

Innovative Lecturer: Using Digital Tools in the Study Process

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Abstract

The education system is still known as a conservative social system, which is notoriously resistant to change and is challenging teachers to innovate (OECD, 2016). However, the changing perceptions of education policy makers and educational communities about the future of children's education point to the need for changes in teacher education, with the content of studies focusing on the acquisition and enhancement of new skills such as initiative, challenge-taking, and organisation / management of the process, as well as on the use of personalised, active, motivating, and engaging learning approaches. This paper explores the definitions of innovative teacher and educational innovation in more detail. The aim of the research is to reveal what kind of innovations lecturers do apply in the study process. The research was carried out using a mixed-methodological approach, involving surveys and interviews with university lecturers of pedagogical studies. The results of the study reveal a high level of the use of innovative methods, the latest learning tools, scientific sources and theories in the study process.

Keywords: Innovative Lecturer, Innovations, Educational Innovations, Digital Tools

Introduction

The modern world, characterised by terms such as the Internet of Things (IoT), cloud computing, artificial intelligence, and big data, is one in which imagination is becoming reality through innovation (Means, 2018). This changing world is transforming our personal and social values, our family lives, and the relationships between family and children, classmates, colleagues, and nations. Drastic changes in different areas of life are dramatically altering people's mental and social behaviour, their psychological perspective on life, their decision-making process, their level of knowledge and understanding, and their overall skill set and capabilities. We can also call this period the knowledge revolution, in which the human brain is both the most important commodity and the most valuable natural resource (Arieli, 2021). Means (2018) stresses that in the future, humans will live in a fully intelligent physical space, starting with robotic factories, smart cities and other tools created by society. In response to the changes in the world and society, it is important to ask how HEIs can not only catch up, but also be active in the Global Revolution 4.0? How can we create a modern school, and thus a school of the future? What kind of education could help prepare young people for the complex challenges we are facing? How should young people be educated for life in a future world where no one knows how to live. According to Bereiter & Scardamalia (2006), schools need to be radically transformed into organisations that promote knowledge creation, foster a culture that is innovation-oriented, and encourage creative thinking among 21st century learners. Research on cultures that influence innovation has gained attention in recent years (Tian et al., 2018). A cultural perspective is essential for understanding innovation (Jaskyte, 2004, O'Reilly & Tushman 1997), and an innovative culture is a predictor of organizational performance (Danks et al., 2017).

Research methodology

Although the discourse in educational science emphasises the importance of integrating qualitative and quantitative research (Creswell, 2003), common research practice is usually limited to a quantitative or qualitative paradigm. Given that the integration of innovation into educational practice is not only related to changes in the organisation of the educational process, but also to teachers' personal experiences and experiences of changing and organising the educational process, our research methodology was based on a mixed research design. The use of mixed methods is considered valuable in research in new fields (König & Dressler, 2021), and is therefore relevant for investigating how teachers apply innovative tools in their study process. Integrating the two types of research allows to increase the usefulness of the study, as the data are linked and complement each other to provide valuable insights (Creswell & Plano Clark, 2007).

A key feature of mixed research is the integration of different methodological paradigms. Mixed methods is defined as research in which the researcher collects and analyses data, integrates findings and draws conclusions by drawing on both quantitative and qualitative research perspectives or methods in a single study or research programme (Tashakkori & Creswell, 2007). The research is based on an Explanatory Design (Creswell & Plano Clark, 2007), which consists of first collecting quantitative data and then qualitative data to help explain or elaborate on the quantitative results. The quantitative data and results provide an overall picture of the research problem, and a more detailed analysis is needed to refine, expand or clarify the overall picture by collecting qualitative data.

In order to avoid research gaps, a mixed-methods study combining a questionnaire survey and qualitative reflective writing (Jasper, 2005; Shum et al., 2017) was conducted. The questionnaire survey was conducted between March and April 2021. The survey was administered to 58 lecturers in the university's pedagogical degree programmes. The purpose of the questionnaire survey was to find out: *To what extent do lecturers use digital technologies in their studies? How is the educational content developed and what didactic tools are used, and how is the study process organised using digital tools?*

The results of the questionnaire survey provided valuable insights for the formulation of the questions for the qualitative study, which aimed to find out about the participants' experiences and perceptions of innovation in education and the impact this has on their behaviour in applying innovation in the course of study. In the second phase, 12 lecturers took part and shared their experiences of using digital tools in their studies. Lecturers' personal experiences are crucial to understand how they perceive and experience innovation in the educational process. The survey asked the following questions: How is digitalisation (important for educational practice? How does the use of digital tools in the learning process shape the profile of an innovative teacher? What motivates and inspires you to use digital tools in your studies? What changes can be observed in the study process by applying digital tools?

Data analysis

The data were analyzed through a combination of statistical analysis of the survey results and content analysis of the reflective essays (Johnson, Grove & Clarke, 2019). The survey data were analyzed using the statistical software SPSS. The texts of the reflective essays were analyzed based on content analysis using an inductive approach (Liu, 2016). The analysis of the qualitative research data was carried out by consistently analysing the content of the text, dividing the research content into analytical units, i.e. categories and subcategories (Sabaliauskas, 2017). The results of both surveys were analyzed using a mixed-methods approach, with four stages in the pillar integration process: listing (i), matching (ii), checking (iii), and pillar development (iv) (Johnson, Grove & Clarke, 2019).

The validity of the study is reflected in the use of 'live' reflective extracts from the participants in the coding, abstraction and conceptualization of the data. Summative validity is based on the triangulation of researchers, combining qualitative and quantitative research (Maxwell, 2022).

Research ethics

Participants were provided with detailed information about the purpose and objective of the study. All respondents participated voluntarily. The principle of anonymity ensures that the data obtained in the course of the study will not be linked to a specific person. The texts of the respondents' reflections have been given individual pseudonyms. The principle of confidentiality guarantees that the data will be stored in special electronic files created for the study and that the information will be accessible only to the researchers (The European Code of Conduct for Research Integrity, 2017).

Theoretical assumptions of innovation in educational process

Innovation, the implementation of creative ideas, is a necessary process for organisations to compete globally (Kremer et al., 2018). Innovation in related operations can improve an organisation's efficiency, productivity and competitiveness (Manafi & Subramaniam, 2015). In the education system, the application of innovation is vital to improve learning outcomes, the quality of education services, equity and equality, and efficiency, in addition to reducing the cost of education and maximising revenue from education spending (OECD, 2016).

Innovation is a multidimensional concept that is recognised in two domains. The concept of innovation emphasises elements of process, competitive advantage and technological innovation. This is particularly relevant in the context of education, where higher education institutions rely on the continuous "modernisation of the operational process, the pursuit of competitive advantage, and the provision of exceptional services that are inseparable from technological innovation" (Išoraitė, 2010) in order to achieve outstanding service quality. Okamoto et. al. (2013) echoes this, stating that in education it is necessary to continuously "innovate in the educational process", which leads to a multifaceted educational quality. As Almonaitienė (2006) points out, an innovation is a creative idea that has been adapted and implemented. In the scientific literature, innovation refers to a new idea/project/object (Karnowski, 2011, Janiūnaitė, 2000). The term "innovation" itself derives from the Latin word "nova", which means "new" (Stripeikis & Ramanauskas, 2011). In French, "innovation" means "renewal" or "giving a new form to an existing thing" (Jakubavičius et al., 2008). Shalley et al. (2004) emphasise the creation, use and diffusion of innovation. In the context of education, innovation is defined as "anything that is new at the level of the organisation, at the level of the pedagogical system" (Janiūnaitė, 2000 cit. Hopkins, Ainscow West (1998)), that which is adopted or rejected by potential users. Theoretical model of innovation in educational process based on theoretical analysis is shown in Figure 1.

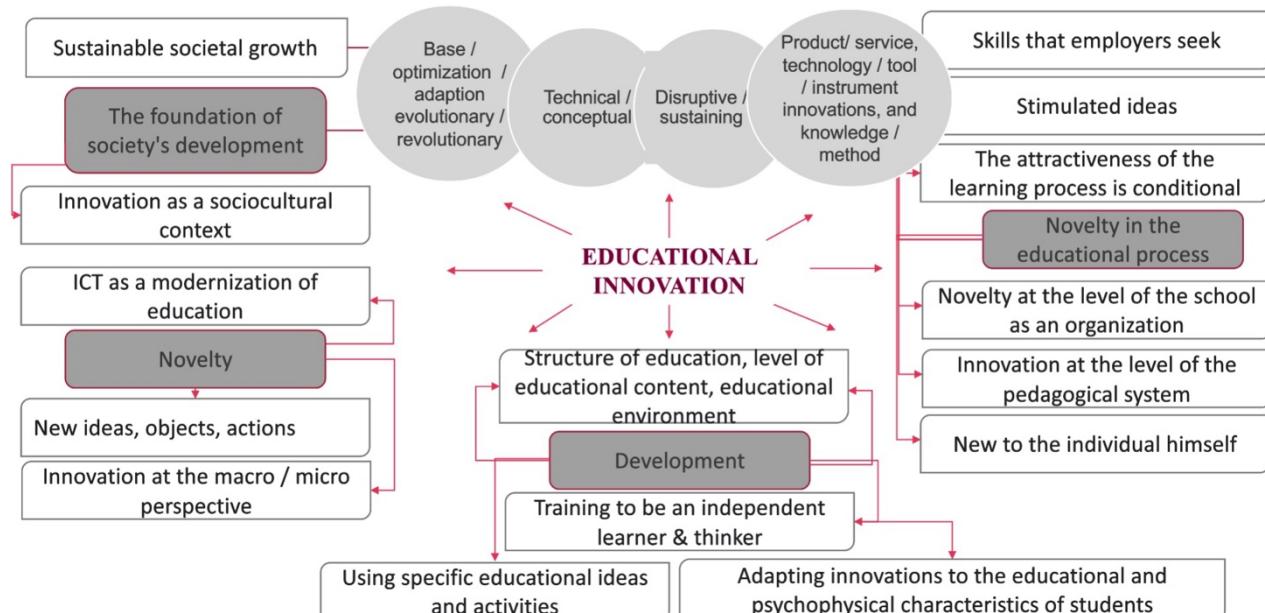


Figure 1: Theoretical model of innovation in educational process
 (Designed by the authors, according to Vesshoff, 2010, Baumann et al., 2015, Dahiya, 2019, Popescu, Crenicean, 2012, Letelier & Sandoval, 2015, Neubauer, 2015, etc.)

Innovation is recognised through differences from existing forms of thought, behaviour or subject matter. It is a new practice or process for the individual implementing it (Janiūnaitė, 2000 cit. Hord et al [1989]). Vesshoff (2010), Albers (2005), Garcia & Calantone (2002) distinguish between the micro and macro levels of innovation, where at the macro level innovation is perceived as an innovation in the world, in the market, and at the micro level as an innovation for the consumer. However, it is noted that it is not only a new product/process, but also improvements that complement/enhance activities with new approaches, insights that increase the benefits for the user. According to Melnik & Strazd (2000) an innovation "is an idea, activity or some tangible object that is new to the firms, group or organisation that implements or uses it. Budreckienė & Janiūnaitė (2010) define innovative activity as the generation of new ideas, the creation of innovations, modifications, processes creating new services, methods, etc. Innovation is "the development and implementation of new processes, products, services and delivery methods that result in a significant improvement in the efficiency, effectiveness or quality of results" (ANAO, 2009). Thus, innovation can involve significant improvements or more transformative approaches. For example, the South Australian Department of Education and Child Development draws on OECD (2005) in defining innovation as 'the implementation of a new or significantly improved product (good or service) or a new organisational approach' (also DECD, 2010). Innovation is a process - the adaptation of a new or significantly changed creation (OECD, 2005) - that requires a long-term commitment, resources and an innovation climate within an organisation (Badran, 2007).

Innovation is understood as the introduction of a new educational idea, the transition and use of new ways of doing things Janiūnaitė, 2000 cit. Hopkins [1990]), the successful introduction of a new subject or method" (Brewer & Tierney, 2012). In this practice, an idea, an object, a practice is introduced at the level of an individual, a group, an organisation, an education system. This view is echoed by Dahiya (2019), who states that innovation is seen as "the introduction of new methods/practices, new/improved products/services. Educational institutions can apply innovation in any activity related to learning, be it education, educational process or management of the institution, to improve the efficiency of the institution and overcome day-to-day problems and difficulties".

Innovation is seen as a prerequisite for change/renewal, where challenges are overcome, changes are implemented to improve performance, and educational content is modified. Innovation refers to changes in technology, process or operational methods (Pogosian & Dzemyda, 2012). Innovation should be seen as a means of necessary and positive change. As Serdyukov points out, any activity (e.g. industry, business or education) needs continuous innovation to remain sustainable. Innovation is created as a result of "the relationship between science and the knowledge base and technological development" (Levickaitė et. al. 2011). Innovation is associated with progress focused on replacing the old with the new (Jakubavičius, 2003), a process that involves purposeful collaboration (Kirstukas et al., 2013). Bländul (2015) points out that innovation in educational institutions is one of the ways to meet the challenges of a changing world. In order to improve certain aspects of education, practices, individual behaviours and attitudes, and to realise systemic goals, planned changes are initiated and introduced into the educational environment by changing "the content of education through complementary change" (Janiūnaitė, 2000).

New information technologies are an integral part of the perception of innovation, where new information technologies are used for educational innovation, usually in order to modernise an educational institution and improve the quality of the educational process. Jong and

Hartong (2007) emphasise the ways in which activities are organised within an organisation through the use of the technological medium. As Popescu & Crenicean (2012) point out, new communication and information technologies stimulate innovation, thus changing the established educational system. Slahova et al. (2007) emphasize the creation, acquisition, education, and implementation of new technological processes.

Educational innovation requires the unified application of all the elements, as it is a complex process involving "the transformation of the values to be conveyed, the information to be taught, the methods to be used in educational activities" (Blândul, 2015), etc. Thus, in education, innovation must be implemented at all levels because, as Matsuda and Cohen, 2014, point out, "imbalances can undermine the idea of educational content and affect students' academic achievement". This leads to the need to develop all elements of the educational content - "didactic objectives, information content, teaching strategies, forms of organising the educational process, etc." (Matsuda & Cohen, 2014). This can be achieved by applying a unified teaching approach to the whole educational institution, holistically considering the whole innovation process as an "innovation" (Baumann et al., 2015).

Innovation is inextricably linked to the development of abilities/skills, where the emphasis is on the development of an independent personality and the need for new skills and competences. It is emphasised that innovation and creativity in education should promote students' analytical thinking, the ability to solve problems, to put their ideas and knowledge into practice (Matsuda & Cohen, 2014), and to become independent and responsible for their own educational process (Blândul, 2015). The development of these skills would meet the needs of employers, as research has shown that innovation and creativity in education are the skills most emphasised by employers and the process of building them (Popescu & Crenicean, 2012). Educational innovations related to the development of creativity and innovativeness of the individual are used to find access to the beneficiary, to create positive behaviours, and to foster creativity and innovativeness (Popescu & Crenicean, 2012).

The application of innovation in education is based on the importance of the characteristics of learners and the implementation at different levels of education. It is noted that new technologies are used as an integral part of innovation in order to improve the efficiency of education. However, the latter must be "adapted to the educational and psychophysical characteristics of the learners" (Matsuda & Cohen, 2014). An innovative approach must include relevant stakeholders (parents, businesses, students, education providers, communities, political organisations), the objects of innovation (mindset, organisation, products, processes, etc.) (Baumann et al., 2015) and the different levels of education (structure, organisation, content and environment) (Popescu & Crenicean, 2012). "In education, innovation is expressed as a new pedagogical theory, methodological approach, teaching technique, teaching tool, learning process or institutional structure that results in a significant change in teaching and learning, leading to improved student learning. Educational innovations thus aim to increase the productivity and efficiency of learning and/or to improve the quality of learning. Innovation can be directed towards advancing one, several or all aspects of the education system: theory and practice, curriculum, teaching and learning, policy, technology, institutions and administration, institutional culture and teacher training. It can be applied to any aspect of education that can have a positive impact on learning and learners. Similarly, educational innovation involves all stakeholders: learners, parents, teachers, administrators, researchers and policy makers, and requires their active participation and support" (Serdyukov). The success factors of an educational innovation are determined by the applicability of the innovation to the education sector, recognising the

conditions, characteristics, objects and stakeholders that exist within it (Baumann et al., 2015).

Analysis of research data

The results of survey revealed what lecturers consider to be innovations in the study process and what innovations they use (Fig.2). It also highlighted the opportunities for students to develop by experiencing the innovativeness of the study process.

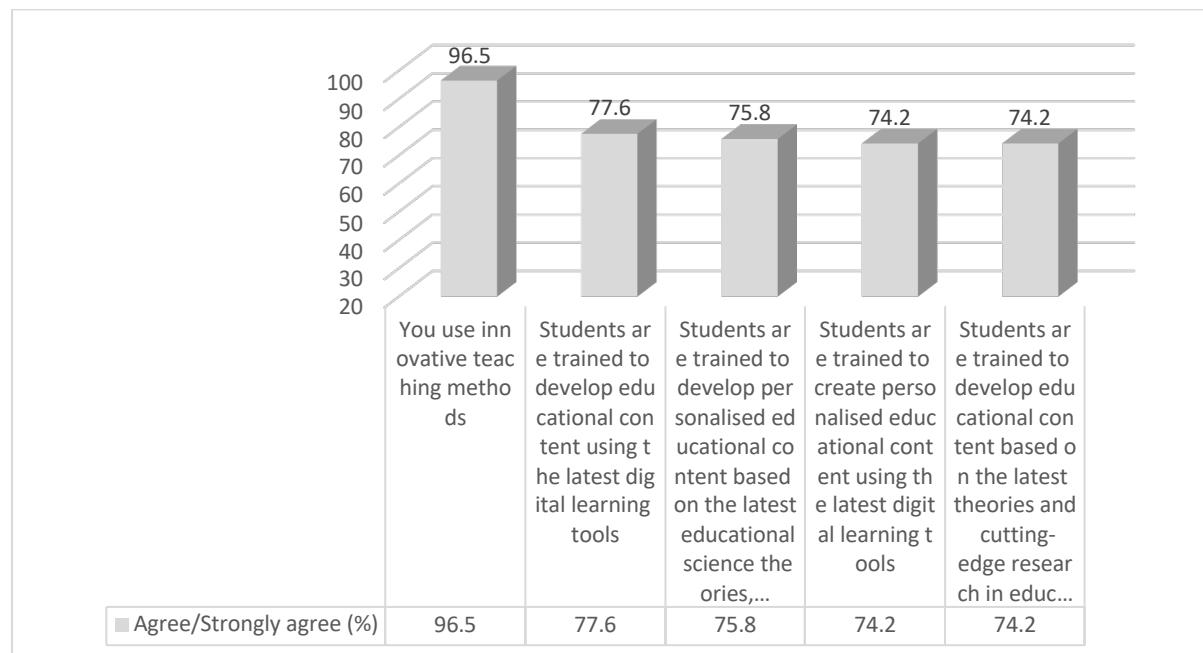


Figure 2: Lecturers' innovations in the study process (N=58)

The analysis of the survey data (Fig.3) revealed that lecturers apply innovative study methods (96.5%), which they also consider as essential innovations in the study process (62%). In parallel, the use of digital resources (56.9%) is also recognised as an important innovation in the study process.

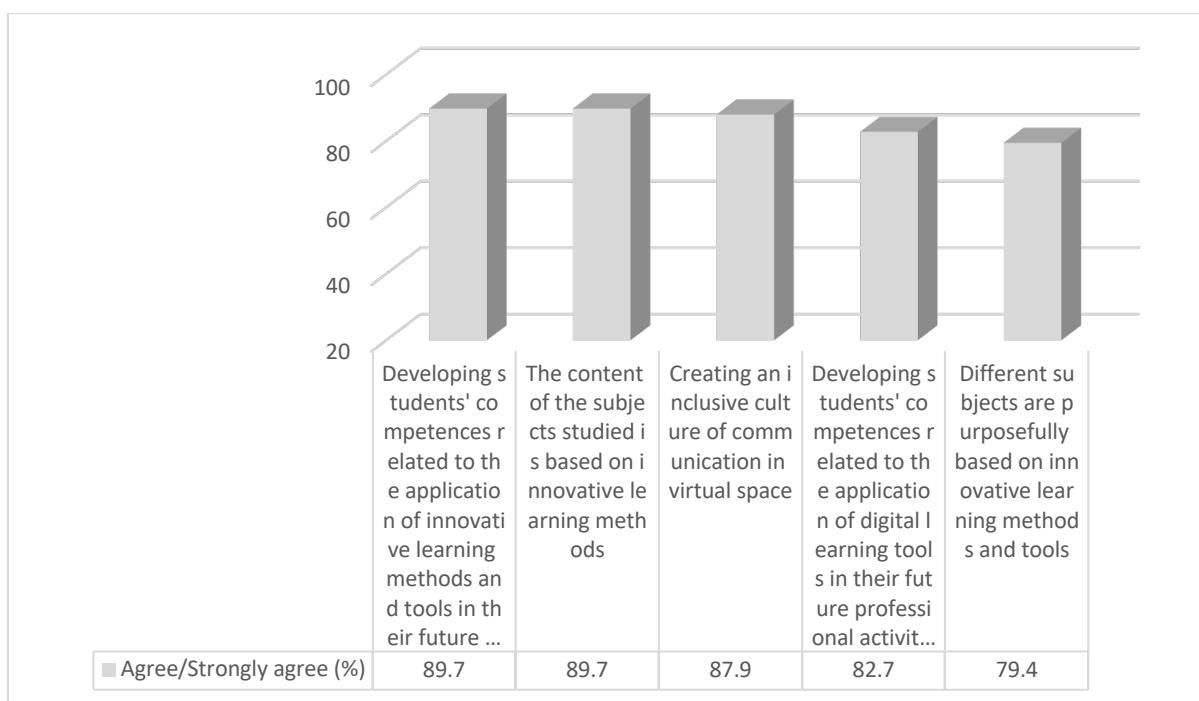


Figure 3: Student access to digital learning tools (N=58)

Studying in pedagogical studies creates an inclusive culture of communication in the virtual space (87.9%), and that students are enabled to develop competences related to the application of innovative learning methods and tools in their further professional activity (89.7%).

The qualitative research sought to identify the relevance of digitisation (the use of digital tools) for educational practice. On this basis, the theme "Changing the educational process" was identified, consisting of three sub-themes (Fig. 4).

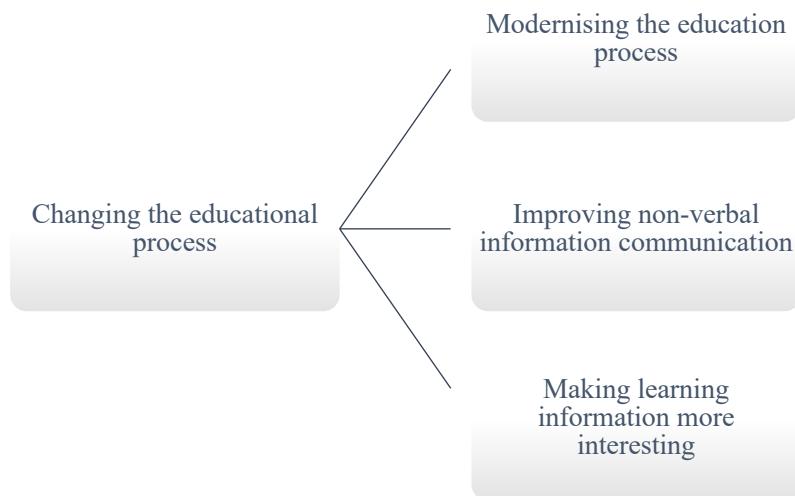


Figure 4: Insights from teacher educators on the role of digital tools in educational practice

As can be seen from the figure above, the first sub-theme "*Modernising the education process*" identifies that digital tools and their application allow for a modern educational process, when a participant of the study says: "*Nowadays, we can no longer use the traditional model of teaching, where the teacher/lecturer is the knower and the*

pupils/students are the hearers. Therefore, the educational content should be supplemented with a variety of digital teaching methods to engage and interest the new generation" (No.9). Another sub-theme "*Improving non-verbal information communication*" shows that digital tools in educational practice take the place of creating content that makes sense of non-verbal communication: "*This tool creates specialised illustrations for a particular biological context. It allows to improve the non-verbal communication of information and can also be used in assessment*" (No. 2). The third sub-theme "*Making learning information more interesting*" reveals that digitisation is a prerequisite for learners' interest and a motivational factor for learning.

It also explored what changes pedagogical lecturers have noticed when they have used or are using digital tools in their studies. The two themes "*Promoting students' self-regulated learning*" (Fig.5) and "*Supporting the lecturer in organising the educational process*" (Fig. 6) show that the use of digital tools is seen from two perspectives, i.e. the lecturer's and student's.

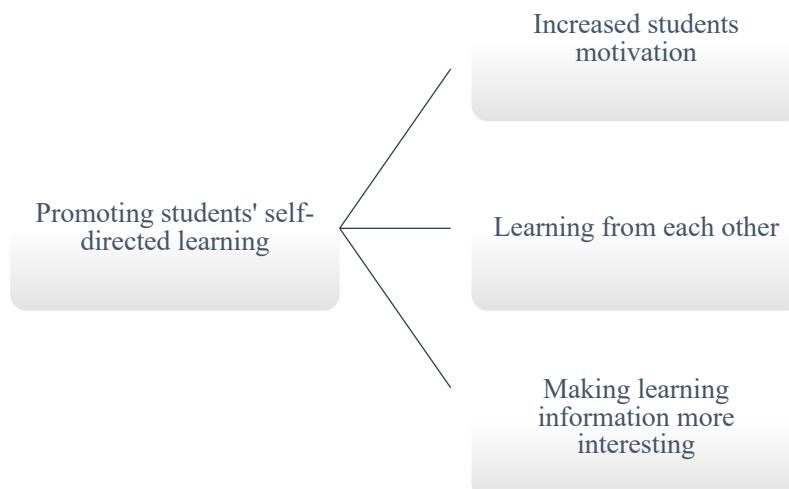


Figure 5: Changes in the study process when digital tools are used, as identified by teacher educators

The analysis of the data identified three sub-themes, the first of which "*Increased student motivation*" shows that digital tools are associated with increased student motivation. It can be assumed that digital tools should be used in the study process in order to foster students' motivation to learn. The second sub-theme "*Learning from each other*" shows that digitalisation promotes peer learning, where students can consult or choose stimulating tools to work together. The third sub-theme "*Making learning information more interesting*" highlights that digitisation of educational content activates interest in the learning material, which leads to deeper student engagement.

As can be seen in Figure 6, the theme "*Supporting the lecturer in organising the educational process*" has two sub-categories.

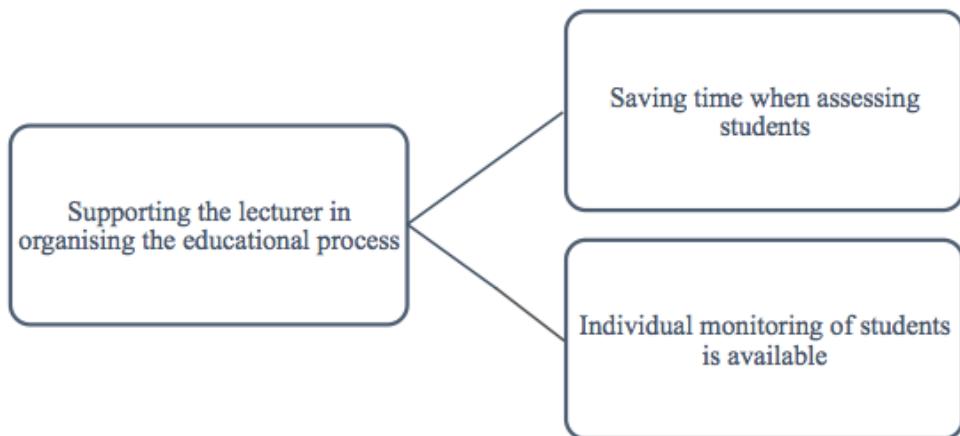


Figure 6: Changes in the study process when digital tools are used, as identified by teacher educators

The study found that the use of digital tools in the study process also saves lecturers' time, specifically in student assessment. This shows that lecturers tend to use and apply tools that also allow them to assess learners. Second sub-theme "*Individual monitoring of students is available*" reveals that digital tools help personalise the learning process and monitor individual student progress. This use of digital tools focuses on the modern educational process.

Conclusion

The use of innovative teaching methods using digital resources (e.g. virtual learning environments or digital teaching tools) is an essential feature of innovative pedagogical studies at the University. Lecturers perceive the use of digital tools in the study process as a significant innovation. By encouraging students to innovate, lecturers create environments in which students can experience the innovation of the learning process by developing educational content, learning to personalise educational content, linking the educational content they develop to advanced research.

Effective curriculum development relies on the development of educational content through the integration and synergies between the latest digital technologies and the latest research findings in educational sciences or other fields.

Digital technologies play a key role in personalising the learning process. Digital tools allow teachers and students to diversify and adapt educational content according to the learners' level of progress and facilitate the administration of academic processes.

The emergence of a future learning culture requires the creation and development of learning ecosystems that connect interacting people, technologies, content, and cultures, and that exist both inside and outside the organisation.

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