PADLET AS A TECHNOLOGICAL TOOL FOR FORMATIVE FEEDBACK IN UNIVERSITY STUDENTS

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KEYWORDS	ABSTRACT
Teaching *Learning* *Padlet* *University* *Student* *Feedback* *ICT*	*The teaching of mathematics in virtual classes is a challenge for the teacher, who currently relies on technology to teach his class; however, the absence of individual formative feedback has been detected. One way to do it is the use of the Padlet; Thus, the objective of the research was to know the student's satisfaction about the use of the Padlet platform. The study was carried out on 40 students through a questionnaire. The results showed that the largest number of students were satisfied with its use and perceived an improvement in the motivation of the course.*

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1. Introduction

In the face-to-face Mathematics classes, the teacher, after finishing the dictation of his subject, asked the students to develop the proposed exercises individually and explain the process to verify what they had learned; and finally the feedback was given, but without neglecting to answer the questions about the difficulties they presented at the time of development. However, during the virtual classes it was not possible to continue with this methodology because the teacher could not monitor the students due to the fact that only the videoconference platform was used, which did not allow to follow up the student's work or to verify if all of them were developing the proposed exercises. Therefore, during the first virtual cycle, students were asked to develop the exercises conscientiously for a time between fifteen to twenty minutes, then the teacher requested the final answers through the chat or using the microphone, but very few responded and the teacher was realizing that student participation was very low (Reinholz et al., 2020); then, the teacher developed the exercise together with them, however, the teacher was left with the doubt of knowing if the student had really understood the topic since no formative feedback could be given.

Formative feedback consists of delivering and showing detailed information and comments to the student about their achievements or progress with respect to the expected skills and abilities (Nikolaeva & Korol, 2021), valuing the performance performed, that is, not only praising or criticizing without basis but based on the learning objectives of the subject (Melesko & Ramanauskaite, 2021); however, it is necessary to generate positive attitudes to learning and promoting motivation. In this way, the student will be able to improve his performance after making the corrections indicated by the teacher (Llorens et al., 2015).

This feedback process improves teaching practice (Contreras, 2018), because it can make readjustments to its teaching and communication methods after understanding the processes followed by students; which allows strengthening students' learning and thus decreasing the gap between their current and expected achievement levels (D'Souza et al., 2021; Castagnola et al., 2021).

In addition, during virtual classes it is necessary to use technological tools that not only allow comments to be made on the students' work, but that must have a certain degree of interaction in order to be valued by the students (Julia et al.,2021) and to improve the quality of teaching. Thus, in order to provide formative feedback in virtual mathematics classes, it was decided to find out about some technological tools or platforms that were inexpensive and easy to use for the teacher and for the student; and that allow promoting student participation and providing individualized formative feedback (Holguin-Alvarez et al., 2020). Thus, the Padlet platform was chosen and applied during the teaching of the mathematics course.

According to the background review, it was observed that the Padlet platform has been used as a strategy for the teaching and learning process at different educational levels such as basic education and university. The information gathered indicates that it has been used in the teaching of various courses such as language, writing, communication, ecology, languages, chemistry and programming (Arif et al., 2020; Etfita & Wahyuni, 2020; Hursen, 2021). Its use has been proposed for individual or collaborative work (Mehta et al., 2021), and it was requested to write sentences or comments, upload images and documents worked by students, given that it is a platform that stores information in the cloud and displays the answers in an organized manner (Siegle, 2020). It could be identified that students improved their learning experience in their courses (Lomicka & Ducate, 2021), also, research collected indicates an increase in motivation, participation and positive perception of students towards the lecture delivery (Chen, 2021; Poloju & Naidu, 2020). In addition, an increase in students' academic performance is highlighted, indicating that meaningful learning was achieved due to the use of Padlet in classes (Adulyasas et al., 2021; Pardo-Cueva et al., 2020; Sætra, 2021).

However, one of the investigations showed a disadvantage regarding the use of Padlet by the teacher (Rosnida & Zainal, 2017), and that is that the teacher's comments to the students' activities were not made immediately but took seven minutes at most, which originated in the students a low perception in the use of the platform. Despite having several results about the use of Padlet, very little literature has been found about

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its use in mathematics courses, however, the results found are encouraging to start working with this tool and use it as a support for the teaching-learning of the course.

2. Development of the research

Padlet is a free web 2.0 platform with cloud storage, in which you can create virtual murals and perform multiple activities such as taking photos, uploading images or files, inserting gifs, writing texts.

In this research, Padlet was used as a technological tool to provide formative feedback on the development of the mathematics exercises that students placed on the mural prepared by the teacher, for which they can do it from their cell phone or computer without the need to download or install any application. In addition, it is possible to work synchronously with teacher monitoring and offers various tools to provide formative feedback.

In order to use the Padlet platform (https://Padlet.com/auth/login) you need to log in using a Gmail, Microsoft or Apple account; however, if it is the first time you log in, you will be able to link directly by accepting the requested permissions. Then, to start customizing the mural, click on the + Make a Padlet icon to create a Padlet mural and choose from the options provided by the platform, write the title, and to provide feedback, enable the comments and reactions option. Then, the first message to be placed in the panel are the indications of what the student should do, in this case the number of the exercise to be done is indicated, which can be found in the class material. Finally, the shared Padlet link is copied, to send it to the students at the time of the individual work part.

Table 1 shows the plan prepared for the delivery of the course, which has a duration of 150 minutes.

Table 1. Lesson plan design

	Activity	Description	Time (minutes)
1	Planning	Creation of a Padlet panel with the indications.	Before class
2	Content development	Delivery of the first part of the theoretical class	70
3	Practical part and feedback	Individual work and formative feedback with Padlet	60
4	Closing	Final feedback and directions for the next class	20

Source: Own elaboration

As indicated in the details of Table 1, first the theoretical part is explained and examples are solved with the participation of the students. Then, at the beginning of the individual development part of the exercises, the shared link of Padlet is sent through the videoconference chat and the delegate is asked to forward it to the course WhatsApp group. In this part, students are asked to solve the proposed exercises, then, take a picture of the solution of their exercise or of their progress and upload it to the Padlet wall placing their name as title; in addition, they are asked to be attentive to the feedback that the teacher makes on their work and that they try to correct the observations made, finally, the student edits or uploads again the image of the corrected development.

The following sequence shows the work done by one student and the teacher, which is replicated for all the others:

1) The student solves the exercise or progress in his/her workbook, takes the photo with his/her cell phone, enters the link and uploads the photo of his/her development, places his/her name as the title and publishes it.

2) In the teacher's computer a Padlet notification appears indicating that someone has uploaded an image, then, the teacher reviews the student's solution and gives feedback, for which two tools were used: Comments, which allow to write below the solution the strengths, weaknesses in the development of the exercise and suggestions to correct the development; in addition, the tool Give Stars was used: This is a very useful tool because all students would like the 5 stars and when they do not reach them, they read the teacher's comments and correct, unlike the use of comments alone, which does not attract their attention and for that reason they do not make any corrections in most cases.

3) The student receives the grade notification and comments from the teacher, reviews them and corrects them if they do not have 5 stars (see Figure 1).

Figure 1. Mural worked with formative feedback.
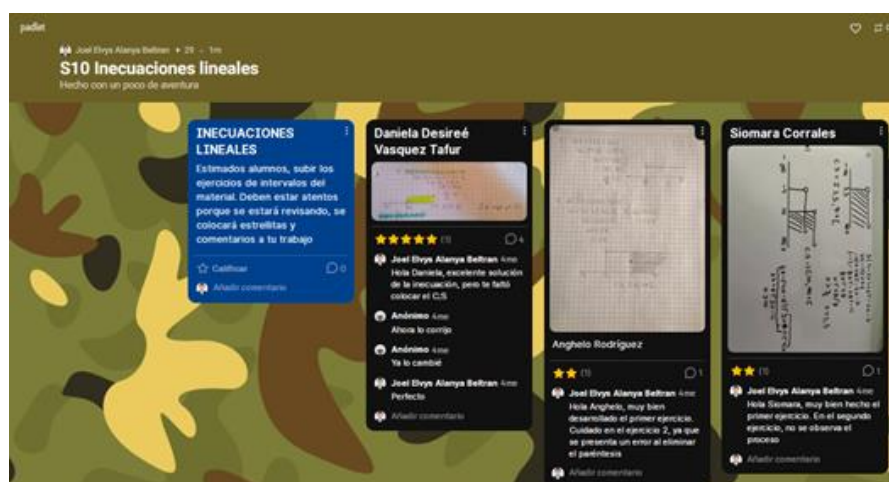
Source: Own elaboration

Class after class, there was evidence of an improvement in the development of the exercises by the students, who followed the steps and suggestions indicated by the teacher during the class. The experience with the Padlet platform was worked with first year students of Architecture in the mathematics leveling course of a private university in Lima, Peru. The sample size was 40 students, who participated during the first semester of the year 2021. At the end of the academic cycle, a satisfaction test was applied regarding the use of the Padlet platform as a technological tool for formative feedback, for which a questionnaire was applied using an online form.

3. Results

During the first class sessions with Padlet, the students were satisfied, and stated that in their experience it was the first time in a math course that the teacher gave personalized feedback, and indicated that next class they would get the 5 stars the first time they uploaded the exercise.

The results of the questionnaire showed that 85% stated that the use of Padlet facilitated their learning and allowed them to consolidate their knowledge; furthermore, 92% indicated that it increased their participation

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and 90% that it promoted their participation. On the other hand, although 82% indicated that it is a very easy tool to use, 22% stated that they had problems accessing the Padlet wall. Finally, 93% indicated a high level of satisfaction with the use of Padlet.

The results indicate that the use of Padlet as a formative feedback tool in the mathematics leveling course generated positive satisfaction in the students. The support of the various Padlet tools was important to generate quality formative feedback, given that it allowed the assessment with the use of stars, and the space to place assertive and clear comments, which generates a significant impact on the motivation of students (Hung, 2021). In addition, it was important for this study, that the Padlet platform is easy to use for the student, since it allowed their participation in the classes and boosted the improvement of teaching-learning by consolidating knowledge and showing satisfaction with learning (Arif et al., 2020; DeWitt & Koh, 2020; Ploj, 2021). Finally, teachers must self-evaluate and make the necessary changes in their methodology to teach according to how their students learn (Nikolaeva & Korol, 2021).

4. Conclusions

The findings show that formative and interactive feedback can be provided in mathematics classes using the PADLET platform, since it is possible to evaluate and comment on the development of the exercises performed by the student during the class, and it also generated a high level of student satisfaction.

The interest in verifying what each student has learned is considered fundamental, motivating inclusion and active feedback, for which it is necessary to allocate adequate time to the understanding and development of the activities during class, since the student wants his teacher to guide him and care about his learning, otherwise he will lose motivation and participation in the class. The intention is to encourage teachers to reflect on this and replicate the experience in their classes with the use of Padlet.

On the other hand, since this experience was only carried out for individual activity, its use is recommended for collaborative activities, for which other tools provided by Padlet could be used; in addition, it is suggested to use it in the Flipped-Classroom methodology. Therefore, it is necessary to conduct further research to verify if the above is sustainable or in correlational studies with variables such as academic performance, among others.

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