

Formative evaluation in a virtual context: A systematic review

Evaluación formativa en un contexto virtual: una revisión sistemática

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Resumen

El objetivo de la investigación fue analizar las publicaciones realizadas sobre evaluación formativa en un contexto virtual. El método que se aplicó fue un enfoque cualitativo, revisión sistemática, se desarrolló la metodología del diagrama PRISMA, se utilizó las bases de datos Scopus, EBSCO, ProQuest, OneFile y Eric para la búsqueda de artículos científicos mediante el uso de ecuaciones booleanas de las cuales 108 fueron inicialmente seleccionados, finalmente reducidos a 40. Los hallazgos permitieron identificar que la evaluación formativa en el contexto de la virtualidad es un proceso importante que permite tanto a docentes como a estudiantes realizar reajustes en el proceso de enseñanza-aprendizaje y tomar decisiones para mejorar el aprendizaje. retroalimentación formativa de calidad, actitud positiva hacia la evaluación y uso adecuado de las herramientas tecnológicas, incluyéndolas como grandes aliadas. Entre las conclusiones se encuentran que la evaluación formativa implica el desarrollo de diversas estrategias que permitan el aprendizaje de los estudiantes; así como retroalimentación que ayude a identificar avances y aspectos de mejora en el aprendizaje; a partir de la autoevaluación y la evaluación por pares, se permite la interacción y la confianza en sí mismos en los estudiantes y finalmente, el uso de herramientas tecnológicas facilita la realización de la evaluación formativa de manera virtual.

Palabras claves: Evaluación formativa, retroalimentación, autoevaluación, evaluación por pares y herramientas tecnológicas.

Abstract


The objective of the research was to analyze the publications made regarding formative assessment in a virtual context. The method that was applied was a qualitative approach, systematic review, the methodology of the PRISMA diagram was developed, the Scopus, EBSCO, ProQuest, OneFile and Eric databases were used to search for scientific articles through the use of Boolean equations of which 108 were initially selected, finally reduced to 40. The findings allowed us to identify that formative assessment in the context of virtuality is an important process that allows both teachers and students to make readjustments in the teaching-learning process and to make decisions to improve learning. quality formative feedback, positive attitude towards evaluation and appropriate use of technological tools, including them as great allies. Among the conclusions are that formative assessment involves the development of various strategies that allow student learning; as well as feedback that helps to identify progress and aspects of improvement in learning; from self-evaluation and peer evaluation, interaction and self-confidence are allowed in students and finally, the use of technological tools makes it easier to carry out formative assessment virtually.

Keywords: Formative assessment, feedback, self-assessment, peer assessment and technological tools.



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Introduction

Formative assessment in virtual contexts is considered a permanent process of very important improvement in the educational work since it takes into account the permanent compilation of evidence to analyze and reflect on the achievements achieved, allowing to rethink pedagogical strategies in search of the improvement of students' learning (Wqfubwa, 2020). The primary purpose of this assessment is to inform and engage students in learning actions, influencing the affective aspect of the educational process (Çekiç, & Bakla, 2021). Likewise, it has a positive impact when the teacher gives them feedback on what has been analyzed (Gezer et. al, 2021), since it allows them to make the corresponding improvements and achieve the expected learning. On the other hand, formative assessment, according to Ayalon, & Wilkie (2021) is very valuable for students; however, it is a very complex process for teachers in virtual education, constituting a constant challenge.

In the global context, there are several studies that address this category, among which is the research carried out by Díaz (2018) who said that for formative assessment to impact student learning, it is necessary to It must be present in the teachers' paradigm and be coherently related to the purpose of the curricular areas and learning outcomes. On the other hand, González et al. (2020) asserted that teachers, by applying formative assessment, contribute to student participation, benefiting them in their learning. Likewise, formative assessment allows students to manage their own learning, achieving their autonomy and self-regulating their learning (Cunill, & Curbelo, 2021). That is why education professionals must take it into account and apply it, understanding that an adequate formative assessment will contribute to the progress of educational quality and raise learning standards.

In the virtual work carried out, formative assessment takes on greater meaning and importance due to the fact that in this modality the teacher and the student are distanced in space; This implies that the student develops autonomy competencies; It is necessary for the teacher to make use of the formative assessment process based on self-assessment and co-assessment; However, this is complicated in the virtual modality because the teacher often focuses more on hetero-evaluation, making this a permanent challenge.

As is public knowledge, education has now undergone radical changes in the way classes are taught, with Information and Communication Technologies (ICTs) being indispensable allies of the education sector. In this regard, Viñoles-Cosentino et al. (2021) considered the importance of the digital tool in formative assessment in a

virtual context; They also referred to the need for teachers to continue developing their digital skills to optimally carry out their classes, incorporating digital strategies on an ongoing basis, so that education can continue.

Based on the above approach, the aim of the research was to analyze the publications made regarding formative assessment in a virtual context.

Formative Assessment: Theoretical Considerations

Formative assessment is a process of analysis of results that includes feedback on learning throughout the development of class sessions (Alharbi et al., 2021). This process allows the teacher and students to know and share the learning purposes, which allow them to make adjustments to teaching and learning strategies in order to achieve the goals (Hidalgo, 2021). This evaluation involves proper planning, which will benefit both teachers and students; since it will allow the student's learning evidence to be used to readjust teaching processes and modify learning strategies (Popham, 2013 cited in Calderon, 2021).

The importance of formative assessment lies in the fact that it seeks to make the student the main actor and responsible for regulating their own learning, getting involved in the assessment process in a conscious and responsible way (Gros & Cano, 2021).

The objective of this assessment is to increase the achievement of students' learning, constantly motivating them based on their achievements and successes (Hidalgo, 2021).

The subcategories that have been considered in this study are: Strategies, Feedback, Self-Assessment and Peer Evaluation and Technological Tools.

Strategies

Strategies are procedures that allow an objective to be achieved through the implementation of planned actions; therefore, there is a need to consider as a strategy the intensive training of teachers in teaching and assessment issues through the use of technology so that they are prepared to take on the challenges demanded by virtual education (Sa'di et al., 2021).

In this context, it is necessary for teachers to acquire strategies that allow them to develop their capacities and skills required to carry out teaching work efficiently, using various strategies, including the use of ICTs, so that they can carry out optimal and quality work, which responds to current demands (Ehren et al., 2021).

Feedback

Feedback is a process that takes place in a given learning context and is effective when there is initial knowledge (Moreno, 2021). This process makes it possible to make judgments regarding the teaching-learning process, to know how students are progressing and how much they have been learning, so that, based on this, timely decision-making can be made. The authors, Cano et al. (2020, cited in Moreno, 2021) presented three modes of feedback: information, which refers to the information that the student receives about his or her task; interaction, in which a dialogue is developed between the teacher and the student about a task in order to deepen its good performance; and action, refers to a range of activities that the student carries out based on the information received to improve their work. In the same vein, feedback is considered a constant process that occurs in three periods: giving and receiving information, processing and understanding information, and making decisions to improve the expected learning (Guasch, & Espasa, 2015 cited in Espasa-Roca, & Guasch-Pascual, 2021).

Self-Assessment and Peer Assessment

Self-assessment is a practice where students become aware of their own learning, in order to transform and modify it (Basurto-Mendoza et al., 2021). On the other hand, Klenowski (1995, cited in Ustabulut, 2021) stated that it consists of making a certain judgment about the person's own situation. This strategy allows the teacher to spend more time supporting students in other relevant aspects of the learning process (Ustabulut, 2021).

Peer assessment is a strategy in which a student evaluates the quality of evidence of learning from another student of the same level, understood as a process in which they provide information, either descriptive or improving, about the work of their fellow student (Huertas-Abril et al., 2021). In this evaluation, it is important that the teacher provides clear guidelines to the students, seeking to actively involve them in the evaluation of their peers, thus achieving a better understanding of the activities developed. This strategy, carried out, requires the student to assume the role of evaluator to give feedback to their partner, being a complex process (Del Pozo, 2020), but very effective.

Technological tools

Technological tools are innovative resources that force a change in the pedagogical axis of teachers, the educational institution and the education policies themselves (Moliner & Chávez, 2019). Likewise, information and communication technologies are tools that allow knowledge to be processed, directed and shared through

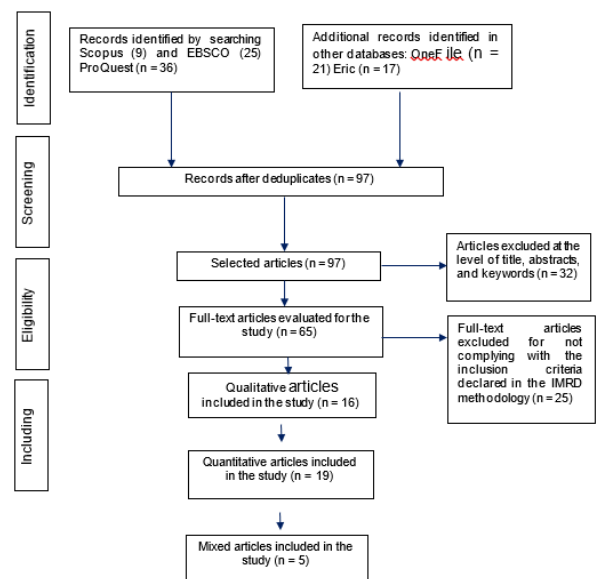
different technological devices, allowing interactions between users (Muñiz-López et al., 2021).

Methodology

The research methodology responds to a qualitative approach, systematic review based on the search for scientific references between the years 2020-2021 in the databases of Scopus, EBSCO, ProQuest, OneFile and ERIC. In this regard, Suyo-Vega et al. (2021) reported that these databases bring together journals whose publications are from different countries and different languages and meet criteria accepted by the scientific community. Systematic review is a type of scientific research that allows the review of scientific articles on a category and subcategories by applying systematic protocols to reach objective conclusions about that category. The research was carried out using Boolean equations "AND" and "OR"; taking into account searches in languages such as English and Spanish (Suyo-Vega et al., 2021). The equations used were "formative evaluation AND/OR Strategies", "formative evaluation AND/OR Feedback", "formative evaluation AND/OR Self and peer evaluation", "formative evaluation AND/OR Technological tools". A total of 108 scientific articles were obtained from the search, and after careful analysis, a selection of 40 was made. Within the inclusion criteria, articles with a qualitative, quantitative and mixed approach and that have the IMRD methodology were considered; within the exclusion criteria, articles that did not have a clear methodology and literature reviews were considered.

Figure 1

Formative Assessment Diagram



Source: Adapted from PRISMA, flowchart (Urrutia & Bonfill, 2010)

Of the 40 selected studies, 40% were qualitative, 47.5% quantitative and 12.5% mixed; 17.5% corresponded to the formative assessment strategies subcategory (5 of the 7 studies showed interrelation with the other subcategories); 32.5% to the feedback subcategory (7 of the 13 studies demonstrate interrelation with the other subcategories). 15% to the self-assessment and peer assessment subcategory (2 of the 6 studies demonstrate interrelation with the other subcategories) and 35% to the technological tools subcategory (5 of the 14 studies demonstrate interrelation with the other subcategories).

Results and discussion

Of the 40 selected studies, 40% were qualitative, 47.5% quantitative and 12.5% mixed; 17.5% corresponded to the formative assessment strategies subcategory (5 of the 7 studies showed interrelation with the other subcategories); 32.5% to the feedback subcategory (7 of the 13 studies demonstrate interrelation with the other subcategories). 15% to the self-assessment and peer assessment subcategory (2 of the 6 studies demonstrate interrelation with the other subcategories) and 35% to the technological tool's subcategory (5 of the 14 studies demonstrate interrelation with the other subcategories).

When analyzing the results in the sub-category strategies in formative assessment, it was found that educational institutions in the context of virtuality were not prepared for the development of virtual formative assessment strategies; Likewise, teachers showed distrust about the validity of the virtual assessment of students, fearing that it will not be carried out properly, harming the assessment, which aims to contribute to reflection on learning (Sa'di et al., 2021). On the other hand, in another study it was evidenced that those teachers who in the face-to-face modality were innovative in the strategies applied in their pedagogical practice are those who have been more predisposed to the modality of remote work, as well as those who had a knowledge of technologies, adapted their pedagogical practice in less time, in order to provide the educational service; however, it requires personal and collaborative organization in this new scenario (Ehren et al., 2021)

The formative assessment approach to teachers' pedagogical practices considers five strategies such as the presentation of class objectives, the presentation of evaluation criteria, student questioning and engagement, feedback, self-evaluation and peer evaluation; Some evidence of the application of these strategies was observed; however, only a minority of them were able to demonstrate the effective use of any specific strategy (Kanjee, 2020).

It is important to consider an adequate formative assessment strategy, in which the results reveal the proper development of this assessment, which increases the motivation and commitment of students, through the application of a creative and shared methodology, which considers play and feedback as important elements. It is therefore important to let students know, from the beginning of the development of the learning activity, what is expected of them, what they should develop and how they will be able to improve their learning.; The study shows that students are satisfied with the engagement generated by formative assessment, both individually and in groups; highlighting the teacher's confidence in the students' achievements (Bores-García et al., 2020).

On the other hand, a study shows how theories related to summative and formative assessment are often not taken into account by teachers, since in most cases they are only carried away by their dogmas; likewise, they report that teachers require adequate tools with perspectives on evaluation in relation to current norms (Ferretti et al., 2021); an alternative is Google Forms, which is a valuable tool that improves students' knowledge and self-efficacy, resulting in both students and teachers showing positive attitudes towards online formative assessment (Alharbi et al., 2021). Another of the strategies needed in formative assessment is the portfolio, which allows to evidence essential changes in decision-making and in the way, students face a problematic situation, in which the written feedback given by the teacher from the use of this strategy, gives them a new opportunity for reflection (Pessoa, & Dalto, 2020). Likewise, the structure of students' knowledge objectives related to teachers' self-efficacy and the use of formative assessment practices presented a statistically significant result (Xiang et al., 2020).

Diez-Gutiérrez, & Gajardo (2021) in their study concluded that online formative assessment is fairer, but it must use a diversity of strategies and instruments that allow assessing the progress of the work developed by students during the learning process and that it is also useful for students to know their strengths and weaknesses Likewise, a study on the application of a school-based formative assessment (SBA) model shows that there is no adequate guidance for teachers on the model to follow; being a negative aspect that prevents you from doing an optimal job; In addition, the high workload, the excessive number of students per classroom, as well as the absence of supervision and monitoring of the program by the authorities (Rahman et al., 2021). On the other hand, Novôa, & Nasser (2021) stated that assessment should be perceived as a formative strategy that allows the achievement of learning, since it is always possible to provide students with the possibility of understanding where they went wrong and correcting their

mistakes by themselves; This contributes significantly to their learning.

When analyzing the results of the subcategory feedback in formative assessment, it was found that through the development of an adaptive formative assessment system applied by teachers, using computerized adaptive tests and dynamic Bayesian networks, students can take elements and tests adaptively to receive personalized diagnostic feedback at a distance on progression of their learning in an efficient way (Choi, & Mcclenen, 2020); This is beneficial. On the other hand, a result shows that teachers are willing to give up some of their existing powers in the assessment process, such as using the digital system in assessment and feedback-DAFS as a means to find strategies and tools to increase student participation in the assessment and feedback process, these topics are widely discussed in the literature and some are already existing practices, therefore, this research did not contribute to the discovery of new knowledge; rather, the way in which student participation can be exercised from three areas of learning agency in DAFS: self-assessment, enabling a library at the level of a feedback program, and establishing a mechanism whereby grades are only sent to the student after the feedback is acted upon (Casanova et al., 2021).

The study carried out by Espasa-Roca, & Guasch-Pascual (2021) showed the need to plan strategies that seek to focus on the students' need for decision-making and address actions based on the feedback received; in order to rework and improve their evidence of learning. In the same way, the professional development of the teacher can focus on specific areas within the decision-making framework of the evaluation design that were compromised during the transition period from face-to-face to remote learning, such as feedback, which can be done through other means: such as audio or video, maintaining a quality educational service (Jaam et al., 2021).

The findings of (Haughney et al., 2020) demonstrated that quality feedback, conducted conscientiously, with accepted quality standards, such as being positive, concrete and relevant, which promotes the active participation of students, has a greater impact on success; Additional characteristics, in which feedback must be given throughout the learning process, being necessary to consider the preferences and needs of the students in order to directly influence the achievement of their learning. Likewise, they also demonstrated the importance of the active participation of students in the feedback process by testing the feasibility of the feedback design that involves different types of response on the feedback received by the teacher, the students recognized the positive impact of the individual feedback received and related its effectiveness to its possible practical application; They suggest further

research on the delivery and use of teacher feedback in relation to students' individual learning styles and self-regulation skills.

Formative feedback conducted by video, according to studies conducted by Cutting, & Larkin (2021) and Nikolaeva & Korol (2021) is positive; It makes it possible to easily share the computer screen and use images in the recording to present the ideas of the student, thus helping to connect the student with the learning environment, which allows an increase in self-reflection and bonding with the teacher. Likewise, effective feedback encourages teachers to reflect on their pedagogical practice, generating positive affective and cognitive impacts on students to achieve the learning purpose, getting them to carry out a self-evaluation to modify and adjust their learning styles to the strategy provided by the teacher and working simultaneously to create an appropriate learning environment (Milawati et al., 2021).

In the study by Jeong et al. (2020) it was shown that the motivation carried out by teachers, through feedback and logbooks, positively influences the participation of a sustainable and flipped online formative assessment interface, providing a sustainable and active learning methodology; in the case of teachers, they can differentiate their teaching method using adaptation assignments, feedback assignments and their records; the interface can be used to increase communication between students and teachers. The findings also show that the feedback given by peers fosters a model of improvement for students, both in the face-to-face and online modalities (Andrade et al., 2020). In addition, students who submitted notes on the progress of their work and received formative feedback for their assignment achieved better results than students who did not, the educational theory of effective feedback design was put into practice and it was shown to positively affect the educational outcomes of students in this module (Cobbold, & Wright, 2021).

Finally, the development of additional oral practices, supported by formative feedback, for the improvement of oral competence, from the participation of students in additional online oral activities, indicated that students recognized the benefits in terms of language learning and learning strategies, teachers recognized that peer-supported feedback helped to lessen their workload, with respect to correction, as they shared this responsibility with more advanced students (Bedford et al., 2020).

The results regarding the subcategory of self-assessment and peer assessment in formative assessment showed that teachers maintain a positive attitude towards formative assessment, highlighting that this assessment allows them to improve their work performance, and allows them to

improve their work performance. It allows a change in the perspective of assessment that includes peer assessment and self-assessment by students, taking into account the context and different techniques and strategies for their application (Huertas-Abril et al., 2021). In addition, another study reported that the practice of formative peer assessment has a favorable impact on student learning, as it allows for student intervention, knowledge sharing, and learning enhancement (Arif et al., 2021).

Another result shows an evaluation model in which the purpose of learning is considered, as well as the achievement criteria and peer evaluation, contributing to the modeling of a strategy to develop skills in students, allowing the achievement of their learning (Wafubwa, & Csíkos, 2020). Another study revealed that a large number of students were able to assess a peer-to-peer oral performance and to self-assess with an acceptable degree of accuracy, demonstrating that it is important for them to know the assessment criteria, which allow them to know what is expected of them; This also allowed students to be engaged, helping them to feel better prepared to successfully carry out their final oral evaluations (Del Pozo, 2020). Likewise, Chorrojprasert (2021) confirmed the benefits of peer assessment and feedback as it allows the improvement of students' knowledge, cognitive skills, criticality and autonomy; Therefore, it is necessary for teachers to manage formative assessment and apply it appropriately with their students.

Regarding the category of technological tools in formative assessment, the study carried out by Silvis-Cividjian et al. (2021) revealed that teachers have been incorporating technological tools into their praxis and providing students with the challenge of using it as an adequate substitute for the traditional pencil and paper exam, which was very well received by students during distance education. Likewise, García (2021) stated that formative assessment through the use of technological tools has benefits in different educational systems, whether distance or virtual.

A study revealed that in the distance context there are difficulties in formative assessment and this is partly due to a partial knowledge of the possibilities offered by technologies and the socio-political context in which the teacher operates (Ferretti et al., 2021). On the other hand, researchers Major, et al. (2020) conducted a study on the development of ICT-based formative assessment, the first phase of the research was an introductory study that consisted of the distribution of a questionnaire, product development, validation of experience in materials and media, small range experiment and product review, being the advisable and compatible result for the improvement of learning.

The researchers, Bashitialshaaer et al. (2021) concluded that in distance education there are difficulties in achieving the application of electronic exams, with the underlying vulnerability of the electricity supply and the grid being a major problem. Therefore, it is necessary to establish policies to support and guide teachers and students in order to facilitate their integration and adaptability so that they can achieve the expected results. Finally, the impact of this health crisis on education has shown the potential of distance learning, whether synchronous or asynchronous; whereas, the remote evaluation process still raises technical, functional, and ontological controversies that need to be addressed and improved (García-Alberti et al., 2021).

On the other hand, the results presented by Grier et al. (2021) showed that teachers use technology assessments in their classrooms; It is important that they consider that students have different interests and characteristics; therefore, teachers to meet these needs, must consider a variety of technological assessments such as Kahoot, for those who prefer to compete, and those who do not, can use the Google form; because, If only one type of assessment is chosen, it may be inefficient and of little interest to some students.

Another technological application is Tryout, which allows teachers to give feedback individually and in groups, based on comments and information, also the teacher can discuss students' learning difficulties using the Webvoting application. The web-based formative feedback system, which uses isomorphic multiple-choice items, has been shown to provide more specific feedback for both students and teachers, not only because of the score that these conventional multiple-choice tests usually give, but also because of the student's proficiency in the a specific learning indicator (Kusairi, 2020).

On the other hand, the study conducted by RR, et al. (2020) revealed that inexperienced teachers find the adoption of the practice of questioning quite complicated and need extensive support to change their practice. The results indicated that all closed-ended items were common to all the tools examined and were automatically graded, while only some of them offered underdeveloped methods for grading open-ended items. All of the tools provided students with various forms of data and different feedback mechanisms; although, the most common form of data was immediate responses and numerical scores (Çekiç, & Bakla, 2021). Another study shows that performance, positive motivation, feedback, and logs have a positive influence with 98.6% participation in the sustainable, flipped online formative assessment interface (Jeong et al., 2020).

Another important finding is that students are satisfied with the performance of formative assessments through the incorporation of technological tools made by teachers, as it allows them to carry out collaborative work during the tests, have enriched materials and adequate time to carry out. In general, they have positive views on digital formative assessment; however, they are dissatisfied with the technical issues they encountered during the administration of the digital formative tests (Çetin, 2021).

Conclusions

Formative assessment in a virtual context is an important process of analysis of the results that allows both the teacher and the students to make adjustments to the teaching-learning strategies and to make decisions that allow the achievement of the established objectives. There are difficulties, among which we can mention electronic assessments, which are often interrupted due to lack of electricity or deficiencies in the network service. Formative assessment is important because it allows students to regulate their own learning process and allows teachers to evaluate students' evidence in order to make adjustments to the teaching process and achieve the expected results.

The strategies used by the teachers in the virtual spaces are varied, mainly the presentation of the objectives of the class, the presentation of the evaluation criteria, the questioning and commitment of the student, the feedback, self-evaluation and evaluation in the classroom. peers as an appropriate strategy for conducting formative assessment; as this increases the motivation and commitment of the students. Likewise, other strategies in the context of virtuality are the use of virtual tools such as the Google form and the portfolio as a formative assessment strategy, which allows to evidence essential changes in decision-making and in the way, students face a problematic situation, in which the written feedback given by the teacher from the use of this strategy, gives them a new opportunity to improve their evidence of learning.

In the virtual modality, teachers have been providing formative feedback to students, thus changing the focus of assessment that is generally considered for grading purposes. Likewise, the execution of formative feedback through the use of various strategies such as the portfolio, the use of the rubric for peer-to-peer feedback, the use of a structured guide, as well as the incorporation of technology through the use of videos to provide personalized feedback to students is beneficial in learning. On the other hand, considering teacher training in the application of feedback is very important for it to be carried out in a relevant way; as well as, generating a climate of trust between teachers and students, taking into account the context and their learning needs.

Self-assessment is the assessment that the student makes to himself and peer assessment is the one that is carried out between peers, both are strategies of formative assessment that has been applied in this distance modality; being peer assessment the one that has the greatest benefits in students, allowing them to develop their self-confidence, autonomy, critical thinking, and learning from mistakes; as well as maintaining a positive attitude towards evaluation, understanding it as a formative process and not just an act for grading purposes. It is important that in order to carry out the self-assessment and the peer assessment, the teacher informs the students of the criteria that will be taken into account in order to know what is expected of them.

Technological tools are a great ally of formative assessment in virtual contexts, because they allow feedback to be provided to students through the use of various tools such as Tryout, Kahoot, Webvoting, Google Form, either individually or among peers, it is therefore necessary for teachers to know how to use them in a relevant way.

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