Digital Future Learning Model

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Abstract.

At a time when the need for distance learning is becoming increasingly important, it is essential to identify and develop digital learning opportunities, developing technological support and digital learning methods accordingly. One of the most important aspects of e-learning is the personal motivation of the student, so the learning process must involve the student in an active way. There is an increasing shift towards active learning methods in full-time study. Various e-learning platforms have been developed, and more and more researchers are exploring the development of digital teaching and learning methodologies, but there is currently no fully-fledged digital learning technological framework to support the various active learning methods. The aim of the paper is to develop a conceptual technological model of active digital teaching and learning. The technological model of e-teaching and e-learning comprises several interconnected parts of a system that ensures the active involvement of both the student and the teacher in the learning process, ensuring a high quality knowledge sharing between the both sides.

Keywords: active learning methods, e-learning, e-teaching, technological model

1. Introduction

Transitions in the global economy and politics are accelerating, with education, research and culture all affected. Work equipment is becoming more complex and sophisticated, requiring more and more knowledge and skills from workers. This leads to the recognition that knowledge is becoming increasingly valuable. The digital transformation of the global economy and society is increasing the complexity of today's world and the speed of change as the world becomes more connected and better educated. The complexity and speed of change mean that connecting education to the trends shaping the world we live in is now increasingly urgent. The information technology sector is developing rapidly in all areas of the economy, but is lagging behind the growing need to use it in a specific direction. The acquisition of new knowledge and skills has been seen as an important aspect of university education, with no sign of an increase in the importance of study, both in full-time programmes and in individual courses. Today's education system is increasingly moving towards active learning, which includes active teaching methods, but digital tools and models that fully support active learning are still lacking. There are difficulties in replicating traditional teaching methods with unforeseen learning outcomes in the digital age and modern information systems and technologies provide a great deal of continuous development of digital tools, opening up opportunities for strengthening the education system.

At a time when the need for distance learning is becoming increasingly important, it is essential to identify and develop digital learning opportunities, developing technological support and digital learning methods accordingly. One of the most important aspects of e-learning is the personal motivation of the student, so the learning process must involve the student in an active way. There is an increasing shift towards active learning methods in full-time study. Various e-learning platforms have been developed, and more and more researchers are exploring the development of digital teaching and learning methodologies, but there is currently no fully-fledged digital learning technological framework to support the various active learning methods.

The problem is the lack of active learning methods and knowledge management technologies in the study process. The goal of the paper is develop a conceptual technological model of active digital teaching and learning.

The paper examines the possibilities of applying digital active learning methods in a digital environment, assesses the need to personalise the study process and develop a common technological framework for the use of active learning methods. The paper develops a conceptual model of an e-learning technological platform for the use of active learning and teaching methods in studies at higher education institutions.

2. Main focuses of future digital learning in fast growing and big data information society

Lifelong learning is one of the most important parts of today's education system, requiring the development of prior learning and professional skills in line with the requirements of the profession. Learning at a distance in a digital environment is becoming particularly important. Strategically, the main goal of sustainable national development and human well-being is to focus on education for personal development.

Historical circumstances have changed, the content of education has changed, new educational paradigms have emerged, and thus both the professional competence of the teacher and the use of technology have acquired new significance.

The supply of information is increasing and it is becoming increasingly important to navigate quickly and efficiently through large amounts of accessible data, to acquire new skills and competences

2.1. Digital active learning methods

The paper focuses on technological solutions that provide educational methods that enhance each individual's ability to acquire the knowledge, values and skills needed to participate in decision-making for individual or collective action at local and global levels to improve the quality of life without compromising the needs of future generations. Learning materials and methods in a digital environment enable the rapid and secure introduction of new knowledge and the mutually beneficial exchange of data and knowledge, which are key to sustainable education. Active learning methods develop learners' ability to react flexibly in a competitive environment, but have so far been used mainly in face-to-face studies.

Student motivation, engagement and interest in their own learning are imperative for a successful and student-centred education. The global education trend has shifted to a clearer focus on '21st century skills' or transversal competences. Humanisation, accessibility, openness and diversity of the educational environment are the guarantors of sustainable development of education. Several scholars have provided theoretical justification for distance learning ideas related to the expansion of the opportunities offered in the context of home-based education and international or cross-border education (Katane et al., 2012). We need to develop a different orientation to thinking about new technologies in education - not just as tools or delivery systems, but as a set of resources and capabilities that enable us to rethink our educational goals, methods and institutions (Burbules et.al., 2020). Active learning methods provide new content created by the teacher or student (Kim et al., 2020). Technology-enhanced learning environments create flexibility and sustainability in education (Cakula, 2018).

The author carried out an experiment at Vidzeme University of Applied Sciences that involves experiential learning and active participation based on collective coding (VIA student codes) exercises, quizzes, projects and other approaches. Experiential learning in software development courses takes the form of practical exercises in the development of collective solutions. Work on software development exercises is carried out in small groups, with regular feedback data collected in a number of ways to serve as input to the knowledge discovery process to support active learning later on (Cakula, 2021). The methods used were different active learning methods such as Dotmocracy, Fishbowl, Quescussion, Index Card Pass, Flipped Classroom, Complete Turn Taking, Respond, React, Reply, Round Table, Think-Pair-Share, Post It Parade including also solving different exercises on an algorithm theory (Center of Excellence, 2020, Flipped Classroom, 2020).

2.2. Personalized learning process

Instruction tailored to the unique pace of different students is known as personalised learning. Personalised learning is a method of teaching in which the content, technology and pace of learning are based on the abilities and interests of each learner. There are five steps to personalising learning:

1. set clear and specific goals;

2. Make goals challenging and realistic;

3. Make goals dynamic and review them regularly;

4. Let learners know their progress;

5. Involve supporters (parents, friends, etc.) (Rogers, 1997)

In this case, the academic goals remain the same for the group of students, but individual students can progress through the curriculum at different speeds based on their specific learning needs. This is particularly true in e-learning, where each student chooses to study at his or her own particular time, place and pace. Personalised learning includes adaptive learning, individualized learning, differentiated learning, competency-based learning (Briggs et.al., 2009).

Adaptive learning is technology used to assign human or digital resources to learners based on their unique needs. Personalised learning states that the pace of learning is adapted to the needs of individual students. Differentiated learning approaches state that learning is adapted to the needs of individual students. Competency-based learning provides learners with the opportunity to progress through a learning pathway based on their ability to demonstrate competence, including the application and creation of knowledge, as well as skills and dispositions.

Academic objectives, curriculum and content, as well as method and pace, may vary in a personalised learning environment. Unlike individualised learning, personalised learning involves students in the design of learning activities and is based more on the student's personal interests and motivation to acquire knowledge and skills.

Individual perception can be classified as a form of nomothetic psychology and is developed by socionic's theory based on Jungian four personality types. While Jung mostly focussed on personality types as individuals. Based on socionic's, there are 16 types of personalities and respectively 16 types of possible perception of information. All of the people have their strengths and weaknesses and Socionics has defined what the strengths and weaknesses of each sociotype are in perception of information (Grant & Basye, 2014; Гуленко, 1999; Desmarais & Gagnon, 2006; Sampson et.al., 2002).To ensure the highest quality e-learning, the individual characteristics of learners must be taken into account. It should be noted that this is one of the biggest advantages of e-learning, because unlike a standard learning environment where students listen to a lecture together and do the same homework and tests, e-learning can provide tailored information based on the student's most pronounced perceptual channel. In the literature, these are also referred to as modalities, Fleming's VARK model or simply as perceptions. Four perceptual channels are distinguished:

- Auditory,
- Visual,
- Reading, writing
- Kinaesthetic (Othman & Amiruddin, 2010).

Building on all these aspects, smart learning environments provide students with adaptive and personalised learning and assessment, including multimodal/multisensory interaction technologies and advanced interfaces. An industry-driven approach in collaboration with

academics will lead to market-oriented education. New learning individually oriented methodology should be developed based on human individual perception – how individuals select and process information, Neil Fleming's pedagogic theory, educational psychology and artificial intelligence for formal and informal education, including workplace learning. Increasingly, the course leader collaborates with students in their studies, which promotes faster and more effective knowledge sharing and the creation of new knowledge.

3. Digital learning framework

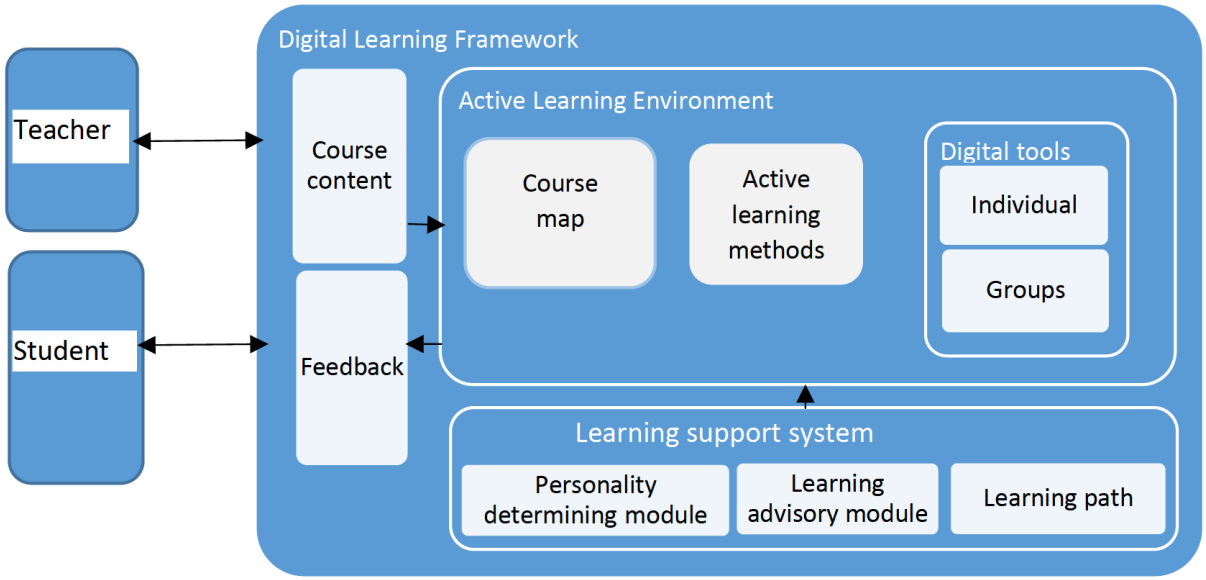
The digital learning framework is built on advances on neuroscience, pedagogical and learning theories, educational psychology as well as artificial intelligence including modal/multisensory technologies. It contains possibility to get access from both sides teacher and student (see figure 1). Framework includes 4 main parts: course content, active learning environment, learning support system and feedback to both - student and teacher.

Course content, the foundations of which are developed by the teacher and may be supplemented by student-generated content under the guidance of the teacher. It is very important that students take part in developing content – this is one of the most powerful methods when students start to look on things from teacher perspective – it develops deeper understanding of necessary knowledge and skills.

Active learning environment includes three main parts – possibility to build course map (Rollande & Grundspenkis, 2017), choose different active learning methods and use tools embedded in the learning environment for using active methods in both group and individual work.

Learning support system includes personality determining module (Cakula, 2018), learning advisory module (Cakula & Majore, 2019) and learning path (Nabizadeh et.al, 2020) what could be developed for every individual student. Personality determining module will profile users, assessing their personality based on socionic's theory, Neil Fleming's pedagogic theory, educational psychology and artificial intelligence in order to provide adaptive learning contents for improving performance in learning. Learning Advisory module system managing learning path for each learner through the course content using different course units, access from different devices and evaluation feedback. As a result the it will be able to advise the learners to follow a different learning design (relevant to their personality type) or access different learning resources (relevant to their information processing preferences). The tutor / administrator will also be informed for the learners' progress during each module / course.

Figure 1: Digital Learning Conceptual Model



Learning path can be devolepd based on China scientists developed algorithm where they have designed a multidimensional knowledge graph framework that separately stores learning objects organized in several classes and proposed six main semantic relationships between learning objects in the knowledge graph. Learning path recommendation model is designed for satisfying different learning needs based on the multidimensional knowledge graph framework, which can generate and recommend customized learning paths according to the e-learner's target learning object (Daqian Shi et al, 2020).

4. Conclusion

Today, the pedagogical paradigm is shifting from teaching to learning, and development from teacher to learner to from learner to teacher. The student and his/her activities have a great influence on the teaching methods and content as well as on the offer of the system. A technology information system is necessary to ensure the delivery of relevant content and the development of a coherent education system, and to motivate students to go deeper in the courses offered and to acquire the competences needed in the labour market. In a rapidly evolving information society, it is increasingly important to deliver the right information to the right learner, quickly.

The working environment is changing with the rapid development of technology and knowledge, so it is important to keep abreast of changing market conditions and to apply available technology solutions as well as to develop new applications of technology in areas of societal need in order to contribute to the overall development of the economy. The development of a sustainable society is influenced by the variety of methods and technologies available.

The developed technological digital learning model draws on advances in learning theory, neuroscience, artificial intelligence, educational psychology and modal/multisensory

technology and gives possibility to cooperate teacher and student in common system using different embedded tools supporting active learning methods.

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