NEW TEACHING STRATEGY REUSING MULTIMEDIA MATERIALS: DIFFERENT USES OF THE QUIZ RESOURCE

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The pandemic and forced social isolation in 2020 prompted a radical change in teaching strategies. This situation was maintained in the 2021 academic year and there was a rethinking of the methodology used in distance education. In a first statistics course offered by the Faculty of Economics at the National University of Cordoba (UNC), Argentina in 2021, the didactic resources of 2020 were reused but redesigned based mainly on the implementation of quizzes worked on during synchronous virtual classes. The results of the strategy change were very encouraging because they allowed for more active virtual classes with greater student attendance, and also presented students with practice to review content and become familiar with the platform used for virtual evaluations.

INTRODUCTION

The teaching strategies set out in this paper were applied in the first course of statistics offered at the Faculty of Economics of the National University of Cordoba (UNC) for the basic common level of accounting, administration, and economics majors. To attend the statistics course, students must have passed two previous math courses. In 2020, there were 293 students who completed at least one course assessment. From that group, 21% of the students dropped out, and 49% were able to take the final exam (acquiring regular status, which means students that have passed two of the three partial evaluation instances). In 2021, 265 students attended the course, and from them, 24% dropped out, and 45% reached regular status. The course was taught by three professors.

The number of students per teacher makes it difficult, or practically impossible, for instructors to monitor the personalized learning process of every student. This situation, added to the advent of the pandemic, constituted an enormous challenge for the teaching staff, in spite of the fact that the Moodle platform had been used prior to 2020 (to keep study material up to date, to report news and activities, and to ask questions about statistics topics or problems in discussion forums). The forced social isolation in 2020 offered a great opportunity to accelerate necessary changes such as innovative teaching and learning processes mediated by new technologies (Albats et al., 2016; Lun et al., 2022).

Concern for finding ways to rapidly respond to this new, uncertain, and changing context led to the implementation of an educational proposal in the 2020 school year that required the teaching team to define a series of objectives and strategies and select appropriate digital platforms for the new isolation context. Table 1 presents an overview of the educational proposal in 2020, the objectives and strategies defined, and the platforms used for each of them. The Guaraní platform is a student management system for all academic activities of the university, and it also has a messenger service (https://www.unc.edu.ar/inform%C3%A1tica/guaran%C3%AD).

Each year, at the end of the course, students must answer a survey to evaluate the teachers and the course in general. This survey is implemented institutionally in the Guarani Platform. For the survey at the end of the 2020 academic year, 85% of the students reported using the resources offered in the course. More than 80% of the students rated the different available materials (book, notes, videos, slides) as good or very good. The majority of students positively rated this educational proposal, especially highlighting the usefulness of the study scheme and self-assessments. This encouraged the teaching team to continue with this didactical proposal during 2021 when virtual classes remained. In the search for improvement of the teaching strategies, the team made some adjustments, and proposed to use the Moodle questionnaire resource in a different way (Alavez Gutierrz, 2017; García-Beltrán et al., 2006; Salas-Morera et al.,2012).

This paper describes the proposed didactic strategy that used the Moodle quiz resource to organize virtual classes. It presents the design and implementation of the strategy and shows some results for the 2021 academic year.

Table 1. Educational proposal: Objectives, strategies, and platforms

Objective	Strategy	Platform
Report news and activities	News	Moodle (forums)
		Guaraní (messages)
	Reinforce news	Instagram (stories)
Keep study materials up to date	Study manual	Moodle (files)
	Explanatory videos	Moodle (lesson)
	Virtual class recordings	Moodle (page)
Guidance in studying the subject	Scheme of study per unit	Moodle (lesson)
	Weekly schedule	Moodle (page)
Develop content	Synchronous virtual meetings	Google Meet (videoconference)
Consult contents and self-assessment	Self-assessments on theoretical and practical content	Moodle (forums) Moodle (questionnaires and files)

CHANGES IN EDUCATIONAL PROPOSAL

In 2021, the university instituted preventive and mandatory social distancing. The institution decided to continue with virtual classes during the first semester of the year because building conditions did not allow social distancing to be maintained in courses with more than 50 students. In that context and with experience from 2020, some questions arose: what materials could be reused? Do we re-record the classes or do we use the recordings of the synchronous and asynchronous meetings from 2020? How do we motivate students to participate more during synchronous virtual meetings?

The 2021 statistics course was taught in a synchronous manner through two weekly virtual meetings, one to reinforce concepts and another with quizzes and activities using different media, and in an asynchronous manner with a study scheme for each unit with reading guides and video reviews. For the design of the new educational proposal, different resources prepared by the teaching team were adapted and reused and made available in Moodle. In general terms, the didactic proposal for 2020 was continued. The main adjustments involved editing the virtual meetings recorded during 2020 and organizing them with the study scheme of each unit (weekly schedule) as well as incorporating quizzes and materials to be completed during the synchronous virtual meetings. Most class meetings were not recorded to encourage active participation from students. Only classes that complemented content available on the platform were recorded. The study scheme outline of each unit (Moodle lesson resource) and the weekly schedule (Moodle page resource) were used to accommodate students in their own learning paths to promote their autonomy and critical spirit (see Figure 1).
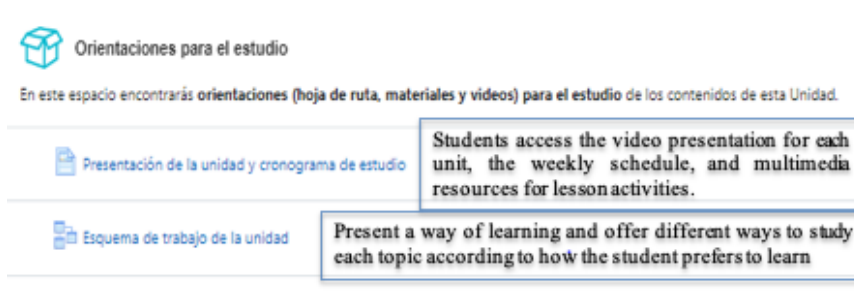

Figure 1. Moodle platform scheme to guide the study

Moodle quizzes were used in 2020 for self-evaluation and for partial and final summative evaluations. In 2021, Moodle quizzes were included in the virtual class to motivate students'

participation. It also served as a valuable tool for reviewing content and learning to use the platform for formal evaluations. Different quizzes were created for each unit using different types of questions stored in the question bank. Questions could be adapted according to the topics of the class. Weekly classes were organized as shown in Table 2.

Table 2. Weekly class organization

Monday	Tuesday	Thursday
Asynchronous activity with video review guide following the weekly schedule.	Synchronous theoretical-practical meeting to reinforce concepts. Some were recorded.	Synchronous meeting structured on quizzes and materials to be completed. They were not recorded.

The use of quizzes and materials to be completed for the resolution of certain practical activities facilitated the follow-up and attention of the group of students during the virtual meetings.

Synchronous meetings were comprised four moments.

- *First moment*: A brief introduction of the meeting's topic was given and questions that might have arisen in the previous days or during the teacher's presentation were answered.
- *Second moment*: Directions were provided for the quiz or activity (Excel spreadsheets or test files) to be completed, and individual work time was assigned. As students worked, the teachers played music proposed by the students.
- *Third moment*: Results were shared with feedback from the teaching team.
- *Fourth moment*: The meeting ended with a summary of the main concepts and difficulties.

Quizzes were designed with structured, semi-structured, and open-ended questions (Figure 2) and questions could be answered an unlimited number of times. If a student gave an incorrect answer, they had to try again until they achieved the correct answer. In the meantime, students could consult with others on the discussion forums. Questions were scored according to their complexity. The total score for each quiz was 100 points and, for each attempt, students could see the score they had obtained. The questionnaires were not timed. Quizzes and support materials were available in the Moodle platform throughout the course.

SOME RESULTS

The Moodle platform offers some statistics about student interactions with the platform such as the number of views for each activity and resource. Views are instances of a user accessing a Moodle resource or activity to read it or download it. Table 3 summarizes the activities (quizzes and other files) used per unit and the average number of views per user in 2021. The results show a higher average number of views per user for quizzes than other files. As mentioned earlier, in 2021, self-assessment questionnaires also were available in Moodle for each unit, as was the case in 2020, but the self-assessment views per user increased in 2021, as did views for the exam model (Table 4).

According to Moodle statistics, the quizzes were widely used by students. However, there are differences if we take into account students' final performance and whether they fulfilled the conditions to access the final exam (regular condition) or not (non-regular condition). Table 4 shows the Moodle quizzes used as self-assessments and for class organizational purposes. The last were split between those that were solved during class and those that were assigned as homework. The first columns of Table 5 show the percentage of students who never used or accessed the quizzes. Of the students who did not reach the regular condition, 32% did not answer the self-assessment quiz and 38% did not answer the homework quiz. However, in this group only 7.5% did not access the quiz used in class. These percentages were very different for regular condition students: 6% did not access the self-assessment and homework quiz, while only 0.85% never used the ones given in class.

How many quizzes were solved by regular and non-regular condition students? Table 4 presents the average number of quizzes solved by students. It highlights that students who reached the regular condition solved more than 70% of the total quizzes (self-assessment, used at class, homework), whereas the non-regular students solved, on average, 50% of the total quizzes used in class, but only 25% of the total self-assessment and homework quizzes.

Figure 2. Sample questions

CONCLUSIONS

The didactic strategy based on the use of quizzes in class implemented in 2021 generated a different dynamic in virtual meetings, transforming them into more personalized ones, with active participation of students. The main purpose of this experience was that the students could carry out a constant review of their learning process and that the teaching team could progressively supervise their progress in the appropriation of the content. In any case, the division offered a wide variety of didactic resources so that the teaching and learning proposal mediated by technologies would meet the needs and demands of the entire group of students.

Moodle statistics reveal that students with better performance (regular condition in Guarani) used different types of quizzes, however, quizzes used during classes were solved by all students, regardless of their performance.

According to the 2021 survey in the Guarani platform, 60% of the students rated all aspects inherent to the teaching and learning proposal as very good and excellent (Figure 3). Although the survey

did not have a specific question referring to the questionnaires, as part of the positive aspects of the course, students considered that questionnaires used during the synchronous meetings were very useful, both for studying content and for individual practice.

Table 3.
Number of resources and views per user

Unit	Activities	Number	Views per user
1	5 quizzes y 1 crossword	6	11.5
	Other files	3	2.1
2	quizzes	6	14.6
	Other files	4	1.9
3	quizzes	8	11.7
	Other files	1	1.9
4	quizzes	2	18.1
	Other files	2	2.1
5	quizzes	4	19.2
	Other files	2	1.7
6	video game	1	1.4
	Other files	4	1.3

Table 4.
Self-assessments and sample exams

Quizzes	
Year	Views per user
2020	17.5
2021	19.8
Model Exam	
2020	1.4
2021	4.1

Table 5. Types of Moodle quizzes and student condition

Moodle Quiz		% of students that did not use		Number of quizzes answered			
		Condition		Condition			
				No regular		Regular	
Type	Total	No regular	Regular	Mean	Variance coefficient	Mean	Variance coefficient
Self-assessment	6	31.97	5.93	1.5	1.00	4.2	0.42
Theme class	16	7.48	0.85	7.7	0.54	12.2	0.25
Homework	10	38.1	5.93	2.3	1.17	7.5	0.41

In an additional survey designed to evaluate specific aspects of this course, the students that attended more than half of the synchronous meetings positively evaluated the quizzes as well as the study material. They pointed out that a negative aspect of the course was the excessive number of videos to view and indicated that some of them were repetitive. The latter is partly due to the fact that some of them were edited videos from the 2020 synchronous classes.

The survey results reveal students' opinions about the comprehensive teaching and learning proposal for the 2021 course. The use of quizzes during the class can be summarized as follows:
● The weekly schedule together with the resources used in the synchronous meetings (quiz and other materials) made it possible to guide the study of the subject.

- Synchronous meetings supported with quizzes and materials for students to complete generated a relaxed study environment.
- The didactic strategy allowed for more active and participative virtual meetings.
- The quizzes were a training practice for the virtual evaluations and motivated greater student-to-student interactions in the virtual platform.
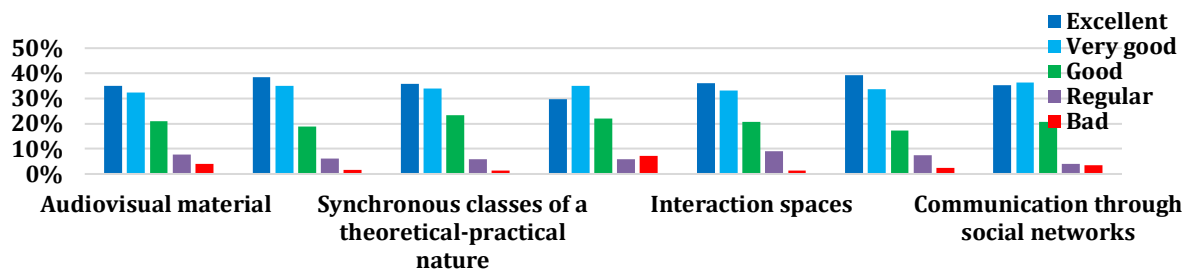

Figure 3. Student survey ratings

Finally, it should be noted that the course teaching team is constantly engaged in new educational strategy challenges to improve the teaching process and to encourage students' self-learning with a critical attitude (Benoit Ríos, 2020; Terán & López, 2007).

The strategy for the 2021 course proposed a redesign of the resources used in 2020 based on the guided reading of these resources, with the support of teachers, and a weekly class based on a topic proposed from a Moodle quiz, all programmed from a calendar and a weekly study proposal. The change was positive in terms of the results obtained. In this way, a different use was given to a resource available on the Moodle platform and widely used as a form of evaluation. The proposal will be maintained for the following course while adapting it to the new hybrid class experience.

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