https://doi.org/10.53656/math2024-1-4-stu

Educational technologies
Образователни технологии

STUDENT SATISFACTION WITH THE QUALITY OF A BLENDED LEARNING COURSE

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Abstract. Globally, the number of online courses offered as electronic versions of conventional learning courses has increased annually over the past decade. A critical variable for measuring the success or failure of these courses is student satisfaction. This paper presents a study which aims to investigate the students' satisfaction with the quality of an online course supporting training in Object-Oriented Programming performed in blended learning mode. The developed questionnaire allows students to assess the course content and design, course organization, communication and support, and evaluation. Based on the summarized result, recommendations for improving the course quality to meet students' expectations and needs have been done.

Keywords: blended learning; student satisfaction; survey; quality

1. Introduction

Due to the progress in the development of technologies and the availability of advanced IT infrastructure, leaders of higher educational institutions (HEIs) worldwide perceive online learning as a supportive tool for traditional teaching and learning (Suat 2021). Globally, the number of online courses offered as electronic versions of conventional learning courses has increased annually over the past decade. This trend has accelerated significantly during the Covid-19 pandemic when universities are forced to quickly move from traditional to distance learning and digitize all courses. However, many HEIs force challenges and obstacles in delivering e-learning effectively (Gopal et al. 2021), e.g. availability of teaching and administrative resources, work under pressure, and dependability on IT infrastructure, digital learning tools and other IT platforms (Hodges et al. 2020).

Student satisfaction is a critical variable in determining the success or failure of online courses. Students who are more satisfied with their online course have also been found to achieve higher academic results. Since student satisfaction is a complex construct and depends on many factors, there is currently no generally accepted definition for student satisfaction. In (Thurmond et al. 2002) satisfaction is considered as "a concept that reflects outcomes and reciprocity that occur between students and an instructor". In (Sun et al. 2008) students' satisfaction is defined as "the degree of perceived learner satisfaction with e-learning settings as a whole". In (Martin & Bollinger 2022) online learner satisfaction is defined as "the fulfilment of a student's need and perceptions of contentment with learner, instructor, course, program, and organization related factors in the online learning environment". Some experts report the relationship between expectations of the service and the reality students receive and consider students' satisfaction as a positive attitude towards the services offered by HEIs (Ros-Morente et al. 2018).

This paper studies student satisfaction with the quality of online course "Object-oriented programming" offered as a supplement tool to conventional academic training. Section 1 explores factors influencing student satisfaction with the quality of e-learning based on previous studies in this area. Section 2 presents the research methodology – a developed author's questionnaire, data collection process, hypothesis formed and tools used for analysing the results. In Section 3, the authors describe the results of an evaluation of the blended learning course based on questionnaires filled out by 51 students. The Conclusion section outlines the contributions, limitations of the paper, and the authors' plans for future research.

2. Literature review

Many researchers worldwide study factors influencing students' satisfaction and suggest some evaluation criterion.

According to findings from some studies, course content (Nikou & Maslov 2023) and design (Mtebe & Raphael 2018) are the strongest predictor of overall online course quality and the success of online learning and satisfaction with online courses. The quality of learning materials is essential to stimulate student success in learning. Teachers must modify the teaching materials they regularly use for offline learning to meet the needs of e-learning and be easy to understand (Ghaderizefreh & Hoover 2018) and adapt course structure to encourage students to be active during the training and motivate them to learn and gain knowledge or skills (Nikou & Maslov 2023). The high-quality course should contain learning resources in different formats (books, presentations, video lectures, etc.), learning activities, and assessment ac-

tivities. The content should provide up-to-date information and be updated periodically by the teacher to achieve efficient training and perceived utility of the provided knowledge and skills (Fleming et al. 2017). Accuracy, relevancy and completeness of course contents also create a high-quality perception of online courses, impacting satisfaction (Pereira et al. 2015). For greater student satisfaction, learning content should include illustrations, real-world situation examples and links to the sufficiency of additional resources (Ghaderizefreh & Hoover 2018). In addition, the course content must be accompanied by informational materials presenting the course objectives and the expectations of the students (Roach 2006). The high-quality online course should be easy to operate and flexible, with clear interaction between teachers and students and located in modern learning environments, enabling the use of innovative technologies (Thoo et al. 2021).

Another group of factors that have a direct impact on student satisfaction are related to the organization of learning and the learning process (Sun et al. 2008). It is crucial for students to be informed about the evaluation criteria and formation of the final grade and the training schedule (Roach 2006). The success of an online course also depends on the opportunities for student autonomy and personalization of learning provided during the training (Thoo et al. 2021), including students' ability to allocate time, learn independently and direct their learning. Self-regulated learning to achieve a personal goal centred on self-motivation becomes more critical to success in an online learning environment. A determining factor for high student ratings of course quality is the effective way of presenting and delivering learning content (Thoo et al. 2021). Learning activities should facilitate the acquisition of new knowledge, allow familiarization with the current level of achievements in the field and contribute to the professional training of students (Fleming et al. 2017). According to studies, the most preferred mode of teaching are the synchronous methods (Bower et al. 2015), which allow students to interact with their teachers and peers in real-time conference calls, ask and answer questions and stimulate personal involvement in terms of motivation, arousal and convergence. On the other hand, asynchronous learning improves students' ability to process information.

Some authors have identified communication and possibilities for connecting with teachers and peers as crucial predictors of student satisfaction (Nikou & Maslov 2023). The interaction factor is a high catalyst of student satisfaction (Moore 2014). While interaction is significant in any mode of education, many studies have emphasized its extreme importance in online education in enhancing its quality and effectiveness (Yunusa & Umar 2021). According to (Moore 2014), there are three types of interaction: learner-content interaction, learner-instructor interaction and learner-learner interac-

tion. In online learning, interaction can also comprise students' engagement with the technological platform used in a course. Finding of studies confirm the importance of learner-to-learner (Thoo et al. 2021; Moore 2014), learner-to-instructor (Kuo et al. 2013; Alam 2022) and learner-to-content (Kuo et al. 2013) interactions for students' satisfaction. Since engagement during training leads to better learning outcomes and experiences, teachers should find ways to increase engagement levels in their online courses. Possible approaches to improve student engagement are for teachers to design online courses with learning activities typical of project-based learning and create favourable conditions for student teamwork and digital learning community with positive and engaging interactions.

The finding of many studies emphasizes the fundamental role played by the teacher in overall student satisfaction (Ladyshewsky 2013). Teachers should adopt their teaching methods for online learning to create appropriate teaching environments (Nikou & Maslov 2023). It is critical for teachers to use learning technologies that facilitate delivery of course contents, support learning activities and social interaction online (Chen et al. 2020). Teachers act as mentors, provide timely, consistent and meaningful continuous feedback and responses to questions, support students and encourage them to apply critical thinking techniques while studying online (Alam 2022; Sun et al. 2008; Mtebe & Raphael 2018). The timely and meaningful feedback and teacher support reduce learning time and positively affect student grades and satisfaction (Morris et al. 2014). Therefore, teacher experience and knowledge, as well as students' degree of comfort in approaching teachers for help and advice, have a crucial impact on student satisfaction.

IT infrastructure and technology play significant roles in student satisfaction as they positively contribute to the student's learning experience. Reliable technology, facilitating conditions and platform availability (Mtebe & Raphael 2018) have a large impact on students' satisfaction. To provide high-quality e-learning HEIs should have advanced IT infrastructure and technology (Nikou & Maslov 2023; Zein et al. 2023), digital learning management tools (Sun et al. 2008) that allow students to track their learning progress. By itself, the availability of modern infrastructure is not enough to ensure high-quality online courses and students will experience high frustration levels without proper technical support. HEIs should provide adequate and timely administrative and technical support to ensure that students can always receive assistance when they are encountering difficulties in working with the systems, e.g. through 24/7 call centres.

Another significant factor in student satisfaction studied by experts is the assessment of student achievement and overall performance (Bismala & Manurung 2021). Students need to be informed about assessment options, meth-

ods of assessment and the grading system and must understand the task to achieve higher results.

3. Materials and Methods

Based on the reviews of literature concerning quality of online learning, in this study, the authors regard e-learning quality as a multidimensional construct of four components influencing student satisfaction: Course content and design; Organization, preparation and conduct of training; Communication and support in the learning process; Evaluation.

The study's methodology is based on an exploratory survey using questionnaire for data collection. The questionnaire (Gaftandzhieva et al. 2023) contains 31 mandatory questions that require students to state how far they agree with the statements regarding the blended learning course using the following 5-point Likert scale (1 – strongly disagree (SD), 2 – disagree (D), 3 – neutral (N), 4 – agree (A), 5 – strongly agree (SA)). The questions are divided into four areas to evaluate the student satisfaction concerning the already mentioned four course quality components: Area 1. Course content and design – 9 questions; Area 2. Organization, preparation and conduct of training – 11 questions; Area 3. Communication and support in the learning process – 7 questions; Area 4. Evaluation – 4 questions.

All 86 students who completed the training on "Object-oriented programming" in the academic year 2022/2023 were invited to participate in the study and evaluate the quality of the course. They were informed that the collected empirical data would only be used for research and to improve the quality of the course and were asked to complete a consent to participate in the study. The response rate was 59.30

Based on the developed questionnaire four research questions are formulated:

RQ1: Are students satisfied with the course content and design?

RQ2: Are students satisfied with the organization, preparation and conduct of training?

RQ3: Are students satisfied with the communication and support in the learning process?

RQ4: Are students satisfied with the evaluation activities and feedback?

Collected data was analysed using Excel. Summarized results of the responses to all questions are presented in tables and figures (see Result section). Then the paper analyses average scores of statements separately for the four evaluated areas to assess students' satisfaction with their quality, their significance and opportunities for improvement. Results are compared with results of other surveys and answers to research questions are given (see Findings). In the second stage of the study (Gaftandzhieva et al. 2023), some

hypotheses were tested and the association between grade and students' satisfaction level was evaluated.

4. Results

The absolute value of the calculated Skewness (between 0.981 and 1.638) and Kurtosis (between 0.152 and 2.585) indexes for each area was below 3.10, which shows no severe deviation of data from normality. Cronbach's alpha coefficients for different areas ranged from 0.88 to 0.94, indicating that the items within each area are highly correlated, demonstrating the reliability and consistency of the measurements. All constructs exhibited Average Variance Extracted (AVE) values varying from 0.60 to 0.75, indicating that the constructs explain more variance than measurement error. In addition, all constructs demonstrated Composite Reliability (CR) values between 0.92 and 0.95, which suggests strong internal consistency and reliability. The calculated Cronbach's alpha coefficients, AVE values greater than 0.5, and CR values exceeding 0.7 prove the reliability of the areas in the questionnaire for measuring the various dimensions under investigation. These findings provide confidence in the consistency and accuracy of the collected data, enabling us to draw meaningful conclusions and make valid inferences based on the measured constructs.

Area 1 provides insights into students' perceptions regarding **the course content and design**, evaluating folloving elements:

Q1. The learning objectives (knowledge and skills that students will acquire upon successful course completion) are clearly articulated;

Q2. A comprehensive list of literature sources is available for students' self-study;

Q3. The roles of the team conducting and providing the training are clearly indicated, and contact data are indicated;

Q4. The overall presentation of the learning content is well structured and includes diverse components;

Q5. The learning content for theoretical training is consistent with the learning goals and is illustrated with appropriate examples;

Q6. The learning content for practical training (exercises) and consolidation of theoretical knowledge is clearly formulated;

Q7. The learning content for self-study and self-assessment (materials, projects, tests, assignments, etc.) is clearly formulated;

Q8. The learning content for assessment is clearly formulated;

Q9. The overall design of the e-course is intuitive and interactive, allowing convenient and easy use and navigation.

Table 1 summarized the results. It is evident from the results that a significant percentage of students agreed or strongly agreed with various aspects of

the course content and the course design. For example, 43.14% of students agreed that the learning objectives were articulated clearly, indicating that the course goals were well-defined. Additionally, 39.22% of students agreed that a comprehensive list of literature sources was available for self-preparation, highlighting the availability of resources to support independent learning. The results also indicate that there is need for improvement in certain areas. For instance, a notable percentage of students expressed neutrality or disagreement regarding the clarity of educational content for self-preparation and self-assessment (Q7) and the formulation of the learning content for assessing knowledge and forming the final grade (Q8). These findings suggest a need for more understandable instructions and guidelines in these fields. Overall, the findings from Table 1 indicate a generally positive perception of course content and design, with specific areas identified for further enhancement to better meet the needs and expectations of students.

Table 1. Area 1: Summarized results

Area 1	1-SD	2-D	3-N	4-A	5-SA
Q1	0.00%	1.96%	19.61%	35.29%	43.14%
Q2	0.00%	13.73%	11.76%	35.29%	39.22%
Q3	0.00%	1.96%	9.80%	27.45%	60.78%
Q4	0.00%	9.80%	13.73%	31.37%	45.10%
Q5	5.88%	7.84%	17.65%	33.33%	35.29%
Q6	3.92%	5.88%	15.69%	27.45%	47.06%
Q7	0.00%	5.88%	15.69%	27.45%	50.98%
Q8	1.96%	1.96%	7.84%	29.41%	58.82%
Q9	3.92%	1.96%	5.88%	31.37%	56.86%

Area 2 is dedicated to **assessing the organization, preparation, and conduct of training**, evaluating following elements:

Q10. The way to organize and conduct the training is known and feasible in advance;

Q11. The training schedule is known in advance and is feasible;

Q12. The requirements for successful completion of the course, assessment methods, and the formation of the final grade are known in advance and adequate;

Q13. Possibilities for preliminary technological preparation for working with the e-learning system are provided and available to students;

Q14. Possibilities for personalized determination of the time and place of training are provided;

Q15. Interactive tools are available to track the student's progress in the learning process;

Q16. Measures are foreseen to verify the identity of the students;

Q17. Measures have been introduced to prevent plagiarism and exam fraud;

Q18. The learning content is presented sufficiently comprehensively, allowing course successful completion;

Q19. The learning content allows familiarization with the current level of knowledge and achievements in the field;

Q20. In the learning process, knowledge and skills are acquired that contribute to the professional training of students.

Table 2. Area 2: Summarized results

Area 2	1-SD	2-D	3-N	4-A	5-SA
Q10	1.96%	0.00%	9.80%	23.53%	64.71%
Q11	0.00%	1.96%	5.88%	17.65%	74.51%
Q12	3.92%	5.88%	7.84%	31.37%	50.98%
Q13	1.96%	5.88%	11.76%	37.25%	43.14%
Q14	7.84%	3.92%	19.61%	31.37%	37.25%
Q15	7.84%	5.88%	5.88%	47.06%	33.33%
Q16	1.96%	1.96%	9.80%	29.41%	56.86%
Q17	1.96%	3.92%	19.61%	23.53%	50.98%
Q18	5.88%	5.88%	5.88%	33.33%	49.02%
Q19	5.88%	3.92%	17.65%	37.25%	35.29%
Q20	3.92%	1.96%	23.53%	31.37%	39.22%

The results, shown in table 2, demonstrate that most students agreed or strongly agreed with various aspects regarding this area. For instance, a significant percentage of students (64.71%) believed that the way the training was organized and conducted was known and feasible in advance (Q10). This fact indicates that students had a clear understanding of the training process. Moreover, the availability of interactive tools to track student progress (Q15) and measures to verify student identity (Q16) received positive feedback from a significant count of students. These findings highlight the importance of technological infrastructure and security measures in ensuring a smooth learning experience. However, it is worth noting that certain aspects, such as personalized determination of the time, place, and pace of training (Q14), received mixed responses. This fact suggests that the authors of the

course should give further attention to providing more flexibility in these areas to cater to individual learning preferences. In summary, Table 2 reveals a generally positive perception of the organization, preparation, and conduct of training, with some areas identified for potential improvement to enhance the overall learning experience.

Area 3 was dedicated to evaluating the **communication and support in the learning process**, evaluating the elements:

Q21. Appropriate tools for synchronous communication are used (online chat, virtual classroom, video/audio-conferencing software tools, etc.)

Q22. Appropriate tools for asynchronous communication are used (email, forum, etc.)

Q23. Continuous access to tools for communication and interaction with peers is provided (chat, forum, tools for teamwork, etc.)

Q24. Continuous access to tools for communication with the system administrator is provided (chat, forum, etc.)

Q25. Appropriate tools for communication with the teacher(s) are used (email, chat, forum, etc.)

Q26. Timely support is provided by the teacher(s) when students encounter difficulties

Q27. Timely support is provided by the administrator when students encounter technical difficulties when working with the system

The results, shown in Table 3, highlight students' views on various communication tools and support mechanisms provided for them. A substantial percentage of students agreed or strongly agreed that appropriate tools for communication with peers (Q23) and teachers (Q25) were utilized, suggesting effective channels for interaction and collaboration. Furthermore, the availability of continuous support from teachers when encountering difficulties (Q26) and timely assistance from administrators for technical issues (Q27) received positive feedback from most students. This result indicates that the learning environment fostered a supportive atmosphere, ensuring students had access to the necessary guidance throughout the course. However, there is room for improvement in certain areas. For example, a significant percentage of students expressed neutrality or disagreement regarding the provided tools for synchronous communication (Q21) and asynchronous communication (Q22). These findings suggest the need for a more robust and diverse range of communication tools to facilitate effective interaction among students and instructors. Overall, Table 3 highlights the importance of establishing effective communication channels and providing timely support to enhance the learning experience in blended learning courses.

Table 3. Area 3: Summarized results

Area 3	1-SD	2-D	3-N	4-A	5-SA
Q21	5.88%	5.88%	11.76%	33.33%	43.14%
Q22	1.96%	3.92%	3.92%	35.29%	54.90%
Q23	3.92%	3.92%	7.84%	43.14%	41.18%
Q24	1.96%	1.96%	17.65%	23.53%	54.90%
Q25	1.96%	1.96%	5.88%	25.49%	64.71%
Q26	0.00%	7.84%	7.84%	27.45%	56.86%
Q27	1.96%	5.88%	11.76%	37.25%	43.14%

Area 4 focuses on the **evaluation aspect of the learning process**, evaluating the elements:

Q28. The questions/tasks/topics/projects for (self)assessment of knowledge are feasible;

Q29. The time provided for the assessment of knowledge is of sufficient duration;

Q30. The teacher(s) provide(s) useful feedback, incl. for assessment results;

Q31. The teacher(s) provides useful feedback on the implementation of self-assessment/ self-study activities (materials, projects, tests, etc.), incl. suggestions to improve the work.

The results, shown in Table 4, indicate students' perceptions regarding the feasibility of assessment tasks, the duration of time for assessment, and the quality of feedback provided. A significant percentage of students agreed or strongly agreed that the questions/tasks/topics/projects for knowledge assessment were feasible (Q28) and that the time provided for assessing was sufficient (Q29). Moreover, many students recognized the usefulness of the feedback for both knowledge assessment results (Q30) and the implementation of activities for independent preparation and self-assessment (Q31). This result indicates the importance of constructive feedback in supporting students. However, the percentage of students expressing neutrality or disagreement shows a need for improvement in some areas. For instance, feedback on implementing activities for independent preparation and self-assessment (Q31) received mixed responses. This fact suggests the need for more understandable and specific feedback, including suggestions for enhancing students' work. In summary, Table 4 emphasizes the significance of providing feasible assessment tasks, appropriate assessment duration, and valuable feedback to enhance the evaluation process and support students' learning and growth.

Table 4. Area 4: Summarized results

Area 4	1-SD	2-D	3-N	4-A	5-SA
Q28	1.96%	3.92%	11.76%	39.22%	43.14%
Q29	1.96%	5.88%	7.84%	27.45%	56.86%
Q30	3.92%	9.80%	1.96%	27.45%	56.86%
Q31	3.92%	7.84%	3.92%	29.41%	54.90%

To assess the impact of the evaluated areas on student satisfaction the regression parameter estimates are detailed in Table 5. Notably, all of them demonstrate statistically significant effects on student opinions. For instance, the composite index related to Area 1. Course content and design correlates positively with student grade averages, thereby elevating overall satisfaction levels. Similarly, our findings indicate that the remaining three composite indices also significantly enhance student satisfaction levels. We also found that the value of adjusted R-square is 0.95, indicating that the model fits the data well.

Table 5. Regression model results

Composite contents	Estimate	*p* value
Course content and design	1.29	<0.001
Organization, preparation and conduct of training	2.25	<0.001
Communication and support in the learning process	3.54	<0.001
Evaluation	2.90	<0.001

5. Findings

Overall, the findings from the survey give clear answers to the research questions and provide valuable insights into the student's perspective on the quality of the "Object-oriented programming" course. The results indicate several areas of strength, such as positive perceptions of course content, training organization, communication channels, and assessment feasibility. Generally (see fig. 2), the results show that students are satisfied with the course quality and their training (an average score above 4 on 27 statements from the questionnaire). There is need for teachers to make improvements

in the theoretical learning content and illustrate it with more examples (average score 3.84), provide more possibilities for personalized learning (average score 3.86), integrate more tools and (or) aware students how to use them to track their progress in the learning process (average score 3.92), and update the learning content to allow more in-depth familiarization with the current level of knowledge and achievements in the field (average score 3.92).

By addressing these areas, teacher(s) can enhance the overall quality of blended learning courses, ensuring students a more effective and engaging learning experience.

The paper emphasizes the significance of considering students' subjective experiences and perceptions of learning. The findings support the results of other studies, which emphasize the importance of teacher-student interaction support (Zeqiri et al. 2021; Zein et al. 2023), communication channels and the instructor's role in creating a positive learning experience (Zeqiri et al. 2021; Zein et al. 2023), organization of training (Zeqiri et al. 2021), peer interaction (Zeqiri et al. 2021; Zein et al. 2023), well-designed courses and technology (Zein et al. 2023) play vital roles for student satisfaction.

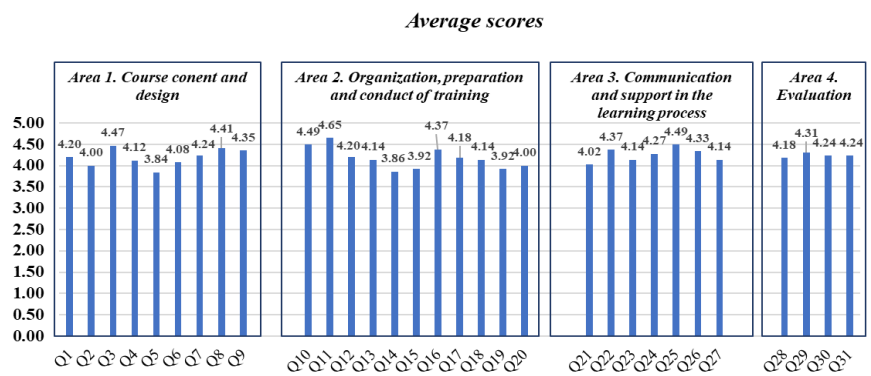

Figure 1. Average scores on statements

6. Conclusion

This paper emphasizes the importance of addressing areas for improvement in blended learning courses, such as self-preparation materials, personalized learning flexibility, and communication tools used. The results allow teachers to take action to improve the course quality to meet the needs and expectations of students.

This study has some limitations. The discussed results are based on a specific sample (59.30% of trained students during the academic year) and

may not be generalizable to the entire student population. For this reason, further research with all 86 students has to be done to confirm these findings.

The study contributes to the extant literature on student satisfaction with blended learning courses. It highlights the importance of prioritizing the quality of course planning, organization, communication and assessment to increase student satisfaction.

Future research should continue to examine the student satisfaction with the quality of the "Object-oriented programming" course in the subsequent academic years. The comparison of the results will allow us to assess whether the measures taken have led to an increase in student satisfaction and whether this has not been at the expense of a decrease in satisfaction in other areas, as well as to follow trends.

Acknowledgements

This paper is financed by the European Union-NextGenerationEU, through the National Recovery and Resilience Plan of the Republic of Bulgaria, project № BG-RRP-2.004-0001-C01.

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