ISMA
ANNO 1994

INFORMĀCIJAS
SISTĒMU
MENEDŽMENTA
AUGSTSKOLA

SCIENTIFIC
AND PEDAGOGICAL
INTERNSHIP

COMPOSITION OF THE EDUCATIONAL PROCESS IN THE EU AND UKRAINE: RECOMMENDATIONS FROM PEDAGOGY AND PSYCHOLOGY TEACHERS

SEPTEMBER 30 – NOVEMBER 10, 2024
Riga, the Republic of Latvia

ISMA INFORMĀCIJAS SISTĒMU MENEDŽMENTA AUGSTSKOLA
ANNO 1994

ISMA University of Applied Sciences

Scientific and pedagogical internship

COMPOSITION OF THE EDUCATIONAL PROCESS IN THE EU AND UKRAINE: RECOMMENDATIONS FROM PEDAGOGY AND PSYCHOLOGY TEACHERS

September 30 – November 10, 2024

Riga,
the Republic of Latvia
2024

Head of organising committee:

Romans Djakons – Dr.sc.ing., Professor, Academician, President of ISMA University of Applied Sciences.

Each author is responsible for content and formation of his/her materials.

The reference is mandatory in case of republishing or citation.

Composition of the educational process in the EU and Ukraine: recommendations from pedagogy and psychology teachers : scientific and pedagogical internship. September 30 – November 10, 2024. Riga, the Republic of Latvia. 60 pages.

ISMA University of Applied Sciences, 2024

CONTENTS

Інтерактивні методи навчання здобувачів вищої освіти (на прикладі викладання дисципліни «Латинська мова та медична термінологія»)
Апоненко І. М., Шубкіна К. А. 4

Інтеграція гуманізації у розвиток безпечного університету
Горішна О. М. 8

Практичний досвід як основа формування професійної мобільності майбутніх фахівців у галузі психології та реабілітаційної психології
Іванцев Н. І. 14

Особливості практичної підготовки вихователів та вчителів початкової школи в європейських країнах
Карук І. В. 20

Оцінка рівнів цифрової компетентностей викладачів зарубіжних закладів вищої освіти
Остапенко А. В. 26

Неперервність як основна характеристика сучасної освіти: організаційний та особистісний аспект
Пономаренко О. В. 29

Теоретико-методичні засади підготовки фахівців у галузі спеціальної педагогіки
Потюк С. В. 36

Interactive teaching tools and students' mathematical competency: results of experimental study
Termenzhy D. Ye. 40

Професійні якості практичних психологів та корекційних педагогів для роботи з дітьми з особливими освітніми потребами
Турубарова А. В. 46

Підготовка психологів у цивільних вишах до служби на посадах офіцерів-психологів у Збройних Сил України
Улунова Г. Є. 51

Підготовка майбутніх учителів початкових класів до аналізу художніх творів на уроках читання як засобу соціалізації молодших школярів
Франчук Н. Л. 54

Література:

1. Яцинік А. В. Особливості підготовки майбутніх дефектологів в умовах розвитку інклюзивної освіти. *Імідж сучасного педагога*, 2018. № 4 (181). С. 76–79.

INTERACTIVE TEACHING TOOLS AND STUDENTS' MATHEMATICAL COMPETENCY: RESULTS OF EXPERIMENTAL STUDY

Termenzhy D. Ye.
PhD in Pedagogy, Associate Professor
State Tax University
Irpin, Kyiv region, Ukraine

The main purpose of this paper is to present several results of a six years long experimental study in higher mathematics courses teaching with applying interactive teaching tools. It took place in Vasyl Stus Donetsk National University, which was a natural setting. The experiment was led by our research team of three academics of the faculty. We have a long-standing experience of the applying technologies for enhancing the quality of higher mathematics learning in Ukraine. In 2011 our research group made the decision to study, develop and implement interactive teaching tools into several mathematical courses (Analytical Geometry, Algebra and Geometry, Introduction to Higher Mathematics) at the Faculty. This was an important step for us in recognizing the inherent value in blending the best face-to-face learning experiences with those enhanced by web technologies. Some results were presented on several conferences in Moldova, Slovenia and Austria [4, 5, 6].

We have started a pilot experiment with applying of educational interactive Portal in freshmen course of Analytical Geometry for Mathematics students at the University in autumn semester in 2012. This study was preceded our experiment, some results were presented in author's PhD thesis [1] and proved the efficiency of this methodology in improving teaching-learning relationships and producing a greater involvement and commitment of the students and a higher motivation.

So we decided to conduct an entire experimental study on the focus group throughout the whole period of training (Bachelor's and Master's Degree). This study is being carried out, as a different approach to the teaching/learning process in Mathematics, at a higher education institution. It was implemented from 2013/2014 till 2018/2019 academic years.

It must be mentioned, that at the beginning of the study we had 38 participants. But in 2014 due to the complex socio-political situation in the east of Ukraine our University had to evacuate from Donetsk to another city in Ukraine – Vinnytsia. And some of students transferred to other higher educational institutions throughout the country. This led to the investigation only focus on the experience of fourteen students who remained and completed the programme. In spite of this fact we decided to keep on our project with smaller sample.

The sample of our study consisted of 14 students, enrolled in 2013/2014, who specialized in Mathematics. The participants' age ranged between 17 and 22 years old. The selection of students was based on their interest and ownership of appropriate gadgets for studying (laptop, smartphone, PC, webcam etc.). Because of small sample size (only 14 students), we decided to select as control group previous group of Mathematics students (enrolled in 2012/2013 academic year) who remained in the university and learned all curriculum mathematics courses with traditional teaching.

Six mathematical courses: Analytical Geometry (2013/2014), Mathematical Logic (2014/2015), Differential Geometry (2014/2015), Methodology of Teaching Mathematics (2015/2016), History of Mathematics (2016/2017), IT in Teaching Mathematics (2017/2018), were taught during five academic years. These courses as well as additional course «Preparation of Master's Work» were taught by using the interactive teaching tools with implementing blended learning approach as a pedagogical strategy (including flipped classroom model), while other courses from the curriculum were taught by traditional teaching methods.

The methodology of the study was to apply interactive teaching tools for supporting blended learning in competency-based mathematics curriculum. In spite its widespread use in higher education no simple and reliable definition of "interactive teaching tool" exists. Many scientists use terms like "digital educational tool", "interactive learning material", "web-based teaching tool", "digital educational resources" or "online learning tool" etc. In our study, we understand interactive teaching tools as: "learning tools that focus on interaction with the student and implement the management of educational activities" [2]. These are interactive resources designed to teach a specific learning outcome.

In our empirical study students used interactive mathematical portal and distance courses on LMS (learning management system) Moodle developed by our research team. These courses were designed by our team in national language, Ukrainian. All courses included: **syllabus** – program contents of the discipline covered in mathematics curriculum; **tutorial slide lectures**, followed by exercises that can be performed online, in which the student automatically receives the quantitative results, the feedback for each question and a proposal for a comprehensive solution; **e-lectures** with links for downloading; **diagnostic tests** – with several levels, that can be done online; **links to external webpages** with mathematical

resources that explore the different contents in mathematics; additional tasks (so-called "extraproblems") for gifted students; **online quizzes and surveys** (a set of multiple choice tests, true/false and matching); **depository of students' scientific projects; discussion forum panel** [3].

At the beginning of the blended learning course, the class met face-to-face in the computer lab to take part in general induction activities on the moodle course, such as navigating, accessing resources, creating forum posts, charting in online consultation module, taking part in interactive mathematical games etc.

Several results of the study. The test procedure of the experiment consisted of 5 parts. We also used electronic survey designed with applying the tool Google form. At the beginning of the study we conducted pre-tests: subject competencies test (for six disciplines), digital literacy test and several intellectual tests (intellectual lability, ambition test). Validity and reliability of these tests were proven. According to t-test, the difference between experimental group and control group was not statistically significant in pre-test and intellectual tests.

During the study we offered to experimental group students some questionnaires ("My motivation", "Some feathers of using of moodle course" etc.) Students were required to indicate on a five-point scale their opinion towards various statements about the experiment. Students were generally positive to both the experiment setup and the associated learning experience.

At the end of the study we offered: post-math test (subject competencies test and Digital Literacy test), questionnaires ("My outcomes of the course"), Interviewing ("Alumni Job placement" after graduation). At the end of each mathematical course after exam, an anonymous survey was given to students.

Students of experimental group had *demonstrated higher results* of outcomes than control group. According to t-test, the difference

between experimental group and control group was statistically significant in 4 (Analytical Geometry, Differential Geometry, Methodology of Teaching Mathematics, History of Mathematics) of 6 courses at 0,05 level of significance. Compared to the control group, experimental group achieved higher results in Digital Literacy Post-Test: more than 20 % had the highest level – expert, 28% – high level, 36 % – moderate level, and only 2 students had basic level. According to t-test, the difference between experimental group and control group was statistically significant at 0,1 level of significance.

We obtained interesting results of interviewing ("Alumni Job placement" after graduation) in 2020. Analysis of students' job placement shown, that more than third part of experimental group practice their profession (as mathematician in research institution (1), as teacher of mathematics and computer science (4)), in control group there are only 25% students work in field of mathematics. Additionally, 43% of experimental group and 38% of control group work in related occupation (as business and financial analyst, developer of mobile apps, software engineer), and only one student of experimental group as well as control group decided to continue study in post-graduate program.

Conclusions. The implementing of interactive teaching tools supporting blended learning encourages both students and professors to rethink how learners learn and professors teach. Of course, our research is not without limitations. Firstly, the sample size of this study is not big. Secondly, it will be more ideal if a comparison can be made between a group taught all mathematics disciplines by our methodology, and another group by traditional teaching. However, this calls for a different experimental design and is out of the scope of this research. In conclusion, I would like to say that our experience demonstrate that such new learning environment can facilitate a professional competencies development of mathematicians,

including, competence with IT and increase students' motivation for learning the discipline.

Bibliography:

1. Губар Д. Є. Методика створення і застосування інтерактивних засобів навчання студентів класичного університету аналітичної геометрії : автореф. дис. … канд. пед. наук : 13.00.02. Черкаси, 2014. 20 с.

2. Жарких Ю., Лисоченко С., Сусь Б., Третяк О. Комп'ютерні технології в освіті : навч. посібн. Київ : Видавничо-поліграфічний центр «Київський університет», 2012. 239 с.

3. Losyeva N., Termenzhy D. Distance technologies in action: E-learning in exile (the experience of Donetsk National University, Ukraine). URL: http://p3.usal.edu.ar/index.php/supsignosead/issue/current

4. Losyeva N., Termenzhy D. *Blended learning in action: up-to-date teaching mathematics*. X International GUIDE Conference «Optimizing Higher Education for the Professional Student: A balance of flexibility, quality and cultural sensitivity». Vienna, Austria. 2015. P. 35.

5. Termenzhy D, Losyeva N. Prospect of implementing a blended learning of mathematics in higher education: a case study of Vasyl Stus Donetsk National University. International Conference on mathematics, informatics and informational technologies (MITI-2018). April 19-21, 2018. Balti, Moldova. P. 215–217.

6. Termenzhy D. Interactive teaching tools and mathematical student competency: Pedagogical experiment in higher mathematics courses teaching. Book of Abstracts. 8th European Congress of Mathematics. 20–26 June 2021. Portorož, Slovenia. P. 410.