the job market. The research to understand what innovation competences really are was started. The core of innovation pedagogy was to introduce an approach with which students' innovation competences can be enhanced during their studies. (Marin-Garcia et al., 2013, 2016; Avvisati et al., 2013; Keinänen, 2018.)

As a consequence of the introduction of innovation pedagogy, the traditional gap between "theoretical teachings" and "the practical requirements of working life" was filled, which enhanced the professional growth of students already during their studies. (Penttilä et al., 2009.) Innovation pedagogy as a pedagogical approach had effects on all university key activities, including learning and teaching methods, working life cooperation and curriculum design. However, what the key activities are and how they should be redesigned has been a main question during the lifespan of innovation pedagogy.

The goals of innovation pedagogy have been redefined during its lifespan. The aims mentioned earlier remain valid. However, they have been extended and nowadays receive different emphasis. The original aim of innovation pedagogy is to educate graduates who will succeed in their lives both as professionals and as individuals. Right from the beginning, innovation pedagogy aimed at personal growth of an individual by believing in the capacity of each individual to be the best expert on one's own future. However, the world is under a constant change and so is work tasks and working conditions. Education must apply foresight and act proactively to respond to these changes. It is likely that the speed of the change will only accelerate in the future. Today, success and good life may bear a different meaning compared to the early days of innovation pedagogy. The change and its consequences have an impact on the whole welfare society where the economic growth is traditionally seen as the foundation for the welfare of people. (Elliott, 2017; Fadel et al., 2015; Snaza et al. 2014: Evans 2012; Sterling 2010; Dweck, 2006)

In this paper, we describe the development process of innovation pedagogy during the last decade. During this time, the authors have acted as researchers, planners, agents, developers evaluators and consultants of innovation pedagogy in Finland as well as in other countries in several educational institutions that have wished to adapt the innovation pedagogy approach to their own organizations. In this paper, we start with a brief presentation of the early approach. The approach in this paper is based on action research and on the experiences of the authors during the process of implementing and developing innovation pedagogy in universities. However, the emphasis of the paper is on the current and future vision of innovation pedagogy, that is, what it has been changed, why and how, and what has to be redesigned in the future. No pedagogical strategy or approach is ever final but must be continuously developed. The development of innovation pedagogy has required time and so does its implementation. A successful change process needs participation of the whole educational community and it requires management commitment. This study describes the results of the development work of innovation pedagogy and states that educational development process requires continuous reconsideration of processes, structures and aims of the education institution in question.

Innovation pedagogy - early days

The first versions of the framework for innovation pedagogy were presented nearly ten years ago (e.g. Kairisto-Mertanen et al., 2009; Lehto et al., 2011). They presented a model aiming to bridge the gap between education and working life (Figure 1). With the help of the model, the learning and teaching processes

improving competences for students entering working life could be charted, which facilitated improving both students' personal and professional growth and social skills. Learning processes were seen to be deepened and strengthened as previously gained knowledge was continuously applied in practical contexts. Innovation pedagogy emphasized that education should not start with knowledge and only later proceed to its application; on the contrary, new information must be applied in practical situations immediately, even before the information was assimilated. In other words, innovation pedagogy combined learning with information creation and its application.
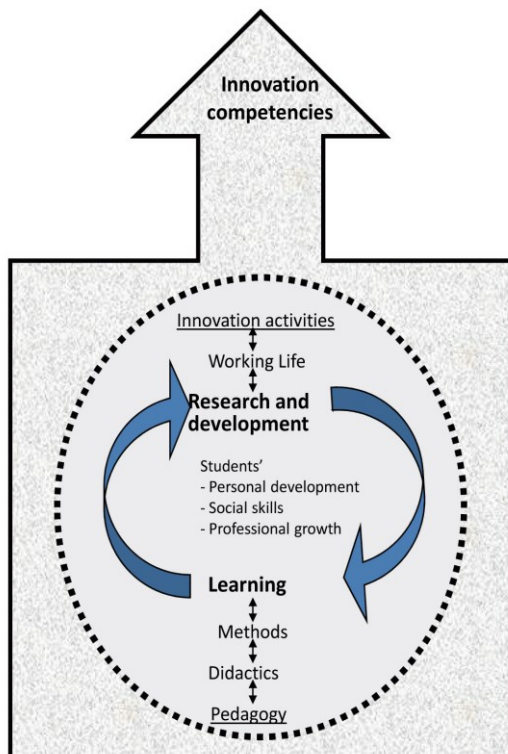
Figure 1. The drivers for pedagogical development in universities of applied sciences (Lehto et al., 2011, p. 17).

In the early texts, innovation pedagogy referred to an approach to learning and teaching that emphasized working life cooperation as well as research and development (R&D) skills. This meant applying existing learning and teaching methods in a creative, value-increasing way, developing new methods, and ensuring that students take responsibility for their learning and that they actively pursue their learning objectives. The aim was that as a result, graduating students have professional skills and qualifications that are both innovative as well as development-oriented.

In Finland and well as in other EU countries, there was a clear demand for an approach such as innovation pedagogy. The approach was supported in Finland by the new innovation strategy in year 2008. The world as well as working life had become more dynamic, requiring innovative people to develop innovations. Innovation pedagogy aimed to generate environments in which know-how-inspired competitive advantage

could be created by combining different kinds of competences. In a multidisciplinary environment, it was considered possible to evoke regional innovations and increase entrepreneurship through research and development. From the first beginning, innovation pedagogy strived for contextually emerging and cumulative knowledge that is boundary-breaking, practical and societally durable by nature, and therefore it was a suitable theoretical framework for developing new innovative cooperation between working life and universities of applied sciences.

In the first publications, it was stated that innovation pedagogy offers an abundance of opportunities for further studies. The research subjects that were particularly emphasized included the creation of an innovation barometer in order to evaluate the impacts of innovation pedagogy and research on learning environments that enhance the development of innovation competences.

Innovation pedagogy now

After the early days, innovation pedagogy has continuously been developed further. A significant step was the definition of the cornerstones of innovation pedagogy (Kairisto-Mertanen et al., 2012a, 2012b). As a concept, cornerstones of innovation pedagogy refer to the tools and methods of innovation pedagogy. These cornerstones have been reformulated and completed several times during the lifespan of innovation pedagogy, aiming at responding to the development needs of education in the current and future world (Penttilä et al., 2011; Penttilä & Kairisto-Mertanen, 2012, 2013). In the following, the cornerstones are presented in accordance with their current definitions.

Working life orientation and cooperation refers to differently implemented ways of action, based on the cooperation between education and working life, which improve graduates' employment opportunities, ensure that education meets the demands of working life, and additionally, evaluate, develop and renew the models of operation of working life. *Entrepreneurship* and entrepreneurial attitude are encouraged, as both are needed since the world has become more agile and requires instant actions and active attitude from everybody. The importance of *globalization* is ever-increasing, as the global perspective is present in every profession. It is also important to understand that a sustainable future can only be reached by developing a global mindset. Moreover, innovation pedagogy relies on *systemic thinking,* as every action must be considered in relation to its consequences and other actions. Collaboration and inclusion are in the core of the ways of actions of innovation pedagogy. Innovations seldom are created alone but by a group of people who interact with each other and have different competences and capabilities.

The above introduced cornerstones are basic requirements for innovation pedagogy. In addition, there are several other essential cornerstones, which enable the successful implementation of innovation pedagogy in order to reach the set aims. These cornerstones are the integration of RDI operations with studies, flexible curricula, multidisciplinarity, activating learning and teaching methods, versatile and development-oriented

assessment, and renewing teacher and student roles. Some of these cornerstones can be implemented starting from an individual teacher's ambition to do things in a new and different way. A single teacher can decide to start using activating learning and teaching methods as well as versatile and development-oriented assessment methods. To integrate RDI operations with studies, make the curricula flexible, introduce multidisciplinary studies or put an effort on renewing teacher and student roles, strategic commitment and decision-making of the management is required from the educational institution in order to integrate innovation pedagogy into educational goals and organizational structures and to make a real change in the learning culture.

Giving students opportunities to work with real-life assignments and in authentic research and development projects is crucial when aiming to improve their innovation competences, and therefore *RDI operations* must be integrated with curricula and studies. *Flexible curricula* enable students to take different, alternative learning paths. Curricula can be shaped and developed easily and thus they can react quickly to the development needs of the surrounding society. *Multidisciplinarity* enables collaborative learning, which was described earlier, bringing different competences and expertise to work together. Something new and innovative is likely to be born when people with different expertise get a possibility to work together. *Learning and teaching methods* used in education must be *activating* and versatile, as such methods have been found to be strongly influential when considering the development of students' innovation competences (Keinänen & Kairisto-Mertanen, 2019). *The assessment* is *development-oriented*, which means that students are able to evaluate their own competences and know how to develop them. *Renewing teacher roles* support, encourage and guide students in order to advance learning, and *students* need good study skills in order to take an active and responsible role on their own learning path. (Konst & Kairisto-Mertanen, 2018.) All these cornerstones, as well as the process and aims of innovation pedagogy, are listed in Figure 2.

Cornerstones of learning
- RDI integration with studies
- Flexible curricula
- Multidisciplinarity
- Activating learning and teaching methods
- Versatile and development-oriented assessment
- Renewing teacher and student roles

Innovation process of learning
Development of innovation competences and study-field specific competences

Growth as a human being: values and ethics, comprehension of human and nature

Success in work and life
- Ability to participate in diverse innovation processes
- Real innovations
- Good life
- Sustainable future

Working life orientation and co-operation   Entrepreneurship
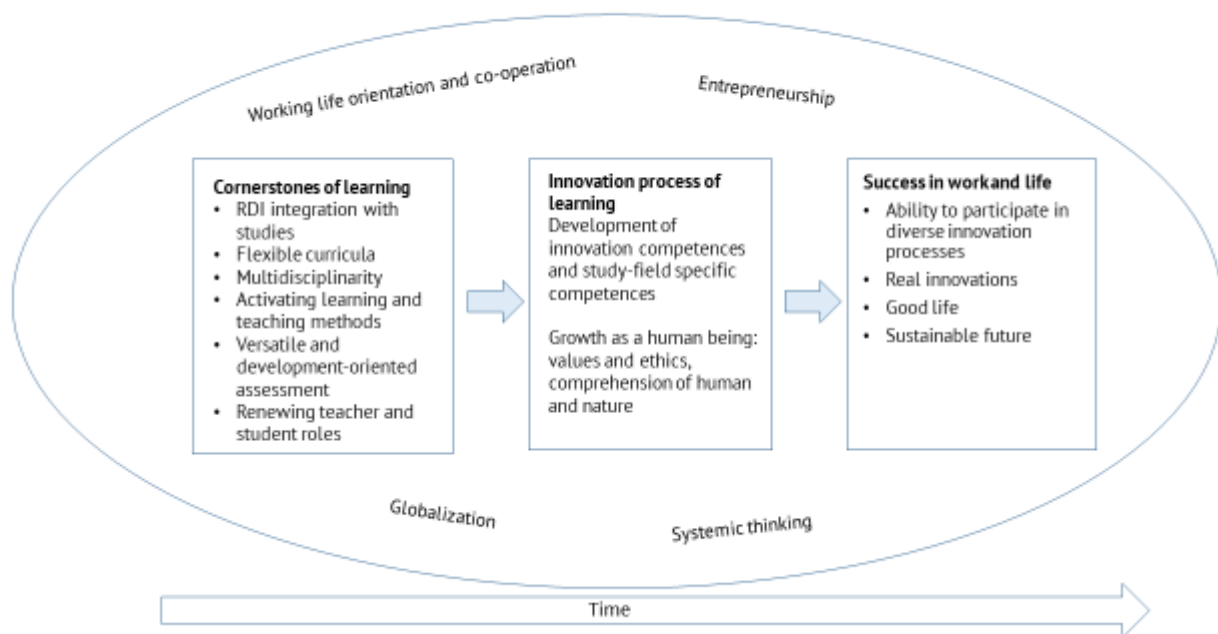
Globalization   Systemic thinking

Time

Figure 2. Innovation pedagogy in a nutshell; the cornerstones, process and aims.

These cornerstones enable the innovation process in learning, during which learning takes place and this is demonstrated through the development of innovation competences and study field specific competences. To reach the goals of innovation pedagogy, students must acquire the competences of their own study fields or disciplines and, in addition, a set of so-called innovation competences during their studies. Students are expected to become active contributors in the different innovation processes they will encounter when they enter working life, which is why the objective is that they will develop their knowledge, skills and attitudes related to their study field specific competences and to the capability to act innovatively already during their studies. These learning outcomes, which are generic and common for all study fields, are called innovation competences, and they can be categorized into individual, interpersonal and networking competences, all of which are needed to produce innovative knowledge. (Marin-Garcia et al., 2016; Kairisto-Mertanen, Penttilä & Nuotio, 2011; Keinänen et al., 2018.) According to the latest research, innovation competences have five dimensions that focus on creativity, critical thinking, initiative, team working and networking (Fincoda, 2017; Marin-Garcia et al., 2016).

As innovation pedagogy aims at generating learning outcomes such as knowledge, skills and attitudes absorbed during the learning process, it can be said that the innovation process forms the core of the learning process. In other words, when a learning process closely resembles an innovation process, it facilitates the development of both study field specific competences and innovation competences. In practice this means, for example, that students work in authentic learning environments as well as in teams and groups which often are multidisciplinary, that they are given real problems to solve, and that they have opportunities to create, test, implement, evaluate and communicate different solutions to the problem. As the world is

becoming increasingly complex and the amount of information is growing, it is evident that innovation competences are required, because only a few can outdo the collective strength of a group or a team through individual actions. (Penttilä et al., 2013.)

When innovation competences are defined as learning objectives, listed as learning outcomes in curricula, and when learning methods and environments are designed to facilitate developing innovation competences, it is natural that an assessment tool for their development is required. Therefore, the development process of innovation pedagogy has included the development of an innovation competence assessment tool as well.

The impacts of innovation pedagogy have been acknowledged widely. There is a lot of research evidence about the capability of innovation pedagogy to develop students' innovation competences (e.g. Keinänen 2019; Konst & Scheinin 2018; Konst & Jagiello-Rusilowski 2017). Thus, innovation pedagogy has arousen interest widely and several higher education institutions have adapted innovation pedagogy successfully also on international markets, especially in Brazil, Indonesia and Poland. According to education policy of the European Union and OECD education development, innovation pedagogy is on the right path in pedagogical development, and it has been noted as an excellent example how education can be modernized (European Commission 2017). Key factors how to implement innovation pedagogy successfully are management commitment and staff involvement. In our case description of TUAS, innovation pedagogy is a part of the university strategy and integrated with university structures and processes. When embedding it in the university strategy and operations, university staff has been included in the change process from the first start to create real internal motivation, i.e. people need to want the change themselves before any real progress can be done.

On future of innovation pedagogy

It is important that the learning process includes elements that support students' growth as human beings. To strengthen the comprehension of the interconnectedness of human and nature, chosen values and ethical considerations should be included in the learning process. Without ethics, the understanding of some of the innovation competences may remain inadequate and result even in dangerous notions. What is meant by this is, for instance, that using creativity and problem solving ability together should not result in ethically questionable results but in solutions, which generate new solutions that in their turn help to save the environment. The purpose of innovation pedagogy is not to provide competences for working life only but competences for a good life and sustainable future, as well; competences that help to build a sustainable society, learn to think beyond ourselves, consider nature in all our actions and understand what is right under the new and changing circumstances. Therefore, the latest definition of innovation pedagogy acknowledges and emphasizes growth as a human being, as well as ethics and values.

The same development can be seen in the aims of innovation pedagogy. In the early days of innovation pedagogy, the aim was defined as an individual's success at work, which will result in the success of their employer organization, as well. Reformulating the aim became necessary along with the understanding that the world is interconnected and the success of one individual or organization is ultimately connected to the success of wider surroundings. "There is no good working life without good life" (Konst & Kairisto-Mertanen, 2018, p. 20), which is why innovation pedagogy aims at educating students to contribute to the sustainable development of the globe. The redesigned aim is to provide students with the competences needed at work and to simultaneously support them to grow into mature and independent individuals and critical, constructive and ethical citizens who will actively participate in developing society and making it a better place for all living beings and for the environment. This is the challenging step in the development of innovation pedagogy further. The values and ethics must be put into practice and focus on curriculum redesign and renewing teaching and learning, as examples of practical steps for preparing for the future.

The illustration of the latest description of innovation pedagogy (Figure 2) involves a time axis. This is important because learning approaches or pedagogical strategies cannot be successful without continuous redesigning and renewing. The world around us is constantly changing, and education must be a step forward to be able to react and to change the world towards the desired direction.

Discussion

The role of education is to provide society outside of the university with the kind of people it needs. As the world is changing at an accelerating speed, universities must be prepared to constantly monitor and acquire information about these changes and adapt their ways of carrying out education to meet the changing requirements.

As a learning approach innovation pedagogy is constantly evolving to meet the changing requirement of the environment. Its purpose is to present suggestions and guidelines for carrying out education so that graduates will have the best possible chances to create a good life and success for themselves, for the society and for the globe. This must be done with the understanding that "a good life" also involves acknowledging the global challenges and acting to solve the sustainability crisis on our planet.

The big challenge for all education is promoting an ecological civilization. Innovative mindset is needed when looking at alternatives for the use of fossil energy, which largely forms the base of our western lifestyle. The measures taken to prevent the ecological crisis are only in the beginning. (Heikkinen, 2019; Värri, 2018). The priority in the future development of innovation pedagogy must be put in redefining our understanding about what competences really matter in competence based education. The emphasis should be put on those competences that enhance innovations contributing to sustainable solutions and enabling a good life and sustainable future in general. (Heikkinen, 2019.)

While focusing on the development process concerning innovation pedagogy approach, this paper is useful showing that education development is a gradual process, which can simultaneously respond to the demands of a sustainable future. This study extends approaches on research in education and innovation pedagogy and strengthens the understanding of the development of innovation pedagogy.

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