

Application of European Experience in Managerial Innovations in Shaping the Educational Process

Liudmyla Mialkovska ¹, Oksana Maiboroda ², Nataliia Koretska ³, Yaroslava Martyniuk ²,
Olena Haponchuk ², Liudmyla Korobchuk ⁴

¹Foreign and Ukrainian Philology Department, Faculty of Digital Educational and Social Technologies,
Lutsk National Technical University, Lvivska street 75, Lutsk, 43018, Ukraine.

²Department of Social and Humanitarian Technologies, Faculty of Digital Educational and Social Technologies,
Lutsk National Technical University, Lvivska street 75, Lutsk, 43018, Ukraine.

³Department of Management, Faculty of Business and Law, Lutsk National Technical University,
Lvivska street 75, Lutsk, 43018, Ukraine.

⁴Department of Ecology, Faculty of Agricultural Technologies and Ecology, Lutsk National Technical University,
Lvivska street 75, Lutsk, 43018, Ukraine.

Corresponding author: l.myalkovska@lutsk-ntu.com.ua

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Abstract: In the era of globalization, the educational process increasingly requires the integration of innovations driven by technological progress and socio-economic changes in the management and organization of education. The adaptation of digital technologies to educational programs has become a crucial element of this transformation. Communication skills now represent an essential component of the learning process. In the context of widespread digitalization, it is vital to develop new educational goals and objectives that enhance competence, flexibility, and adaptability among students and teachers. Consequently, the study of modern information technologies in educational management, particularly through the lens of European experience, is highly relevant for improving educational practices, increasing institutional competitiveness, and ensuring the quality of teaching in the digital age. The purpose of this study is to analyze the implementation of innovative approaches to managing the educational process based on European experience. Special attention is given to the impact of digital technologies, personalized learning programs, and collaboration skills on the overall effectiveness of education. The study employs commonly accepted methods of analysis, systematization, and generalization. The effectiveness of educational tasks was assessed using expert evaluations in two groups: teachers ($n = 15$) and students ($n = 15$). To verify the objectivity of grading, the JASP software package was used, applying the Bayes factor paired t-test, logistic analysis, and stability testing of Bayes factors. Correlation analysis revealed significant relationships between access to individual learning resources ($r = 0.57$, $p = 0.043$), success in online learning ($r = -0.45$, $p = 0.123$), and motivation to use learning methods ($r = 0.43$, $p = 0.129$). The verification of expert assessments confirms that the proper implementation of managerial functions and digital tasks effectively promotes digital skills among both teachers and students. To further enhance the educational process, it is essential to integrate digital technologies, develop personalized learning environments, and strengthen motivation and adaptability—especially under conditions of distance education.

Keywords: change management, digital communications, ecological culture, education, learning, management of educational institutions

Introduction

Modern education is significantly influenced by all aspects of modern information technologies and computer software [1]. New challenges, such as COVID-19, have brought significant changes to online education and the use of innovations in the educational process. The online education market in 2023 is estimated at almost \$13 million. And is expected to grow to almost \$22 million in the next 5 years. In addition, the number of users of online education is growing, which has almost doubled in the last 5 years [2]. Because online education is gaining

momentum, it is relevant to spread digital literacy in the use of digital technologies and programs (Zoom, MathCAD, Google Classroom, Google Meet, Moodle, WordPad, etc.), which improve various forms of classes and approaches to learning, and it is also necessary to use online courses to increase the digital literacy of both teachers and students [3-5].

Therefore, it is extremely important to use digitalization in the modern educational process, which transforms modern education management and adapts the education system to the sustainable development program by increasing the efficiency of the educational process and the adaptability of the education system to current challenges. Also, an innovative approach to the management of educational institutions involves the involvement of all parties to the educational process in decision-making, which promotes openness and cooperation and improves the quality of educational services [6]. Therefore, it is extremely important to influence the strategy of educational management in accordance with modern challenges and support innovative teaching methods.

This article aimed to study innovative approaches in modern management of the educational process based on European experience. The tasks include studying the inclusion of digital interactive technologies, personalized and adaptive curricula, and the skills of collaboration in the modern educational process. The study also examines the best practices of European countries for the digitalization of the educational process in the context of modern feedback.

Literature Review

The European Union comprehensively promotes the development of digital education and tries to improve the digitalization skills of its citizens. The Action Plan on Digital Education includes comprehensive digitalization skills and improving education to create a highly productive ecosystem and transform education from this perspective [7]. Therefore, when modeling the digital process in the European Union, special attention is paid to the digitalization of education and careful planning of the educational process and the development of digital potential, environmental awareness of participants in the educational process, high-quality educational content on the fullness of digital technologies in the educational process, and emphasis on the importance of the use of digital technologies and networking in the modern educational process [8-11]. This draws attention to the fact that the application of modern digital technologies is extremely important in planning and managing the educational process.

As educational institutions in Europe become digital, teachers need to master modern digital education skills to provide teaching at the appropriate level, which will allow them to engage students in the educational process using modern digital technologies, as well as create open programs and projects according to modern trends, which is very important in the face of modern challenges [12-14]. Project-based learning is important in developing leadership, teamwork, and communication skills, which are important characteristics of students' professional growth [15, 16]. The use of these methods also contributes to the development of problem-solving and critical thinking skills during the learning process and also creates a positive classroom atmosphere for achieving educational goals [17, 18].

The use of massive open online courses is very important for the digitalization of the educational process, contributing to the improvement of the quality of teaching by teachers and facilitating the perception of educational material by students [19]. Digitalization studies indicate that many countries have now created platforms for massive open online courses. The most common online platforms are Coursera and EdX, founded in the USA; FutureLearn, launched in the UK; OpenSAP and Iversity, developed in Germany; and the Australian platform Open Learning [20]. Studies also show the importance of using multimedia tools, interactive whiteboards, textbooks, and virtual laboratories. The integration of these technologies into the educational process ensures an improvement in the quality and sustainability of modern education. There is also a need to identify the needs for providing modern means of digitalization in modern conditions of the educational process [21]. Therefore, the modern educational environment requires new approaches to providing technical means in the face of strategic challenges, which must ensure a sufficient speed of transformation, as well as individualization and continuity of the educational process.

Research Methods

The primary objectives of the educational process and the methods of educational management that are suitable for use in the modern educational process in challenging conditions were identified through the application of literature analysis methods, generalization, and systematization as part of this investigation. A survey was conducted of two groups of respondents: teachers (n=15) (Group 1) and students (n=15) (Group 2). The assessment was carried out by the school from 0 to 10, where 0 is the lowest score and 10 is the highest. Using the JASP program, a correlation analysis was conducted to evaluate the efficacy of contemporary management in the implementation of innovative educational methodologies. The JASP program's functionality, which encompassed the Bayes factor paired t-test,

logical-logistic analysis, and stability testing of Bayes factors, was employed to ensure the objectivity of the assigned grades.

Results

The educational process is constantly faced with challenges that require flexibility and adaptation. Studying methods that allow adapting educational programs to modern challenges is a complex and very relevant task. The use of the latest programs and the provision of modern technologies are extremely important tasks for assessing the effectiveness of these changes in the management of the educational process. Educational digital technologies provide new opportunities for personalization, globalization, and accessibility to the educational process. It is also important to note that some methods are provided to complement the teacher and not to replace their role. The main role of these technologies is manageability, adaptability, interactivity, and better interaction between participants in the educational process [22, 23]. Such educational technologies free up the teacher's time for better interaction with students, communication, and a personalized approach to each student. They also allow for rapid feedback, which allows for fairly rapid adjustments to the learning process. The latest educational technologies open up new horizons for teachers and students to better understand knowledge in the educational process [24].

Educational and management goals were organized to assess the achievement of management tasks when using modern technologies as tools in the educational process based on a literature review. The assessment was conducted with the aim of assessing two groups: teachers of higher education institutions (n=15), Group 1, and full-time students (n=15), Group 2, to implement management decisions when modeling the educational process.

The first stage of the study included conducting a Pearson correlation analysis between the assessments of the achievement of management decisions in the educational process between teachers and students. Table 1 presents the correlation matrix of the studied processes.

Table 1. Correlation of Modern Educational Management Tasks in Process Modelling

Area	Task	Planning r	p	Setup r	p	Motivati on r	p	Cont rol r	p
Techno logy	Plan digital tech use	0.764	<0.001	-0.052	0.85 3	0.290	0.295	- 0.310	0.261
Teamw ork	Plan teamwork activities	-0.258	0.353	0.062	0.82 7	0.411	0.128	0.700	0.004
Persona l	Plan individual programs	-0.016	0.954	0.532	0.04 1	0.172	0.540	0.654	0.008
Online	Plan online courses	0.299	0.278	-0.060	0.83 3	-0.189	0.500	- 0.415	0.124

Source: compiled by the authors

Implementing collective learning methods, motivation ($r=0.43$, $p=0.129$), students' academic results control in the online format ($r=-0.45$, $p=0.123$), and access to individual learning resources organization for students and teachers ($r=0.57$, $p=0.043$). The study looked at how management functions relate to educational goals.

Some results showed strong links. Planning digital technologies ($r=0.76$, $p=0.001$), controlling group projects ($r=-0.71$, $p=0.003$), and checking the success of students ($r=0.65$, $p=0.008$) had high values. But p-values over 0.05 mean these links are not steady.

Other results showed moderate links. Planning teamwork ($r=0.26$, $p=0.353$), making plans for online courses ($r = 0.3$, $p = 0.28$), motivating digital use ($r=0.29$, $p=0.295$), and checking how digital tools work ($r=0.31$, $p=0.261$). Organizing group work ($r=0.06$, $p=0.827$), teamwork planning ($r=0.03$, $p=0.95$), access to digital platforms ($r=0.05$, $p=0.853$), and distance learning ($r=0.07$, $p=0.83$).

The experts' responses were found to be divergent, so another analysis was conducted to identify the goals and opportunities for educational management. The Bayesian paired t-test was used [25-28]. Table 2 shows the results of this analysis.

Table 2. Evaluation of the Education System Using a Bayesian T-Test

Measure 1	Measure 2	BF ₀	Error	p-value
C1	F1	0.21	0.01	<0.05
C5	F2	0.49	0.00	<0.001
C9	F3	0.07	0.00	<0.01
C13	F4	0.34	0.00	<0.001
C2	F5	0.11	0.00	<0.01
C6	F6	0.19	0.00	<0.01
C10	F7	0.05	0.01	<0.05
C14	F8	0.20	0.01	<0.01
C3	F9	4.19	0.00	<0.001
C7	F10	2.39	0.00	<0.001
C11	F11	0.08	0.08	<0.05
C15	F12	2.15	0.00	<0.001
C4	F13	0.32	0.00	<0.001
C8	F14	8.83	0.00	<0.001
C12	F15	0.06	0.14	<0.05
C16	F16	0.39	0.00	<0.001

Source: compiled by the authors

It was found that both groups similarly assessed the educational management tasks. These included motivation for active use of digital technologies, as well as several related indicators. It was also found that the implementation of the tasks was effective, and the opinions of the experts were stable.

A good agreement was also observed for planning activities to develop collaborative skills, integrating online courses, developing strategic plans, and controlling students' academic results in the online study. It was also found that the two study groups considered these tasks to be completed effectively.

However, some indicators showed clear differences between the two groups. These included planning individual educational plans, programs, and courses; organizing access to resources for teachers and students' individual learning; and controlling the success of students, considering plans.

Smaller differences were also found for other indicators, showing that this aspect is important for both expert groups but not fully agreed upon.

To understand these differences better, a detailed analysis was carried out for the three indicators with the biggest gaps between expert evaluations: planning educational plans and programs (Figure 1), organization of resource access for students and teachers' individual learning (Figure 2), and control of successful students considering the plans (Figure 3). For this purpose, inferential plots were created using JASP [27].

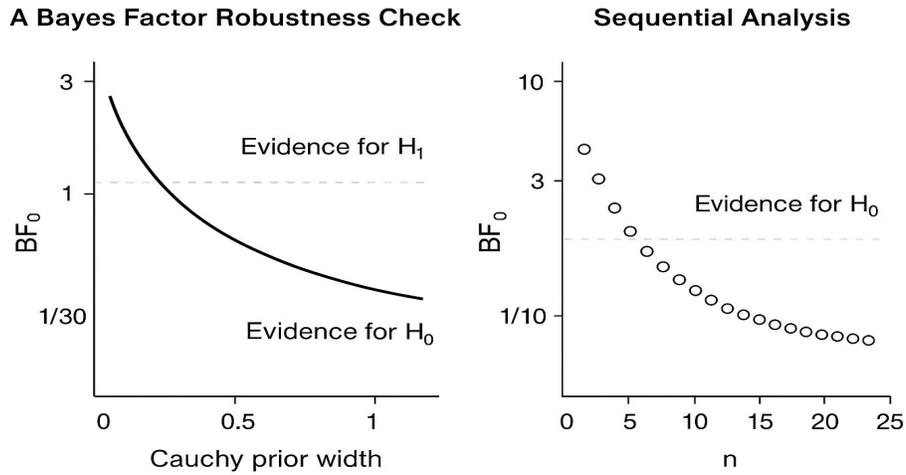


Figure 1. Charts Showing Results for "Planning of Study Programs and Courses"
Source: compiled by the authors

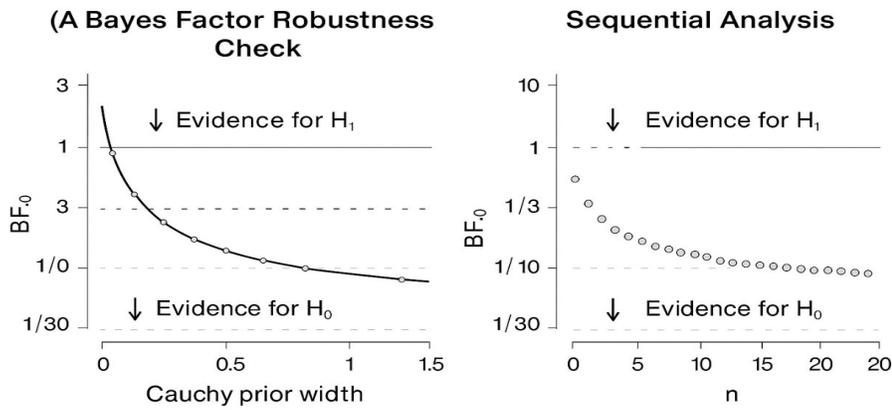


Figure 2. Charts Showing Results for "Access to Learning Resources for Students and Teachers"
Source: compiled by the authors

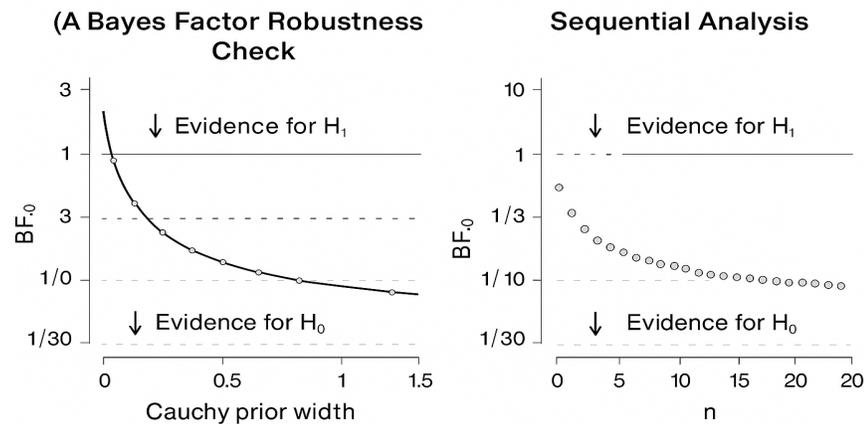


Figure 3. Charts Showing Results for "Checking Students' Progress by Their Individual Plans"
Source: compiled by the authors

The t-test showed that experts had different opinions about planning individual educational plans, programs, and courses. But the inferential plot shows that there is no real difference, so the evaluations of this task are similar.

Table 3. Stability Check of the Bayes Factor – Descriptive Statistics

Group	N	Mean	SD	95% CI
C1	15	6.2	2.0	5.3–7.1
F1	15	5.7	2.5	4.6–6.9
C5	15	5.3	1.9	4.5–6.1
F2	15	5.8	2.3	4.8–6.7
C9	15	7.3	2.6	6.1–8.4
F3	15	6.1	2.7	5.0–7.2
C13	15	5.4	2.2	4.4–6.3
F4	15	6.0	2.4	5.0–7.1
C2	15	6.4	1.9	5.7–7.2
F5	15	5.6	2.1	4.7–6.5
C6	15	5.0	1.8	4.2–5.8
F6	15	5.2	2.0	4.3–6.1
C10	15	6.8	2.7	5.6–8.0
F7	15	5.3	2.5	4.2–6.4
C14	15	5.9	1.8	5.2–6.7
F8	15	5.7	1.9	4.9–6.5
C3	15	5.6	2.3	4.6–6.7
F9	15	6.6	2.6	5.5–7.7
C7	15	5.1	2.0	4.2–6.0
F10	15	6.3	2.7	5.1–7.4
C11	15	6.7	2.4	5.6–7.7

F11	15	6.2	2.8	50–77.3
C15	15	5.8	2.1	4.9–6.7
F12	15	6.8	2.5	5.7–7.9
C4	15	5.5	1.9	47–66.4
F13	15	6.0	2.4	5.0–7.0
C8	15	4.9	2.3	3.9–5.8
F14	15	6.2	2.5	51–77.3
C12	15	7.0	2.4	6.0–8.0
F15	15	5.7	2.8	4.5–6.9
C16	15	5.5	2.2	46–66.5
F16	15	6.1	2.5	5.1–7.1

Source: compiled by the authors

The inferential plot results show that organizing access to resources for students and teachers' individual learning also has no big differences. This means the two groups of experts mostly agree in their assessments.

No significant differences were found between the verification of student performance and plans. This means that the experts agreed with modern management goals and their effectiveness. This indicates that the experts' assessment can be trusted.

At the next stage of the study, it was found that some tasks elicited similar expert assessments. These are planning activities to develop teamwork skills, organizing space for group work, digital platforms, as well as distance learning. This indicates the stability and accuracy of the data measurement.

Other tasks showed a less uniform result, but this does not reduce their accuracy. The results indicate that good performance of tasks helps both students and teachers to acquire good digital skills.

Conclusion

When analyzing the results of the study, it was found that planning significantly impacts the implementation of management tasks in the educational process, and control and organization have a less significant impact. Planning is also necessary for the control and organization of the educational process. Higher education institutions need resources, control of student performance, and careful planning for personalized access to education. Also, adaptation to online learning requires careful planning to obtain better results. It should also be noted that planning, control, and motivation are essential in managing the educational process.

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