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Digital education in Kazakhstani teacher training system

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Abstract. This article discloses the technology acceptance model (TAM - Technology acceptance model) in the aspect of digital technologies in higher education. The authors present a study of the motivational sphere of technology application by the educators of the higher institutions.

The article presents the intermediate and final results of the participation of teachers in the motivational courses of the Coursera platform. The main results obtained in the course of the study indicate an insufficient level of motivation for the use of digital educational technologies in higher education. The application of technology is fragmented. Active participation in international courses increases certain aspects of the motivation for using digital educational technologies due to direct participation in them.

The key findings of the research included the following aspects: Coursera platform could serve as a catalyst for transitioning from traditional education to a blended teaching format in higher education institutions; modifying syllabi to incorporate new digital topics has yielded tangible outcomes in the research; the technology acceptance model (TAM) effectively evaluates the level of motivation among higher education educators to utilize digital tools.

Keywords: technology acceptance model (TAM), motivation, higher educational institution, educator, digital technologies.

Basic provisions

Motivation to use digital tools has been assessed through TAM technology (technology acceptance model) that indicates the following highlights of the research:

1. External motivation by the administration of HEIs led to the gradual transition to internal motivation after the course completion;
2. Coursera platform may perform the trigger to transit the pre-digital education to blended format of teaching in HEIs;
3. The syllabi modification with new digital topics introduction demonstrated the tangible result of the research;
4. TAM technology effectively assesses the level of motivation of HEI educators to use digital tools.

Introduction

The given article seeks to attempt the uncovering of the relation between the Technology acceptance model (hereinafter referred as TAM) and the level of the teachers' motivation to use digital tools in the Higher Educational Institutions.

TAM has been thoroughly scrutinized by the European scholars (Davis, 1989[1]; Scherer, 2019, etc. [2]) who consider it as the method 'to explain teachers' intention to use technology' (Antonietti, C., Cattaneo, A, Amenduni: 2022 [3]).

Kazakhstani recent research shows the stability in digitalisation of education has been enhanced by the global COVID-19 pandemic. Paper-free formats (Ashilova, et al: 2019 [4]) of documentation have been introduced to the educators (Platonus, Moodle, LMS-formats). Digital ecosystems have been created throughout all of the Universities of Kazakhstan.

The present research **aims** to unveil the process of gradual transformation of pre-digital high education to blended and digital formats in terms of motivation of the use of digital tools by HEI teachers.

Materials and methods

The foci of modern digital education have shifted from the educational management and self-identification based on the dichotomy of 'digital natives and immigrants' (Prensky: 2001 [5]) to detailed analysis of the certain aspects of digitalization (assessment, tools, methods, systems, psychological aspects, etc.). But still the focus on the higher educational institutions and the role of digitalisation in vocational education is vague or incomplete.

Thus, the literature review demonstrates the low level of research in the field of high education in Kazakhstan in global perspective.

Even the quantitative analyses demonstrate the insufficient level of the higher educational institutions in Kazakhstan fully realise the digitalization in every level of the vocational studies (communication, study, teaching process, catering, extracurricular activities, upbringing, etc.)

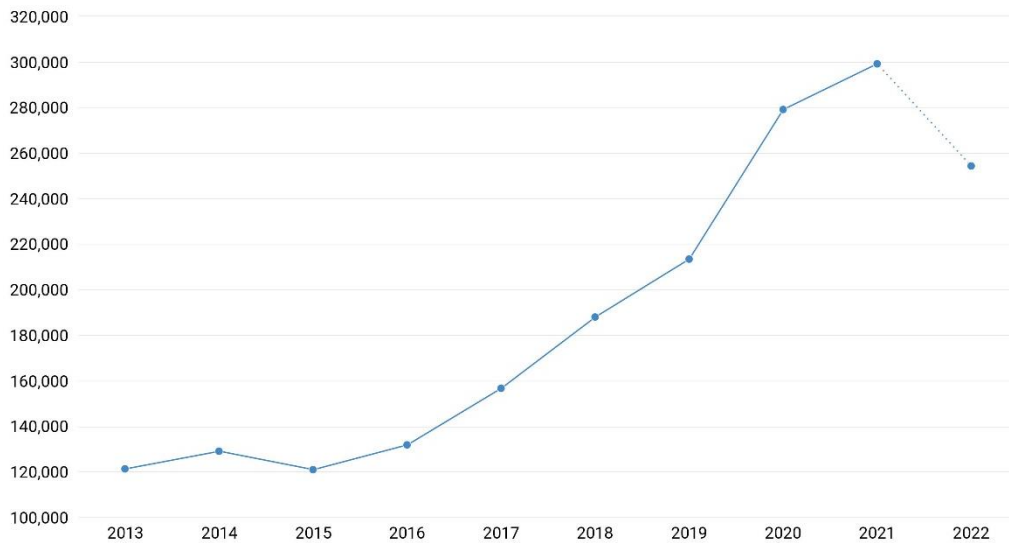


Chart 1. The quantity of publications on Digital Education worldwide per years

As the chart of the publications on Digital Education demonstrates [6], the highest peak of them is dated 2021, in post-pandemic time.

The areas of the research include (ranging from the most frequent filed of research):

- 1) Information and computing science;
- 2) Engineering;
- 3) Health sciences;
- 4) Education.

We can observe the increase in publications mostly in the sphere of ICT, as it is logical to presume. Education is the reflection of modern technologies; it must adapt the existing scientific and engineering inventions, study and classify, implement the elements and assess the current results of them.

Another problem of digitalization of Kazakhstani education lies in the fact that the number of publications in adjacent spheres (secondary and vocational education) is unequal.

The programmes “National platform of open education”, “Digital Kazakhstan” are aimed at intensifying the process of digitalization of all of the levels of education (Kovaleva, Alimzhanov: 2016 [7]), but still the contradictions prevent from realizing all of the planned results.

To illustrate, it is visible to present the data on the secondary education – the researchers mostly publish the practically-oriented articles on how to operate with various types of software/platforms/channels. So, the number of publications has recently been devoted to the following topics:

- 1) Social media in education;
- 2) Educational programmes;
- 3) Methods and tools for teaching subjects;
- 4) Step-by-step tutorials on digital resources.

Only a limited number of articles are dedicated to global issues on higher educational institutions in digital era.

Basically, the research in 2022 concerns the digital competence of educators (DiComEdu): evaluation and assessment of DiComEdu at educators (Muammar, S., Hashim, K.F.B. & Panthakkan, A.: 2022 [8]); digital competence of students (Cabero-Almenara, J., Gutiérrez-Castillo, J.J., Guillén-Gámez, F.D.: 2022 [10]); the link of digital resources to the digital competence of educators (Heine, S., Krepf, M. & König, J. : 2022 [11]), etc.

Still, the data on the TAM implementation in HEIs cannot reveal the whole aspects of reality of education in terms of motivation.

The **objectives** of the research are as follows:

- 1) To uncover the mechanisms of gradual transformation from pre-digital to digital high education;
- 2) To analyse the existing publications on the topic of the research;
- 3) To present the TAM as the motivational basis for transition to the digital high education;
- 4) To compare the existing syllabi / working programmes in terms of digital technologies used;
- 5) To organize the survey on motivation of the use of digital technologies in education among HEI;
- 6) To propose the possible formats of digitalisation in HEIs.

The participants of the research are 72 HEI educators (Kostanay regional university named after A. Baitursynov, Kostanay, Kazakhstan).

The hypothesis of the research: there is a stable correlation between the TAM model and the level of motivation of higher educational institution educators resulting in the various steps of pre-digital into digital transitions.

The methods of the research include:

- 1) Structural survey method (survey monkey tool);
- 2) The method of scaling (motivation to implement digital tools in education);
- 3) Essay writing (additional value to the overall assessment of the motivational sphere of educators).

Results and discussion

The participants are characterized by the following aspects/indices:

- Age (35-62);
- Teaching experience (10-38 years);
- The level of digital competence (ICT qualification/professional excellence programmes participation, etc.);
- Teaching disciplines (optional).

The stages of the research:

- 1) Initial survey conduction (TAM implementation, entry survey);
- 2) Motivational stage (obligatory organization on participation in the digital literacy in Coursera bank of courses – 4 weeks);

3) Final survey (optionally – essay writing on the topic “Digital education in my teaching practice at HEIs”).

Initial stage of the research. Initially, the participants took the survey using the link to the surveymonkey tool. The survey included 4 close questions, 1 open-ended question and 1 essay (optional) on the motivation to use digital technologies in the educational process. 72 participants filled in the survey and indicated their willingness to participate.

The survey included the stated below questions:

1. How often do you use digital technologies in your educational practice (1- never, 2- sometimes, 3 – regularly, 4 – very often, 5 – every day);

2. Indicate to which extent you prefer paper-based format of study to the digital one (1-paper format is never or seldom used, 2 – paper based format is equally used, 3 – digital tools prevail over paper format; 4 – digital tools are the only tools I use, papers are used rarely; 5 – digital tools prevail, papers are never used);

3. Have you ever created any digital content (surveys, tests, quizzes, pages, sites, etc.)? (1- never, 2 – sometimes, 3 – regularly, 4 – very often, 5 – every day);

4. Whenever you use digital technologies, you feel... (frustrated/relaxed/unsure/happy/excited);

5. Do you consider the use of the digital technology inevitable in HEIs (open-ended question);

6. Essay “If I have to use digital technologies every day - my feelings/expectations/plans” (optional).

Analyzing the results, it must be stated that:

1. 50% of respondents sometimes use digital technologies, 45% use them regularly, 5% never use it (work experience is above 25 years);

2. 72% of respondents prefer paper/digital formats combined, 19% use mostly digital tools (work experience is less than 10 years), 9% never use digital tools;

3. 95% of respondents sometimes created the digital content, 5% never created any digital content;

4. 84% of respondents feel unsure when using digital technologies, 6% feel excited, 10% feel frustrated;

5. Respondents state that ‘digital technologies are our present and future’, *‘the use of digital technologies is impossible to be parted from the educational process, but it can be insecure’, ‘I never use them, they are ineffective, they do not develop critical thinking of students.’*

The special attention must be paid to the essay written by some participants (7 essays). The feelings on the use of digital technologies are sharply different. The educators state the oppositions between the use and creation of content online: ‘I can easily search for the information, but sometimes I cannot find the necessary one, so I have to create... And it takes much time, I feel nervous from time to time’, ‘the use of technologies makes our life easier, but we cannot fully rely on it, papers are more instant and secure...’.

As it is seen from the answers, the educators have the mingled feelings towards the technologies in digital format. They experience insecurity and inconvenience when implementing online content or creating it.

Formative stage of the research. The formative stage of the research concerned the active involvement of all teaching staff into the courses on Coursera platform that provides with the

sufficient 4-8 weeks courses on the use of digital courses (ex. “Data Privacy Fundamentals” by Northeastern University, 1-3 months).

All 72 participants chose the courses relevant for their interests, motivational sphere and effectiveness in the teaching practice.

The participants performed all of the necessary tasks, watched the video-instructions, wrote the commentaries, communicated with other participants and created their own content.

The result of the course must have had the tangible result in the form of the syllabi reshaping.

Thus, the new methods/topics were added to the syllabus (the example of the discipline ‘New technologies’, FL department):

1. New Technologies in Teaching Foreign Languages at Secondary School as an academic discipline.

2. Balancing traditional approaches and technology. The role of Educators. The role of Learners. The Role of the School

3. Implementing technology in the classroom

4. Blended learning

5. Mobile learning inside and outside of the classroom

6. Technology-enhanced learning and flipped classrooms. 6 Models of flipping.

7. The Dogme approach and teaching unplugged

8. Educational digital tools and devices

9. Using websites in the classroom. How to find useful websites. How to evaluate websites.

10. Planning lessons using the internet

11. Internet educational resources. Blogs and blogging

12. Pedagogy and teaching approaches

13. Six crucial questions. What is the difference between ICT literacy and expertise vs. knowledge acquisition with the use of ICT? What and how many are the driving forces for e-learning?

14. Six crucial questions. What have we found about the use of ICT in education so far? What are the necessary next steps for teachers?

15. Six crucial questions. What are the characteristics of the new teaching approach?

As it is evident from the stated above topics, the focus on the discipline format has been changed – from the traditional approach to the blended and digital formats.

As a result of the courses completion, it can be mentioned that educators slightly changed their attitudes towards the use of the digital technologies as well as creating the educational online content.

The educators took the survey (see the questions above) again and expressed their motivation to use the digital technologies in the educational process (the increase in the positive attitudes has been traced after the survey analysis).

1. 46% of respondents sometimes use digital technologies, 51% use them regularly, 3% never use it (work experience is above 25 years) – the visible increase in numbers;

2. 72% of respondents prefer paper/digital formats combined, 28% use mostly digital tools (work experience is less than 10 years), 0% never use digital tools – the courses mediated and motivated the participants into digital education;

3. 97% of respondents sometimes created the digital content, 3% never created any digital content – some respondents failed to complete the test and course, generally;

4. 80% of respondents feel unsure when using digital technologies, 15% feel excited, 5% feel frustrated – the decrease in negative attitudes and feelings was traced;

5. The essay (8 answers were analysed) demonstrates the soft change in the use of digital technologies: *'now I know how to create my own web-page', 'students must be proud of me creating a video for them', 'Maybe I will try some quizzes in a meantime, it turned to be handy'*.

Conclusion

It can be concluded that the use of the active involvement into existing effective, interactive courses enhances the process of positive motivation formation towards the digital educational environment.

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Contribution of the authors

Konvisar A.A. – writing the text and critically reviewing its content; proper study and resolution of issues related to the reliability of data or the integrity of all parts of the article.

Bezhina V.V. – research; collection, analysis and interpretation of the data obtained; final conclusions.

Mukanov M.R. – formation of an idea; formulation or development of key goals and tasks; development of methodology.

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Қазақстанның кәсіби-педагогикалық даярлау жүйесіндегі цифрлық білім

Андапта. Мақалада жоғары білім берудегі цифрлық технологиялар аспектісінде технологиялық процесті (ТАМ – technology acceptance model) қабылдау моделі қарастырылады. Авторлар жоғары мектеп оқытушыларының технологияны қолданудың мотивациялық саласын зерттеуді ұсынады.

Мақалада оқытушылардың Coursera платформасының мотивациялық курстарына қатысуының аралық және қорытынды нәтижелері келтірілген. Зерттеу барысында алынған негізгі нәтижелер жоғары мектепте цифрлық білім беру технологияларын пайдалану мотивациясының жеткіліксіз деңгейін көрсетеді. Технологияны қолдану фрагментті. Халықаралық курстарға белсенді әрі тікелей қатысу цифрлық білім беру технологияларын пайдалану уәждемесінің жекелеген сипаттарын арттырады.

Зерттеудің негізгі нәтижелері мынадай аспектілерді қамтыды: Coursera платформасы дәстүрлі білім беруден жоғары оқу орындарында оқытудың аралас форматына көшу үшін пәрменді ынталандыру ретінде қызмет етеді; жаңа цифрлық тақырыптар мен құралдарды енгізу мақсатында оқу жоспарлары мен оқу бағдарламаларын модификациялау ұсынылған зерттеуде нақты практикалық нәтижелерді көрсетеді; технологиялық процесті қабылдау моделі (ТАМ – Technology acceptance model) жоғары оқу орындары оқытушыларын цифрлық құралдарды пайдалануға ынталандыру деңгейін тиімді бағалауға негіз болады.

Түйін сөздер: технологиялық процесті қабылдау моделі (ТАМ – technology acceptance model), мотивация, жоғары мектеп, оқытушы, цифрлық технологиялар.

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Цифровое образование в системе профессионально-педагогической подготовки Казахстана

Аннотация. В данной статье рассматривается модель принятия технологического процесса (TAM – Technology acceptance model) в аспекте цифровых технологий в высшем образовании. Авторы представляют исследование мотивационной сферы применения технологий преподавателями высшей школы.

В статье представлены промежуточные и итоговые результаты участия преподавателей в мотивационных курсах платформы Coursera. Основные результаты, полученные в ходе исследования, свидетельствуют о недостаточном уровне мотивации использования цифровых образовательных технологий в высшей школе. Применение технологий носит фрагментарный характер. Активное участие в международных курсах повышает отдельные аспекты мотивации использования цифровых образовательных технологий ввиду непосредственного участия в них.

Основные результаты данного исследования включали следующие аспекты: платформа Coursera может служить действенным стимулом для перехода от традиционного образования к смешанному формату преподавания в высших учебных заведениях; модификация учебных планов и учебных программ с целью включения новых цифровых тем и инструментов показала конкретные практические результаты в представленном исследовании; модель принятия технологического процесса (TAM – Technology acceptance model) служит основанием для эффективного оценивания уровня мотивации преподавателей высших учебных заведений к использованию цифровых инструментов.

Ключевые слова: модель принятия технологического процесса (TAM – Technology acceptance model), мотивация, высшая школа, преподаватель, цифровые технологии.

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