Challenges and Prospects of Technology-Enhanced Teaching and Learning in Georgian Higher Education Institutions

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Abstract
The study is based on the analysis of outcomes of the Erasmus+ Project DITECH: Developing and Implementing Technology-Enhanced Teaching and Learning at Georgian HEIs (2021-2024). 7 state universities of Georgia were involved in the project, the start of which coincided with Covid-19, thus making its objectives even more pressing and topical. The challenges that Georgian HEIs faced included: lack of students' technological skills in using digital tools in learning; lack of skills and competences of academic staff in designing online courses; lack of appropriate infrastructure and software to design and implement online teaching and learning; lack of appropriate professional development trainings in technology-enhanced teaching approaches and methods. The aim of this study is to explore the impact of applying various digital tools and online resources on learning and teaching, as well as to learn about students' and teachers' perceptions of the challenges and prospects of using educational technology in academic environment. The research data is based on the analysis of students' and teachers' feedback on course pilots within the DITECH project. 297 students (BA-209; MA-88) and 137 professors/teachers from 7 universities participated in the survey. The survey with online semi-structured questionnaires and teachers' self-assessment questionnaires have been used as research tools. The findings have revealed significant changes in teaching and learning practices. The study offers a number of recommendations that, potentially, can support higher education institutions in Georgia in enhancing the quality of education at large.

Keywords: Technology-Enhanced Teaching and Learning, Higher Education Institutions (HEIs), Educational Technology

Introduction: Research Background

Skills needed to be successful in the contemporary world have changed. In this context, the use of technology is fundamental in each of the 21st-century skills frameworks (González-Salamanca, et al., 2020).

Access to technological devices is not enough for students to develop their skills or improve their learning, or to lead teachers to change their practices (Roig-Vila, R., et al., 2015; Ruggiero, D. et al., 2015; Pineida, F. et al., 2011). It needs to be used with purpose, however, there are obstacles that prevent it, such as lack of resources, training, or support, and teachers' beliefs and attitudes (Ruggiero, D. et al., 2015).

The issue of integrating technology into education in general, and into teacher education programs in particular, is still pressing and much debatable worldwide (Petriashili, I., 2012). Why is a special emphasis placed on teacher education programs? The answer is simple: the success of any educational system greatly depends on the degree of qualification of future teachers (Petriashili, I., 2012).

Training of teachers in using ICT becomes really important, in order to increase their skills and knowledge, leading them to use emerging pedagogical models, to understand the importance of ICT in education, and to acquire the confidence and skills to create interactive, engaging, and personalized learning environments (Willis, R. et al., 2019).

The current study is based on the analysis of outcomes of the Erasmus+ Project DITECH: Developing and Implementing Technology-Enhanced Teaching and Learning at Georgian HEIs, 2021-2024 (https://www.ditech-erasmus.eu), the start of which coincided with Covid-19, thus making its objectives even more pressing and topical. The global COVID-19 pandemic has increased the demand for remote working technologies in the education sector, especially due to the emergence of new viable virtual and hybrid learning models that combine in-person classroom learning with remote learning from home (Davey, 2021; Keller et al., 2021; Khadri, 2021). Next to the more common forms like video and audio conference calls, Telepresence Robots (TPRs) are becoming more popular (Davey, 2021; Keller et al., 2021). The study *"Higher Education Personnel's Perceptions about Telepresence Robots"* (Leoste, J. et al., 2022) was also conducted within the Erasmus+ Project DITECH.

Implementing emerging technologies effectively is a difficult task when people lack related knowledge, skills and readiness to apply them, or have sceptical and negative attitudes towards technology (Leoste et al., 2021a). Convincing teachers to accept and adopt novel technologies requires good understanding about introduction of technologies to teachers, teachers' technological frames, gathering their feedback, and constructing an implementation plan that considers their needs (Leoste et al., 2021b; Spieth et al., 2021).

Prior to preparing the proposal for Erasmus+ CBHE project the needs analysis was conducted on the use of educational technology in 7 state universities of Georgia which offer teacher education programs. The challenges that Georgian HEIs faced included: a lack of students' technological skills in using digital tools in learning; a lack of skills and competencies of academic staff in designing online courses; a lack of appropriate infrastructure and software to design and implement online teaching and learning; lack of appropriate professional development trainings in technology-enhanced teaching approaches and methods.

Research Design: Methods and Instruments

This study aims to explore the impact of applying various digital tools and online resources on learning and teaching, as well as to learn about students' and teachers' perceptions of the challenges and prospects of using educational technology in an academic environment.

Within the framework of the DITECH project, two courses were piloted during the 2022-2023 academic year:
- BA course - Basics of Applying Digital Instructional Tools in New Learning Environment;
- MA course - Applying Educational Technology in Learning and Teaching.

The main target groups are the students of the Integrated (BA+MA) Educational Program of Primary Education Teacher Preparation (300 ECTS); Teacher Preparation Certificate Program (60 ECTS); MA Program in Education Sciences; and faculty members (professors/teachers) in 7 Georgian partner universities.

Both courses were delivered in a hybrid/blended mode: in the classroom and online on the MOODLE platform.

Methods of quantitative and qualitative data analysis were used within the research:
- Students' survey with closed and open-ended online Google forms questionnaires (6 sections with N=30 close and N=10 open questions);
- Teachers' feedback on the piloted courses with online Google forms questionnaires (N=8 close and N=10 open);
- Analysis of teachers' self-assessment questionnaires (General information and N=4 open questions).

Data Analysis

7 state universities of Georgia were involved in the project (Ivane Javakhishvili Tbilisi State University (TSU), Ilia State University (ISU), Samtskhe-Javakheti State University (SJSU), Sokhumi State University (SSU), Batumi Shota Rustaveli State University (BSU), Akaki Tsereteli State University (ATSU), Iakob Gogebashvili Telavi State University (TeSaU).

The universities piloted two innovative courses prepared within the framework of the project with the help of European partners. The students of the integrated (BA+MA) Educational Program of Primary Education Teacher Preparation (N=297) from the above seven universities participated in the research, including BA students (N=209) and MA students (N=88).

The survey was also conducted with the faculty members of the above universities (N=137), who participated in the professional development training workshops on Educational technologies, and with the professors/teachers (N=17), who piloted these courses (See Figure1).
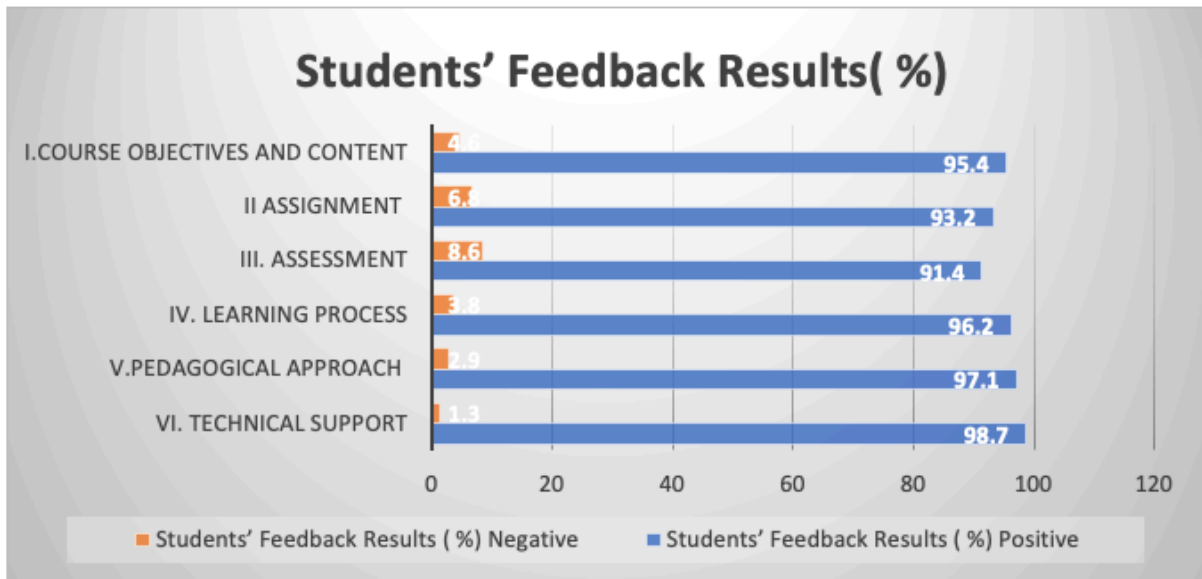
Figure 1: Number of Participants in the Survey

The research data was analyzed within the quantitative and qualitative methods framework: the surveys with closed questions were analyzed by using a 5-component Likert scale and analysis of teachers' self-assessments with selected respondents have been used as research tools.

a) Analysis of Students' Feedback

The questionnaire consisted of six sections: Course objectives and content, Assignments, Assessment, Learning process, Pedagogical approach, and Technical support (see Figure 2).
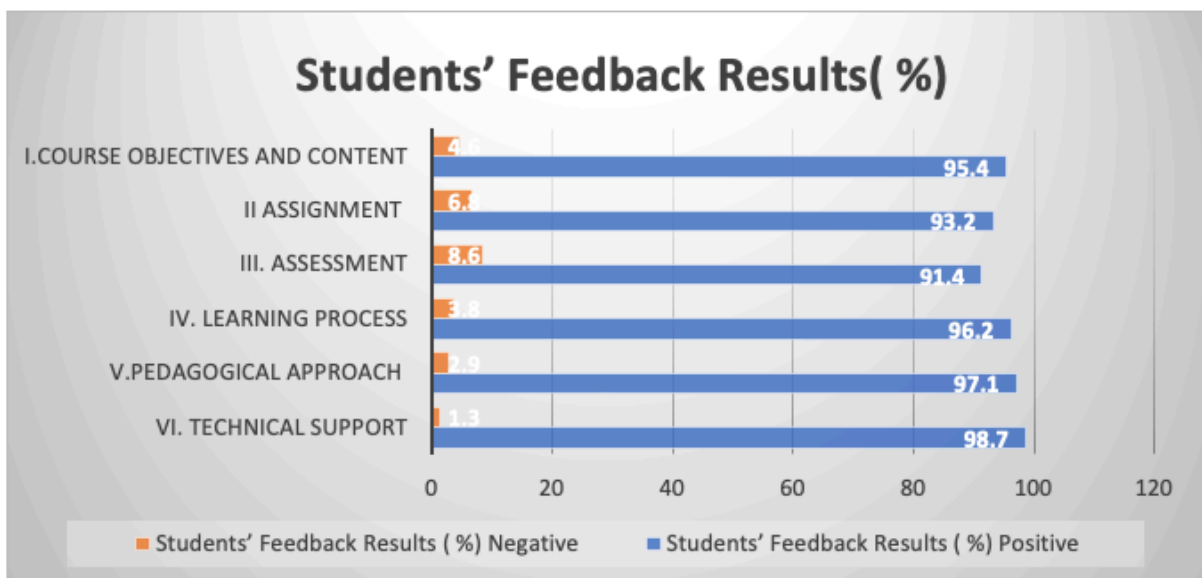

Figure 2: Students' Feedback Results

In each section, in the process of analysis, thematically similar, positive and negative responses were grouped. When summarizing, it was found that in the Course objectives and content section, 95.4% of the participants agree and 4.6% disagree with the following statements:

The Course objectives were clearly stated; The topics presented were relevant; The Course materials were accurate, containing no mistakes; The course materials were developed at a high level; The course was interesting and fun and easy to follow; The course study guide was clear, well structured, and contained sufficient information and support for learning; My expectations were met.

Students expressed the following opinion in the part of the assessment of the tasks given within the course: 93.2% of the participants agreed and 6.8% disagreed with the following statements: *The assignments were of moderate difficulty, corresponding to the course; The assignments matched the content of the course, the number of assignments in the course was acceptable; The time allocated for the assignments was reasonable.*

Also, a high positive evaluation was reported by students in terms of student evaluation during the course. 91.4% of the participants agree and 8.6% disagree with the following statements: *There was enough assessment during the course; The assessment was a useful learning experience.* The Students particularly singled out formative assessment tools and noted that their use in the learning process developed interpersonal skills.

Interesting feedback was provided by students on the learning process and pedagogical approaches:

Communication and collaboration were intensive during the course; Learning activities were engaging and meaningful; Listeners were encouraged to actively participate in the learning process during the Course; The deadlines were set reasonably, The timeframe was appropriate for the Course The pedagogical goals of the Course were clearly defined; The learning activities were designed to make use of different ways of learning; The different learning styles were supported; The learning activities were designed to make use of the prior experiences of learners; The virtual learning environment was well-structured; The learning environment was aesthetically pleasant and environment was user-friendly.

97.1% of 297 students (N=288) gave positive feedback on these questions, while only 2.9% (N=9) of students gave negative feedback.

It should be noted that within the framework of the Erasmus+ project DITECH, the most up-to-date technical equipment, online software and platforms were purchased for each partner university, which had a positive impact on conducting interactive lectures. Satisfaction with technical support is confirmed by the fact that 98.7% of the participants agree with the following statements*: I did not need any technical support during the course; Technical support was fast and professional.*

b) Analysis of the Faculty Members' Feedback

Based on the needs analysis, professional development training workshops were held for the academic staff of the partner universities (N=137) on: Technology-Enhanced Teaching and Learning. The analysis is based on the evaluation of professors'/teachers' feedback survey with open and closed questions (Figure 3).
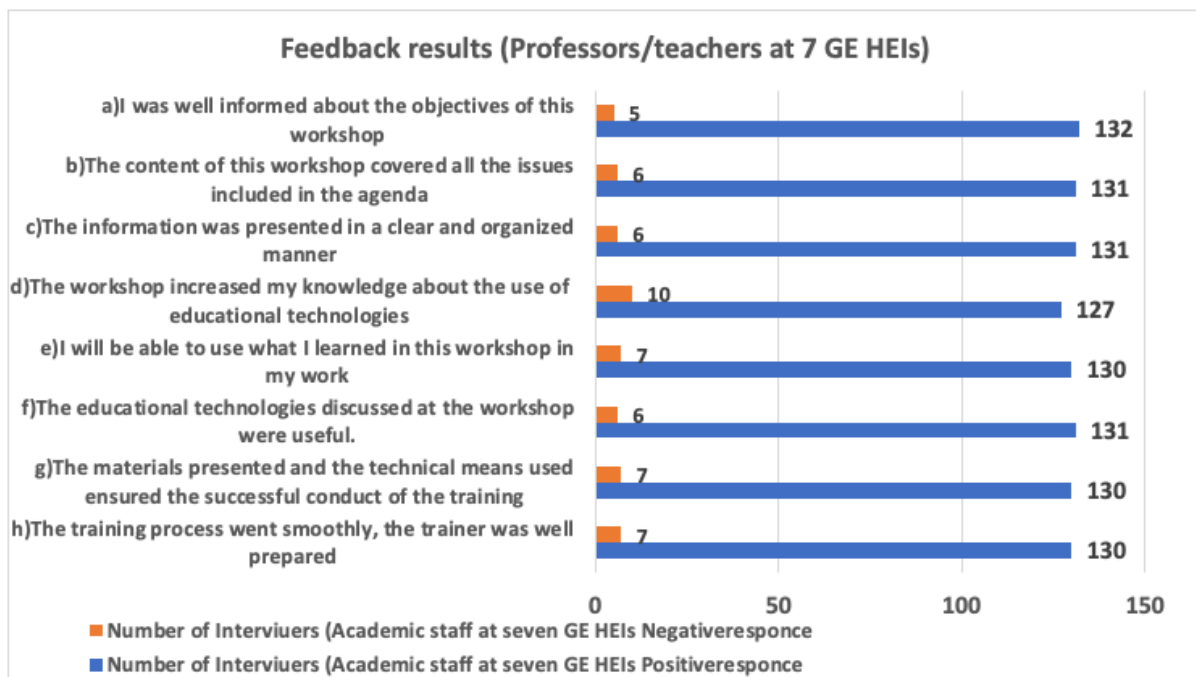
Figure 3: Professors'/Teachers' Feedback Results

8 closed and 12 open questions were prepared to assess the academic staff's evaluation of the training workshops. Likert scale was used for the analysis of the closed questions, where positive and negative responses were grouped. As can be seen from the diagram, in almost all the answers to the closed questions, positive evaluations are higher than negative ones and it is on average 95% (N=130), while negative evaluations are only 5% (N=7).

Open-ended questions also revealed that the training workshop had a positive impact on improving staff skills. Here are some citations from the professors'/teachers' responses to the question: "What had a positive effect on the change of your attitude towards the use of educational technologies after completing the course?":

> *The training modules have equipped me with diverse strategies for motivating students, a valuable asset that I intend to apply in my future classes; The workshops proved to be both engaging and enlightening, with learning materials that were readily accessible and comprehensible; The training modules significantly influenced my professional trajectory by enabling me to introduce modern educational web portals to my fellow teachers. This initiative has contributed to diversifying our teaching approaches and enhancing the overall learning experience.*

Among the new digital tools learned during the workshops, teachers mentioned: Camtasia, Snagit, ThingLink, Mindomo, H5P, Padlet, Panopto, Canva, Jamboard, Quizizz.

The participants' responses to the question: „What was the main value of the training modules? " were also noteworthy. Most of them positively evaluated topics selected for the training modules. They were particularly impressed by the variety and usefulness of modern platforms and software to be used in the learning process, which they got familiar with through the training; the need for more training workshops and accessibility to modern resources was also highlighted.

c) Analysis of Professors'/Teachers' Self-Assessments

Apart from the survey of feedback of teachers piloting the BA and MA courses, their self-assessments were analyzed covering the period of the academic year 2022-2023. Self-assessment was provided by 17 teachers from 7 Georgian universities (TSU, ISU, SJSU, TeSaU, SSU, BSU, ATSU).

In addition to general questions (the names of the piloted courses, the time of the pilots, target population of the courses), the self-assessment questionnaire included 6 questions. Responses to the following questions were considered relevant for the analyses in the current study:
- Why is this course relevant for the target population?
- Describe possible limitations and obstacles found and how you are going to address them in the next phase;
- Describe modifications or upgrades you will perform;
- Summarize the main results of the student assessment of your course.

Reflecting on the relevance of the courses for the target population, i.e., BA and MA students, teachers mentioned, that:

> *"They learn about online learning, using digital skills for their specific professional needs in their future careers; they have ability to use the new tools in learning and teaching process, ... analyze the challenges of online learning and search for appropriate solutions."* (TSU)

> *"It responded to "what", "why" and "how" questions of online learning and introduced digital tools for fulfilling this mode of teaching; as future teachers they enhance their skills and knowledge to implement the elements of online learning in their practice."* (ISU)

> *"The use of modern interactive virtual content tools and new methods of engaging students and pupils in the learning process; as mostly our graduates are employed in schools, colleges, and universities, the course is directly related to the modern challenges of online education; the target group acquires valuable knowledge and skills needed to effectively integrate technology into their teaching practice so that students have the opportunity to share interesting and interactive learning experiences."* (SJSU)

> *"Exposure to e-learning technologies, digital tools, and innovative assessment mechanisms; the electronic platforms and e-learning tools extensively studied within the course equip these aspiring teachers with resources for the seamless implementation of diverse teaching activities."* (SSU)

> *"...It is of great importance to get to know various ways of incorporating collaborative digital platforms into lessons to make teaching/learning interactive, engaging, and motivating for learners."* (BSU)

> *"This course will prepare current teachers with required competencies in educational technology."* (TeSaU)

Another question answered by teachers was to describe possible limitations and obstacles found and the ways of addressing them. The following common limitations and challenges were emphasized by almost all the teachers:

- Attendance problem for working students: they would rather have the fully online course, but according to the Georgian Law, it is not allowed to have fully online courses;
- Not all students have the same learning needs: some students may have some knowledge of the topic, while others may be completely new to it;
- Technical issues, e.g., availability of the fully-equipped classroom with sufficient number of computers connected to the internet, and a projector/smartboard;
- challenges with online platforms or tools used for course delivery;
- Inability of students to install paid platforms on their personal devices: due to a limited number of paid platform licenses within the program students were not able to have individual licenses;
- Some teachers (SJSU, SSU, BSU, TeSaU) mention the limited lecture time, which is insufficient to cover the material and do the practical tasks.

The above limitations mostly can be dealt with at an institutional level. However, students' different learning needs and different levels of digital competence can be addressed by teachers themselves by offering diverse material, using peer-teaching, etc.

Teachers were also asked to reflect on modifications or upgrades they would perform. One of the teachers (TSU) indicated that *"she would update the reading material - to increase the practical part and edit the Reader so that its content and volume of weekly reading material was more learnable/comprehensible by students."*

Several teachers (BSU, TeSaU) would increase the practical part in their syllabi. They wrote that *"it would be better to generalize the theoretical part according to the specific lecture topic." "More lecture time should be devoted to practical tasks to work on adapting the syllabus to increase the timing for teaching each e-tool."*

Lastly, the teachers were asked to summarize the main results of the students' evaluation of the course. Based on their students' feedback, all of the teachers mentioned that students' assessments were generally positive. Here are some highlights from teachers' responses:

> *"The majority of students noted that they deepened their knowledge about educational technologies, the course was well structured and organized, the objectives of the course were clear, and the learning materials were relevant and useful. Students also mentioned that after completing the course, they became interested in digital tools and resources, and the course provided them with important skills."* (TSU)

> *"As the technology advances, new digital tools and applications emerge rapidly. So, the course needs to be continuously updated to keep track of the most recent tools and their application in education. As an immediate example, AI and chat GPT need to be addressed in the upcoming years."* (ISU)

> *"The majority of students identified the main merits of the course as a novelty and a discovery for them; the students deepened their already existing knowledge about educational technologies and got a lot of new information, developed new skills. They*

think that the course was relevant, necessary, well organized, and, most importantly, the latest trends were transferred from the practice of European universities." (SJSU)
The course is considerably time-intensive, yet highly informative, though accompanied by certain challenges primarily stemming from the relatively modest proficiency in computer skills among some participants; their interest in digital tools and resources increased; the objectives of the course were clear and the assignments reflected the topics presented in the syllabus; the course helped them develop important skills." (SSU)

"The course appeared relevant, up-to-date, and valuable experience for future teachers; The studied educational tools are already successfully used by students (or are going to be used) in the educational field." (BSU)

"The course enhanced the knowledge about educational technologies, increased the interest in digital tools and resources and encouraged them for the active participation in all offered activities." (TeSaU)

Research Findings and Conclusions

As a result of the research, the following findings became evident:
- Evaluation of Training Workshops and Course Pilots by professors/teachers and students respectively were extremely positive. Clear goals, relevant content, and good organization were pointed out as significant strengths. According to the research participants, tutorials offered within the course provided an excellent opportunity to familiarize and be exposed to various educational technology tools, learning resources, mechanisms and techniques of their usage.
- The research participants' responses underline their enthusiasm to embrace technology-enhanced teaching and learning methods. This collective commitment to leveraging electronic resources promises to enrich the teaching and learning landscape with innovation and interactivity.
- As a result of the study were also identified challenges which were mainly related to the academic staff's lack of technology-enhanced teaching skills, especially in regional universities, thus prompting the need for more practical work and activities. Some challenges were associated with technical problems. Consequently, in their feedback, the participants asked for additional training workshops with more time allocated for individual practice.

Overall, the results of the study revealed the importance of enhancing digital competencies among students and teachers in Georgian universities. However, the training modules and piloted courses considerably improved their digital skills and the level of academic performance both the staff and the students. The professors/teachers began to actively integrate digital instruments in the teaching process, which ultimately leads to a better quality of teaching and learning.

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