Chapter Seventeen

Impact of Virtual Collaborative Learning on Pedagogy Approaches and Student Assessment

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Introduction

In the last decade, the rapid development of technology and innovations has had a tremendous effect on teaching subjects, especially on the didactic approach in higher education in developed and developing countries. These technological innovations have created efficient conditions for improving the quality of pedagogical methods and increasing flexibility in teaching and learning. Virtual Collaborative Learning (VCL) is reformulating traditional pedagogies by promoting collaborative, technology-enhanced, and student-centred approaches. This innovative method fosters a globalised learning experience, making edu-

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cation more attractive, flexible, and accessible to all. Electronic learning platforms have increased collaboration and interactivity between academic staff and students, creating an academic environment that enables enhanced learning through real-time discussions and the exchange of scientific ideas. The application of these virtual platforms has facilitated the development of new pedagogical methods, which combine traditional classroom learning with virtual learning. Integrating technology into education not only improves academic outcomes but also prepares students for a dynamic and digitalised job market. Referring to these parameters, the application of digital tools within the VCL environment as a learning strategy is particularly important for having an innovative and inclusive education system. Learning based exclusively on conventional formats often does not create sufficient space to foster critical engagement and student autonomy in the learning process, which affects their academic results. For this reason, the development of electronic platforms has enabled the creation of interactive virtual spaces where students can collaborate effectively with academic staff and their peers. The application of electronic platforms not only increases the quality of data distribution but also affects the increase in the flexibility of learning resources, allowing students to create skills and knowledge outside the learning environment oriented to traditional approaches.

On the other hand, student assessment has always been a key component in the academic process, supporting academic staff in the evaluation of students' knowledge, skills, and competencies. Traditionally, different approaches are applied to evaluate the students, such as written tests, time-limited exams, and physically submitted assignments. Nowadays, considering the continual development of new digital technologies, teaching and learning methods are shifting from the traditional way towards the integration of modern teaching methods. The application of these new teaching and learning methods requires new methods of student assessment based on these technologies. Shifting from the traditional way of teaching, learning and assessments towards new methods based on the latest digital trends applicable in the education sector facilitates and enables increased collaboration within the teaching and learning environment. The application of digital tools supports educators in increasing the students' engagement during academic activities and collaboration. Furthermore, they can apply real-time methods that can automate the assessment process, but at the

same time support the feedback given to the students in order to reflect on their challenges and improve their knowledge.

In order to investigate the impact of VCL on pedagogy approaches and student assessment, a questionnaire with seven questions was developed. The questions are generated based on the previous studies and are designed to achieve the aim of this study.

Aim of the Study

The aim of the study is to analyse the impact of the application of digital tools within a Virtual Collaborative Learning on pedagogy approach and students' assessment focused on motivation, engagement, critical thinking, and achievement of learning outcomes.

Objectives of the Study

1. To assess the level and form of application of digital tools in a VCL environment by the academic staff and students in the context of assessment methods;
2. To analyse the impact of VCL on students' motivation and engagement during the learning process;
3. To examine the role of VCL in influencing the encouragement of collaborative learning and developing critical thinking and evaluation skills;
4. To evaluate the contribution of electronic quizzes and other tools to the achievement of the expected course outcome.

Literature Review

Impact of Virtual Collaborative Learning (VCL) on Pedagogy Approaches

Collaborative learning in higher education, as a student-centred approach, is presented as a form of supporting individuals or a particular group that enables students and educators to collaborate and learn, with the aim of knowledge sharing through interactions (Belle, 2000; Lovasz-Bukvova et al., 2006a). Increased virtual collaboration through digital tools and easy access to learning materials increases student productivity and enables the creation of a more dynamic learning experience. Research conducted by Lovasz-Bukvova et al. (2006b) emphasises the importance of implementing e-learning in higher education institutions to develop international, interdisciplinary, and cross-

sectoral learning processes. In general, the research suggests that integrating these virtual methods in higher education can improve the quality of teaching and better prepare students for the challenges of a globalised market. According to Lovasz-Bukvova et al. (2006b), in a modern learning environment, interactive collaboration among team members plays a key role. Considering that their research focus was on the virtual collaboration with several international partners, transferring the collaborative work into the virtual classroom 'proved the solution as principal performant, being both effective (regarding the students' achievements) and highly acceptable (evaluated students' opinion).' Another study related to the VCL emphasises the importance of having clear Tasks, Roles, and Communication tools to improve the fulfilment of VCL aims (Lovasz-Bukvova et al., 2006a).

Also, the study conducted by (Meroño et al., 2021) provides evidence that pedagogical approaches that are oriented towards technological tools and virtual learning increase the quality of performance of academic staff, these findings emphasize that the application of these tools also affects the development of digital competencies that are necessary within the learning process. The study conducted by Herrera-Pavo (2021) emphasises the impact of collaborative learning in higher education, particularly in the context of digital platforms, which directly improve the quality of learning and pedagogical methods. Matee and Nkiwane (2022) analysed the new perspectives and challenges faced by academic staff and students in higher education. The results emphasised that virtual learning is highly efficient and useful in increasing academic quality and performance.

However, the lack of technological tools and investments in this area hinders the efficiency of virtual collaboration. The study by Matee and Nkiwane (2022) suggests that to improve this situation, it is necessary to invest in advanced technology, provide training for staff and students, and create policies that support the effective use of virtual learning environments.

Today, there are innovative tendencies to change the approach of models in higher education. The research results of the study by Pluta et al. (2013) underline the importance of transforming traditional lecture-based methods into various innovative approaches based on virtual collaborative learning. The use of these methods is seen as the entrance to a new era, driven by the need for team competencies and the availability of digital media. Pedagogical models based on a student-centred

approach and oriented toward students' needs have also been examined in the scientific study by Zhou et al. (2019), which emphasises the importance of collaborative learning through teaching. This pedagogical method places the student at the centre of the learning process, promoting active interaction and the development of critical thinking skills.

Jantos (2024b) has provided an innovative perspective on pedagogical approaches in higher education through his scientific research. He developed adapted pedagogical models for case studies in VCL environments, which help academic staff and higher education institutions integrate innovative pedagogical approaches into the learning process. Osuji et al. (2023) analysed the collaborative pedagogical approach through the application of digital virtual classrooms. Their results showed how this approach enabled academic staff to maintain active student participation in a virtual classroom. However, to make the collaborative pedagogical approach more effective, more training for academic staff and greater support for technological infrastructure are needed. These aspects are highlighted in the study by Acharya et al. (2024), which also emphasises that, if properly applied, the collaborative teaching methodology has a positive impact on increasing the quality of the learning process. Sobko et al. (2020) analysed networked collaborative learning in the context of an online course at the higher education level; their results showed that online engagement with advanced digital technologies positively impacts the construction of knowledge and the analysis of task content by students. The treatment of new pedagogical models based on technology has also been analysed by Ramos et al. (2021), who identified four pedagogical models: collaborative observation and analysis of professional practices recorded with video, collaborative creation of video-supported content, collaborative learning based on video content, and synchronous collaboration supported by video. The scientific findings of the study by Doumanis et al. (2019) show that collaborative virtual environments can significantly improve learning outcomes by stimulating multiple senses and promoting rich interactions.

Students Assessment

Regarding the assessment formats and their applicability to VCL, Jantos (2024a) analysed 24 relevant assessment methods divided into three forms of assessment: Self-Assessment (time and role planning),

Peer Assessment (formative online peer assessment and video documentation) and Automated Assessment (blended programmatic assessment). Based on her analysis and interpretation, of the three forms of assessment, some are fully applicable, limited, or not applicable to the VCL. The author emphasises the importance of having an iterative way of reflection and feedback for every task in order to support the students to improve their learning and grow their competencies continually. Another study (De Brun et al., 2022) that analysed the role of peer assessment using an online platform, identified that initially this form of assessment was not well accepted by the students; they expressed apprehension, perceiving the task as daunting, and a lack of confidence.

To eliminate these barriers and to increase the success rate of peer assessment in online collaboration, they provided detailed instructions on how to complete peer review, ongoing discussion, and feedback to address their concerns. This resulted in a higher level of satisfaction among students with the new assessment form. Another study presented by Nowell et al. (2025) presents that virtual collaboration enables the professor to apply a flexible approach regarding the evaluation of students that allows an adaptive learning experience in line with the students' needs, considering the application of online infrastructure. Another study (Abramovich, 2016) emphasises that traditional assessment methods fail to support students, particularly in the two-phase assessment approach, which includes mid-term and final examinations. In his chapter, he proposes a new way of virtual assessment based on digital badges that are applied in video gaming as a summative assessment. In this case, during the virtual learning environment, students' performance can be related to specific badges that represent, in a form of visualisation, the progress students have achieved during the virtual class. Badges can be related to the submission of evidence by students to achieve a learning objective and then reviewed by the instructor. Application of online formative assessment indicates a positive effect on learning by students as presented by Velan et al. (2008). This study shows that students achieved better grades in their examinations through the application of online assessment methods, specifically, the automated individualised feedback, such as multiple choice, which supported them to achieve mastery of materials in all the courses where it was applied.

According to Lin et al. (2024), the application of virtual assessment technologies, such as computer-based simulation, AR, and VR, along

with other modern assessment methods, supports educators in enhancing the evaluation of both theoretical knowledge and practical skills. The study shows that the application of virtual assessment enables educators to have improved accuracy and objectivity in evaluation. At the same time, the study shows that there are some challenges regarding the integration of these technologies, such as high costs, hardware/technical limitations, and training regarding the application of AR and VR tools. According to Gaad (2022), online collaborative learning has a positive impact on student achievement and engagement. The students confirmed that the application of online collaborative learning helped them to feel more comfortable about sharing their thoughts and comments. Based on these, it can be identified that the application of virtual collaboration supports students to have better results regarding the course materials during the virtual assessment.

Research Methodology

To analyse the impact of VCL on pedagogical approaches and student assessment, the quantitative methodology is applied based on the primary data, where the main instrument for data collection is a questionnaire. The questionnaire data were addressed by 6 partner universities: University for Business and Technology, Prishtina, Biznesi College, Prishtina, Epoka University, Tirana, European University of Tirana, Tirana, International Burch University, Sarajevo, and University of East Sarajevo, Sarajevo. The questionnaire was filled out by the parties involved in the COWEB project, such as academic staff, students, and e-tutors. To achieve the aim of this study, several statistical models based on econometric approaches, such as descriptive statistics, skewness, kurtosis, and non-parametric tests, are applied. The main limit of these statistical tests is the small number of observations, where only 48 observations are collected from higher education institutions as part of the COWEB project.

Results

The results of the questionnaire were analysed based on statistical description and non-parametric tests.

Descriptive Statistics

Table 17.1 presents the statistical description for the questions that analysed the impact of VCL on pedagogical approaches and student assessment. This statistical description also includes the Skewness and

TABLE 17.1 Statistical Description

Questions		(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	How often has the academic staff used digital tools of Virtual Collaborative Learning in the context of assessment methods	48	1	5	4.125	0.89025	−1.009	1.514
2	How has the application of Virtual Collaborative Learning influenced the increase in motivation during the learning process	48	3	5	4.4167	0.64687	−0.661	−0.510
3	How has Virtual Collaborative Learning influenced the encouragement of collaborative learning among is through virtual engagement?	48	3	5	4.4167	0.6131	−0.535	−0.565
4	How do you evaluate the use of digital tools and platforms for Virtual Collaborative Learning in the learning process	48	3	5	4.4167	0.53924	−0.079	−1.131
5	How has the application of Virtual Collaborative Learning tools influenced the final progress in academic courses during the semester	48	3	5	4.2917	0.65097	−0.372	−0.660
6	How has the application of Virtual Collaborative Learning tools influenced the development of your critical thinking and evaluation skills	48	1	5	4.2500	0.81214	−1.492	4.033
7	Has the use of electronic quizzes through the 'Slido' and other tools positively influenced the achievement of the expected course outcome	48	3	5	4.1042	0.75059	−0.175	−1.171

NOTES Column headings are as follows: (1) observations, (2) minimum, (3) maximum, (4) mean, (5) standard deviation, (6) skewness, (7) kurtosis. Valid N (listwise) = 48.

Kurtosis data distribution tests. For almost all the questions, the minimum and maximum values range from 3 (neutral) to 5 (very positive), except for questions 1 and 6, which range from 1 to 5. Based on these statistical results, it is identified that on average, all higher education institutions that addressed this questionnaire expressed a very positive view regarding the impact of VCL on pedagogical approaches and

TABLE 17.2 Testing of Questions According to Non-Parametric Tests

Questions		Test	Sig.	Decision
1	How often has the academic staff used digital tools of Virtual Collaborative Learning in the context of assessment methods	One-Sample Chi-Square Test	0.001	Reject the null hypothesis.
2	How has the application of Virtual Collaborative Learning influenced the increase in motivation during the learning process	One-Sample Chi-Square Test	0.001	Reject the null hypothesis.
3	How has Virtual Collaborative Learning influenced the encouragement of collaborative learning among is through virtual engagement?	One-Sample Chi-Square Test	0.000	Reject the null hypothesis.
4	How do you evaluate the use of digital tools and platforms for Virtual Collaborative Learning in the learning process	One-Sample Chi-Square Test	0.002	Reject the null hypothesis.
5	How has the application of Virtual Collaborative Learning tools influenced the final progress in academic courses during the semester	One-Sample Chi-Square Test	0.000	Reject the null hypothesis.
6	How has the application of Virtual Collaborative Learning tools influenced the development of your critical thinking and evaluation skills	One-Sample Chi-Square Test	0.210	Retain the null hypothesis
7	Has the use of electronic quizzes through the 'Slido' and other tools positively influenced the achievement of the expected course outcome	One-Sample Chi-Square Test	0.200	Retain the null hypothesis

assessment. Specifically, all questions showed an average higher than 4 (very positively), which indicates a very high impact of VCL on the pedagogical process.

Also, the tests that analyse the distribution of data show optimal values within the allowed limits (skewness –1 to 1, and kurtosis –2 to 2), except question 6, where the skewness value is –1.42, and a kurtosis value of 4.03.

Table 17.2 presents the tests of the questions, which represent the main problem of this research, based on non-parametric tests developed through the SPSS statistical program. The results indicate significant statistical reliability, especially from question 1 to question 5. On

the contrary, the findings emphasise lower statistical reliability in questions 6 and 7. Furthermore, according to the results presented in Table 17.2, it is identified that the use of digital tools by academic staff in the context of assessment methods has a very positive impact and presents a significant statistical reliability according to non-parametric tests. Furthermore, the results show that virtual learning based on the VCL approach has had a positive impact on increasing student motivation throughout the learning process; this result also indicates a stable statistical reliability.

Based on the statistical analysis, it is identified a very high level of statistical reliability is identified in question 3, where the application of electronic tools and platforms promotes collaborative learning among students, thus creating a collaborative and interactive learning environment. Also, it is identified that the application of virtual collaborative learning tools has a significant positive impact on the final progress of students in their academic courses, contributing to better academic results. This result also provided significant statistical reliability. However, the development of critical thinking skills and the impact of electronic quizzes may require further investigation or alternative approaches.

Conclusion

The study analysed the importance of VCL in teaching, learning, and assessment of students as a new approach to developing students' knowledge, skills, and competencies, considering their work in a virtual environment. VCL supports academic institutions to be more attractive, flexible, and accessible to all worldwide by eliminating physical global barriers to collaboration. It supports the creation of an academic environment where collaboration and interactivity between academic staff and students are increased. Previous studies show that factors such as the determination of tasks, roles and communication tools improve the fulfilment of VCL aims (Lovasz-Bukvova et al., 2006a). Furthermore, investments in advanced technologies, staff training, policies for the usage of tools and collaboration have a positive effect on VCL (Matee et al., 2022; Osuji et al., 2023). Regarding students' assessment, studies show that online formative assessment has a positive effect on learning by students and their achievements (Velan et al., 2008; Gaad, 2022).

The results of this study show that this form of collaboration sup-

ports students to increase their engagement during teaching activities, at the same time, it supports staff in the students' assessment. The use of digital tools by academic staff in the context of assessment methods has a very positive impact and presents significant statistical reliability according to non-parametric tests. The results show that virtual learning based on the VCL approach has had a positive impact on increasing student motivation throughout the learning process. Also, the application of virtual collaborative learning tools has a significant positive impact on the final progress of students in their academic courses, contributing to better academic results. Results of the analysis show that the application of digital tools and platforms has a positive impact on increasing collaboration within virtual teams, motivation, and their ability to interact and achieve higher results.

The application of VCL in teaching, learning and assessment facilitates and enables increased collaboration within the teaching and learning environment. The application of digital tools supports educators in increasing the students' engagement during academic activities and supports in automation of the students' assessment process in a real-time environment. As presented by many studies, the application of virtual tools supports educators to shift from traditional exams towards more interactive assessment methods such as peer evaluations, group projects and real-time quizzes. Even though there are identified some challenges have been identified that need to be considered and addressed before starting a VCL environment in order to increase the success rate and to achieve the aim and objective of the activity, especially when the participants are from different locations. Therefore, in this context, the findings generally point to the development of a comprehensive model that is in harmony between modern pedagogical approaches and institutional infrastructure and policies for the efficient implementation of virtual collaborative learning.

Based on the findings of this study, the following recommendations must be followed as best practices for educators and institutions: (1) Invest in modernisation of technological infrastructure to support collaborative learning; (2) Train the academic staff on the application of the effective VCL; (3) Encourage the application of interactive evaluation forms through electronic quizzes, group work, peer-to-peer evaluation and virtual discussion; (4) Develop an instructional model that supports the harmonisation of modern pedagogic approaches through the application of technology aligned with the institutional regulations;

(5). Monitor and evaluate continually the effect of VCL in order to increase the quality of teaching and learning.

References

Abramovich, S. (2016). Understanding digital badges in higher education through assessment. *Horizon, 24*(1), 126–131.

Acharya, B., Sigdel, S., & Poudel, O. (2024). Analysis of effectiveness of collaborative pedagogy practices. *Journal of Multidisciplinary Research, 1*(4). https://doi.org/10.3126/nprcjmr.v1i4.70965

Angel Herrera-Pavo, M. (2021). Collaborative learning for virtual higher education. *Learning, Culture and Social Interaction, 30,* 100532. https://doi.org/10.1016/j.lcsi.2021.100532

Belle, A. (2000). Get real! Collaborative learning in higher education. *Journal of Educational Enquiry, 4*(1), 1–13.

Black, P., & Wiliam, D. (1998). Assessment and classroom learning. *Assessment in Education: Principles, Policy & Practice, 5*(1), 7–74. https://doi.org/10.1080/0969595980050102

De Brun, A., Rogers, L., Drury, A., & Gilmore, B. (2022). Evaluation of a formative peer assessment in research methods teaching. *Nurse Education Today, 109,* 105239. https://doi.org/10.1016/j.nedt.2021.105239

Doumanis, I., Economou, D., Sim, G., & Porter, S. (2019). The impact of multimodal collaborative virtual environments on learning: A gamified online debate. *Computers & Education, 130,* 121–138. https://doi.org/10.1016/j.compedu.2018.11.005

Gaad, A. (2022). The effects of online collaborative learning (OCL) on student achievement and engagement. *Journal of Education: Studies in Education, 10*(3), 45–58.

Jantos, A. (2024a). Assessment formats for virtual collaborative learning. In *Proceedings of the 16th International Conference on Education and New Learning Technologies* (pp. 1234–1240). IATED.

Jantos, A. (2024b). Blended assessment strategy for virtual collaborative learning in higher education. In *Digitale Prüfungsszenarien in der Hochschule: Didaktik-Technik-Vernetzung* (Vol. 4, pp. 103–115). WBV Publikation. https://doi.org/10.3278/9783763977055

Lin, P.-Y., Tsai, Y.-H., Chen, T.-C., Hsieh, C.-Y., Ou, S.-F., Yang, C.-W., Liu, C.-H., Lin, T.-F., & Wang, C.-Y. (2024). The virtual assessment in dental education. *Journal of Dental Sciences, 19*(2), S102–S115.

Lovasz-Bukvova, H., Gilge, S., & Schoop, E. (2006a). *Enhancing the framework for virtual collaborative learning: Comparison of two case studies* (Sprouts: Working Papers on Information Systems, 6(67)). http://sprouts.aisnet.org/6-67

Lovasz-Bukvova, H., Schoop, E., & Gilge, S. (2006b). Virtual collaboration in higher education blended learning arrangements. In M. Meißner & M. Engelien (Eds.), *Virtuelle Organisationen und Neue Medien – GeNeMe 2006* (pp. 17–28). Universitätsverlag Göttingen.

Matee, G., N., M., & Nkiwane, P. (2022). Emerging perspectives and challenges for virtual collaborative learning in an institution of higher education: A case of Lesotho. *Interactive Technology and Smart Education, 20*(1), 73–88. https://doi.org/10.1108/ITSE-03-2022-0047

Meroño, L., Calderon, A., & Arias-Estero, J. L. (2021). Digital pedagogy and cooperative learning: Effect on the technological pedagogical content knowledge and academic achievement of pre-service teachers. *Revista de Psicodidáctica, 26*(1), 53–61. https://doi.org/10.1016/j.psicoe.2020.10.001

Nowell, L., Oddone Paolucci, E., Lorenzetti, D., Johnston, S., Dalon, S., & Jacobson, M. (2025). Exploring educators' perceptions and experiences of online teaching to foster caring profession students' development of virtual caring skills: Sequential explanatory mixed methods study. *JMIR Nursing, 8,* e45678. https://doi.org/10.2196/45678

Osuji, G., Nwafor, A., & Enekwe, R. (2023). Collaborative pedagogical approach and virtual class participation: Implications on students' academic performance in Curriculum and Instruction 11. *Journal of Education and Social Sciences, 10*(6), 1–8.

Pluta, W., Richards, B., & Mutnick, A. (2013). PBL and beyond: Trends in collaborative learning. *Teaching and Learning in Medicine, 25*(S1), S9–S16. https://doi.org/10.1080/10401334.2013.842917

Ramos, J., Cattaneo, A., Jong, F., & Espadeiro, R. (2021). Pedagogical models for the facilitation of teacher learning in digital environments. *Journal of Research on Technology in Education, 53*(4), 695–718. https://doi.org/10.1080/15391523.2021.1911720

Sobko, S., Unadkat, D., Adams, J., & Hull, G. (2020). Learning through collaboration: A networked approach to online pedagogy. *E-Learning and Digital Media, 17*(1), 36–55. https://doi.org/10.1177/2042753019882562

Velan, G., Jones, P., McNeil, P., & Kumar, R. (2008). Integrated online formative assessments in the biomedical sciences for medical students: Benefits for learning. *BMC Medical Education, 8,* 52. https://doi.org/10.1186/1472-6920-8-52

Zhou, X., Chen, L.-H., & Chen, C.-L. (2019). Collaborative learning by teaching: A pedagogy between learner-centered and learner-driven. *Sustainability, 11*(4), 1174. https://doi.org/10.3390/su11041174