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Original Article

Professors' Lived Experiences about the Formative Evaluation during Virtual Education

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Abstract

In the era of globalization and technological advancements, virtual education is being utilized as an educational method, and various tools have been created to evaluate and improve it. Formative evaluation is a method that helps improve learning outcomes in virtual education. This research aims to examine the lived experiences of professors regarding formative evaluation during the period of virtual education. The present study was conducted qualitatively with a phenomenological design. Semi-structured qualitative interviews were used to collect data. In this study, 10 professors from Bu-Ali Sina University were selected as participants. Using purposive sampling and conducting 10 interviews, the data reached saturation and were recorded both visually and audibly, then transcribed into text using MAXQDA software. The interview data were analyzed through three stages of open coding, axial coding, and selective coding to categorize the concepts and categories. An in-depth analysis of the professors' viewpoints led to the identification of factors in three domains. The findings of the research showed that the quality of students' learning, based on the implementation of formative evaluation, was meaningful and qualitative learning. Additionally, two major challenges, including weaknesses in the evaluation culture and human resources, and weaknesses in infrastructure and facilities were identified. Strengthening the pedagogical knowledge of professors was also observed as the most important strategy to improve the quality of formative evaluation. Consequently, attention to these factors can lead to the high-quality implementation of formative evaluation in the period of virtual education.

Keywords

Formative evaluation; Lived experience; Professors; Virtual education.

Introduction

Education prepares and nurtures humans for survival and adaptation to their surrounding environment, enabling them to successfully advance their personal and social lives. Education and training are essential parts of human life, needed from the beginning to the end of one's life (Panchal, 2020). In other words, education is the key to personal development and the future of societies, providing equal opportunities and justice, and reducing inequalities (Hedayati & Rudbaraki Klari, 2022).

Education has always been ongoing in any place and time, and the education system must respond to learners' needs based on various conditions (Tourani, 2020). With the outbreak of the COVID-19 pandemic and the shift to online activities, especially teaching and learning activities, many educational systems suddenly turned to electronic learning. However, despite its popularity, e-learning is not without its challenges. One of the most significant challenges in the e-learning system is the assessment and evaluation of learners (Rezaei & Sayahi, 2019). Formative assessment is a motivator for the learner, which can be used to deepen learning and enhance knowledge acquisition. Assessment of learners' knowledge is a fundamental issue in the current

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conditions. (Hatami, 2020). Assessment is an important and integral element of any educational system (Chegeni, 2019), and successful learning is impossible without high-quality educational assessment (Panchal, 2010).

Evaluation, which involves judging and assessing various attributes or phenomena using information obtained through measurement with specific and determined criteria (Abbasi Kasai et al., 2020), plays a fundamental role in educational policies and learners' approach to learning (Chen, 2023). Evaluation methods can be classified into three categories based on time and purpose: initial evaluation, formative evaluation, and Final evaluation (Kaya & Tan, 2014). Moving towards the use of formative and continuous evaluation, employing real assignments and projects, utilizing diverse evaluation methods, and encouraging self-assessment and peer assessment can reduce some of the challenges of one-dimensional or cumulative evaluation (Hatami, 2019). Formative evaluation, by providing feedback, especially during virtual education periods, can be a valuable tool for professors to ensure continuous improvement of courses and student learning (Patterson, 2016).

Formative evaluation can be considered an important part of education, as it provides students and professors with insights into how students are progressing in learning and problem-solving tasks (Cochran et al., 2022). Formative evaluations, which are continuously used in the teaching and learning process of the curriculum, provide feedback not only to the professors but also to the students, allowing them to reconsider their beliefs and ultimately facilitating their learning (Lin & Lai, 2013). In this process, students can move from what they know to what they can do for the future. This type of evaluation enhances the collaboration between students and professors in performing tasks (Tro, 2021). Formative evaluation is designed to expand and encourage learning, and this type of evaluation refers to the repeated and interactive assessment of learners' progress to understand and identify their educational needs, with its main goal being the improvement and enhancement of learning.

Given the importance of the evaluation element in the curriculum, especially in the context of virtual education, which comes with challenges such as academic dishonesty and cheating, lack of face-to-face interaction, and ambiguity in the quality of learners' learning, formative evaluation is one of the key strategies to improve the evaluation process. During the widespread COVID-19 pandemic, this strategy has been used in various forms by students and professors, and in some cases, it has presented challenges for them. Examining these challenges and experiences to improve the formative evaluation process in both virtual and in-person education can be beneficial. Therefore, the present research aims to explore Professors' lived experiences about the Formative evaluation during virtual education and addresses the following questions:

1) How is the quality of students' learning based on the implementation of formative evaluation?

2) What are the challenges and obstacles to the high-quality implementation of formative evaluation?

3) What are the effective strategies and actions for the high-quality implementation of formative evaluation?

Given the importance of the topic, especially during the COVID-19 pandemic, several studies have been conducted, including: Moniri, Geramipour, and Rostagarpour (2023) A study concluded that the efficiency of the educational system and the development of virtual education are at an optimal level. However, it was found that the virtual classes studied were not adequate in terms of creating a learner-centered environment, talent identification, and meeting the educational needs of students. They also lacked in areas such as student participation in online teaching and learning discussions, institutionalizing formative assessment, empowering instructors in formative assessment, and addressing gaps and deficiencies in student learning. Zelenska, Kundra, and Gallaidin (2022) concluded in their study that formative evaluation changes the interaction between teachers and students. Positive, repeated evaluations help

learners focus on progress rather than grading. In another study, Kubena (2021) concluded that evaluation should be conducted in a way that enhances higher-order skills through dynamic activities, benefiting metacognition and self-regulation in the educational process. Additionally, Nagandella, Soliha, and Nalie (2018) found that online formative evaluations are perceived as tools that promote self-directed learning, improved knowledge, and learning tailored to individual needs and learning styles.

Research Methodology

This research was conducted with a qualitative approach and a phenomenological design. The statistical population of the study included 458 faculty members of Bu-Ali Sina University. After conducting interviews with 10 of them using purposive sampling and the snowball method, the sampling process continued until reaching the level of theoretical saturation of the findings. The data collection process was carried out through semi-structured interviews with three main questions by the researchers in the faculty members' offices, both visually and audibly. The interview texts were then transcribed and analyzed using MAXQDA software. For analyzing the data obtained from the interviews with the participating professors, three stages of coding were employed: open coding, axial coding, and selective coding.

Research Findings

Based on the research findings from the analysis and coding of the data, the participating faculty members believe that the following factors are discussable regarding formative evaluation during virtual education: 1) Meaningful and qualitative learning includes the following points: deep learning, process-oriented learning, attention to learner differences to improve mental and ethical health, and reduction of exam stress and anxiety. 2) Weakness in Evaluation Culture and Human Resources, which includes: unfamiliarity of professors and students with the culture of implementing formative evaluation, weakness in the execution of various formative evaluation methods, and lack of alignment between the educational system culture and formative evaluation. 3) Weaknesses in Infrastructure and Facilities, such as weaknesses in network communications and technical platforms, and lack of smart equipment for professors and students.4) Enhancing Professors' Pedagogical Knowledge, through familiarizing them with basic teaching skills, using concept maps and deepening learning, planning and managing quality classes, and employing diverse and quality evaluation strategies. The following sections will elaborate on these points.

1. How is the quality of students' learning based on the implementation of formative evaluation?

   Based on Table (1), the research findings to answer the first question showed that the quality of students' learning, based on the implementation of formative evaluation, is meaningful and qualitative. It includes dimensions such as deep learning, process-oriented learning, attention to learners' differences, improvement of mental and moral health, and reduction of exam stress and anxiety. Formative evaluation is a process that allows learners to receive continuous feedback throughout the educational period. This type of evaluation focuses on meaningful learning and helps students improve their learning path by considering their strengths and weaknesses (Younis et al., 2024). In other words, more value is placed on the learning process rather than solely on the final results. This can lead to deeper learning and encourage students to better understand the materials and apply them practically. Additionally, formative evaluation helps in addressing individual differences in learning. This method enables professors to respond to the specific needs of each student and, by adjusting teaching methods, create optimal conditions for learning. This support can positively impact students' mental health and reduce their stress and anxiety, as they feel supported in their learning journey and do not need to stress about final exams.

Ultimately, this can lead to enhanced learning quality and academic success for students (Khorshid & Shaheed, 2023).

Table 1. Coding

Open codes	Axial codes	Selective codes
Failure to implement formative assessment leads to memorization of material and a lack of deep understanding and comprehension of learning. Formative assessment leads to improved learning, increased quality of student grades, high retention of learning, and improved quality of teaching.	Deep learning	Meaningful and qualitative learning
Evaluation of a learning process, formative evaluation to eliminate defects, discovering students' weaknesses, discovering educational program weaknesses, giving direction to learning, reducing students' cognitive load, formative evaluation as part of learning.	Process-oriented learning	
Orienting students' learning, using different learning styles by students, reducing the risk of evaluation impact, and increasing students' metacognition. Person-centered and student-centered.	Paying attention to learner differences in learning	
Reducing the level of stress and anxiety of students, reducing the impact of cheating factors, student density, increasing students' self-confidence, and increasing students' satisfaction with education.	Improving mental and moral health and reducing stress and exam anxiety	

2. What are the challenges and obstacles to the high-quality implementation of formative evaluation?
   Based on Table (2), the research findings addressing the second question regarding the challenges and obstacles to high-quality formative evaluation indicate two major challenges: weaknesses in the evaluation culture and human resources, and weaknesses in infrastructure and facilities. Weaknesses in the Evaluation Culture and Human Resources: Professors emphasized issues such as unfamiliarity of professors and students with the culture of implementing formative evaluation, weakness in the execution of various formative evaluation methods, and lack of alignment between the educational system culture and formative evaluation.Weaknesses in Infrastructure and Facilities: Two factors were identified in this dimension: weaknesses in network communications and technical platforms, and the lack of smart equipment for professors and students. In summary, the challenges and obstacles to high-quality formative evaluation include several key factors. One of the most important challenges is the lack of sufficient awareness and knowledge among instructors about formative evaluation, which has been reported in many studies (De Quinn & Kherani, 2024). Additionally, the lack of effective assessment tools and appropriate technologies exacerbates the existing challenges (Wu, 2023).

Table 2. Coding

Open codes	Axial codes	Selective codes
The existence of a grade-oriented culture among students, certification in the educational system, students' unfamiliarity with the culture of formative evaluation, and not setting criteria for student learning.	Lack of familiarity of professors and students with the culture of implementing formative evaluation	Weakness in evaluation culture and human resources

Open codes	Axial codes	Selective codes
Weakness in the knowledge and skills of professors in implementing formative evaluation, attention to the quantitative paradigm, lack of familiarity of professors with formative evaluation patterns and models, lack of attention by some professors to student learning, weakness in internal motivation to implement evaluation	Weakness in implementing various methods of formative evaluation	
Administrative and structural obstacles in implementing formative evaluation, failure to implement formative evaluation by all professors and creating resistance in students, some professors and university administrators not getting used to formative evaluation	Weakness in coordination between the culture of the educational system and formative evaluation	
Low level of university courseware facilities, lack of appropriate and sufficient technical infrastructure, lack of appropriate hardware and software, low internet speed, limitation of sending simultaneous audio feedback to students.	Weakness in network communications technical platforms and infrastructure	Weakness in infrastructure and facilities
Students' inability to purchase computers and smartphones, lack of access to the Internet and smart devices for all students, and limitations in the capacity of files by professors in the courseware.	Lack of smart equipment for professors and students	

3. What are the effective strategies and actions for the high-quality implementation of formative evaluation?

   Based on Table (3), the research findings addressing the third question, which concerns the strategies and effective actions for high-quality formative evaluation, indicate that enhancing the pedagogical knowledge of professors is the most important strategy for improving the quality of formative evaluation. In this regard, four main codes were identified: familiarity with basic teaching skills, using concept maps and deepening learning, employing quality classroom planning and management, and using diverse and qualitative evaluation strategies. Effective strategies for high-quality formative evaluation include using diverse and interaction-based methods. One such method is dialogic teaching, which aids in the improvement of formative evaluation through meaningful dialogues between teacher and student, enhancing critical thinking and deep learning (Bigim, 2024). Additionally, providing written feedback to students also helps improve their performance in final evaluations. Ultimately, these strategies can contribute to enhancing the quality of learning and formative evaluation in educational environments (Goodwin & Nathaniel, 2023).

Table 3. Coding

Open coding	Axial coding	Selective coding
Setting learning goals, familiarizing students with their favorite assignments, using active participation	Familiarity with basic teaching skills	Strengthening the Professor's pedagogical knowledge
Defining meaningful projects for students, creating creativity and innovation in	Using concept maps and deepening learning	

Open coding	Axial coding	Selective coding
considering all levels of learning in formative assessment, setting criteria for student learning, using cognitive and motivational engagement, defining original projects for formative assessment		
Giving positive feedback to students, explaining formative assessment to students, using a student-centered approach	Using qualitative classroom planning and management	
Participatory nature of formative assessment, distributing assessment scores throughout the semester by professors, having precise and coherent planning in implementing assessment, implementing assessment in an interactive and participatory manner, using performance assessment, having an assessment plan, using descriptive assessment, implementing formative assessment in the form of assignments and projects	Using diverse and qualitative assessment strategies	

Conclusion and Recommendations

The outbreak of the COVID-19 pandemic had profound impacts on various aspects of human life, particularly on educational systems worldwide, leading to changes in the functioning of educational institutions. These changes created numerous challenges in accessing education and maintaining students' learning progress. Given the physical limitations and the need to safeguard public health, turning to electronic education emerged as a practical and effective solution. While e-learning offers numerous advantages, primarily facilitating access to education for learners, it also presents certain challenges. In such an environment, evaluating learners becomes a fundamental challenge that education specialists must address. Learner evaluation is an essential element of the learning environment (Gikandi, Morrow & Davis, 2011); therefore, this study explores the lived experiences of professors with formative evaluation during virtual education. Although qualitative interviews with a limited number of participants cannot statistically provide generalizable results, they can reveal hidden and often overlooked layers in this field.

The research results showed that the quality of student learning based on the implementation of formative assessment was meaningful and qualitative learning, which includes aspects of deep learning, process-oriented learning, attention to learner differences, improvement of mental and ethical health, and reduction of exam stress and anxiety. The findings indicated two main challenges: weaknesses in the culture of assessment and human resources, and weaknesses in infrastructure and facilities. In terms of weaknesses in the culture of assessment and human resources, issues such as the lack of familiarity of professors and students with the culture of formative assessment, weaknesses in the implementation of various formative assessment methods, and a lack of coordination between the educational system culture and formative assessment were emphasized by professors. In terms of weaknesses in infrastructure and facilities, two factors were identified: weaknesses in network communications and technical infrastructure, and a shortage of smart equipment for professors and students. Ultimately, the findings showed that enhancing the pedagogical knowledge of professors is the most important strategy for improving the quality of formative assessment. In this regard, four core codes were identified: familiarity with basic teaching skills, the use of concept maps and deepening learning, the use of planning and qualitative classroom management, and the use of diverse and qualitative assessment strategies. The obtained results not only indicate multiple challenges in this area but also do not contradict the findings of some previous studies. The results of this research are clearly in line with the findings of studies by Noormohamadi and Khosravipour (2021), Tari and et al

(2017), Arianmehr and et al (2021), Zamani and et al (2016), Beigideh Abadi and Marzanjoushi (2021), and Balni (2015). In general, the results of these studies point to significant challenges in the field of virtual education, including technical support issues, insufficient access to hardware and software, bandwidth limitations, and low internet speed. The main problem in implementing formative assessment is the lack of minimum suitable hardware and software facilities. Additionally, poor access to the internet and network, lack of proper training in the field of e-learning, and lack of technical support are barriers to formative assessment in online courses. There is a weakness in telecommunications infrastructure for both groups of learners and instructors. Moreover, pedagogical challenges such as instructors' unfamiliarity with the structure and technologies used in virtual courses and the low computer and information literacy of students add to these issues. Other problems include the lack of an appropriate lesson plan, lack of clear assessment, lack of consistent planning, and low internet speed, which affect the effectiveness of virtual education. It can be said that assessment is conducted to increase learners' learning outcomes and determine the next steps in learning; in other words, it is a continuous process for learners and instructors to provide and receive feedback based on it (Hong et al., 2018). Online formative assessment can influence how we conceptualize and design learning and teaching, especially in electronic learning environments, and it can enhance learning experiences through increased engagement (Gikandi, 2021). This assessment takes place throughout the instructional design. This process involves evaluating instructional materials and educational content to obtain feedback, which in turn guides revisions to make teaching more efficient and effective (Morrison et al., 2019), and it is a strategy that enables students to become aware of their learning status and create ways to address identified shortcomings (Tortajada-Genaro, 2022).

Therefore, the implementation of modern technologies in virtual education in the country's universities requires the development of infrastructure, increased internet bandwidth nationwide, reduced internet costs for students and professors, the employment of technical and support specialists to address issues arising from users' low computer literacy, and the empowerment of professors and instructors in various dimensions, especially pedagogical and educational knowledge. University professors, regardless of their specialized field, should be equipped with a set of knowledge and skills such as teaching strategies, evaluation, and classroom management. It is the responsibility of the educational institution to prioritize the development of necessary infrastructure as well as the empowerment and development of human resources.

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Conflict of interest
The authors declare that there are no conflicts of interest regarding the publication of this manuscript.

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