This is the PREPRINT of the chapter **Design thinking for developing a formative assessment system in a master's degree** published as:

Sánchez, a. (2022). Design thinking for developing a formative assessment system in a master's degree programme. In A. Guillén (ed.), *International handbook of innovation and assessment of the quality of higher education and research* (1st ed., vol. 1). Thomson Reuters. ISBN 978-84-1390-873-1. https://doi.org/10.5281/zenodo.10904466

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I. INTRODUCTION

In the Master's Degree in Public Sector Management and Administration at the University of Granada (UGR) I teach the 3-credit elective course Open Macroeconomics. The contents of the course focus on the study of the fiscal and monetary policy of the European Union.

The number of students enrolled is around 10. The proportion between men and women is usually balanced. All courses are constituted by students from Spain and from Latin America, China and the Maghreb. The academic background is very varied. Graduates in Economics, Law and Political Sciences have the highest presence. There is also a great variety of ages, from just graduates to senior professionals. Since it is a Master's degree that enables research, most of the younger students take the Master's to continue doctoral studies. The oldest student body (professional seniors) works mainly in Public Administration and takes the Master's as a means of internal promotion.

Until now, the assessment system has given priority to compulsory exams and class attendance. Students did not like this system and thus they felt demotivated. In addition, the new pandemic context meant that during the 2020-2021 academic year, classes had to be held in an online environment. Ultimately, a new assessment system had to be designed and implemented.

II. OBJECTIVES

The main aim of this study is to share the experience in the design and implementation of an e-learning assessment system for students with a course of Master's Degree, following the model design thinking.

- The ultimate objective of this assessment system would be to encourage the active participation of students in the learning process to increase their motivation and improve their results.

For that, such a system must ideally fulfil the next specific objectives:

- Being primarily formative, not simply to evaluate or qualify but an integrated assessment in the learning process (Gallego-Arrufat and Raposo-Rivas, 2014).
- Developing a 360º assessment model in which all parties evaluate (the lecturer, their peers (peer review) and themselves (self-assessment) (Gallego-Arrufat and Cebrián-de-la-Serna, 2018).
- Carrying out an ipsative assessment of students, that is comparing an individual's performance on a measure to their past performances (Armstrom, 2018).

III. METHODS

To design the new assessment system, we followed the technique of design thinking. Design thinking is a process of collaboratively finding solutions for problems in a variety of educational settings (see Panke, 2019). More specifically, the design thinking framework helps students approach problems with a user-centred focus; the emphasis is on understanding the student experience, their challenges, and possible design solutions that are aligned with their needs (Wolcott et al., 2021). According to García Peralta (2020), the design thinking stages would be five: (1) empathize, (2) define the challenge, (3) brainstorming, (4) design the prototype and (5) test the prototype.

1. PARTICIPANTS

A total of 20 students from two previous years of Open Macroeconomic participated in stages (1), (2) and (3) of the model design thinking, during the 2018-2020 academic years. Subsequently, during the 2020-2021 academic year, eight students of Open Macroeconomic took part in the stages (4) and (5).

2. VARIABLES AND INSTRUMENTS

The following instruments were applied to achieve the objectives of each stage of the design thinking model:

Stages (1) and (2): face-to-face interviews and small-group meetings.
Stages (3) and (4): Mashup technique.
Stage (5): satisfaction survey.

3. PROCEDURES

In the previous two courses (2018-2020), students expressed their dissatisfaction with the current assessment system (empathy stage). They felt overloaded and they had the feeling that assignments and exams were not useful for their training. Thus, the challenge was to change the assessment system.

To provide solutions or ideas of how the new assessment system should be to motivate students more, the Mashup technique was applied. In this vein, the next step focused on collecting insights or shreds of evidence in the classes of Open Macroeconomics (both positive and negative) (category 1), as well as the pieces of evidence that could be contributed by the students when they go watch a movie (category 2). From the comparison of evidence of both categories, we extracted aspects that are liked in category 2, which can solve some of the least liked aspects in category 1. Reflecting on those related aspects of the two categories, the new assessment system (the prototype) was devised.

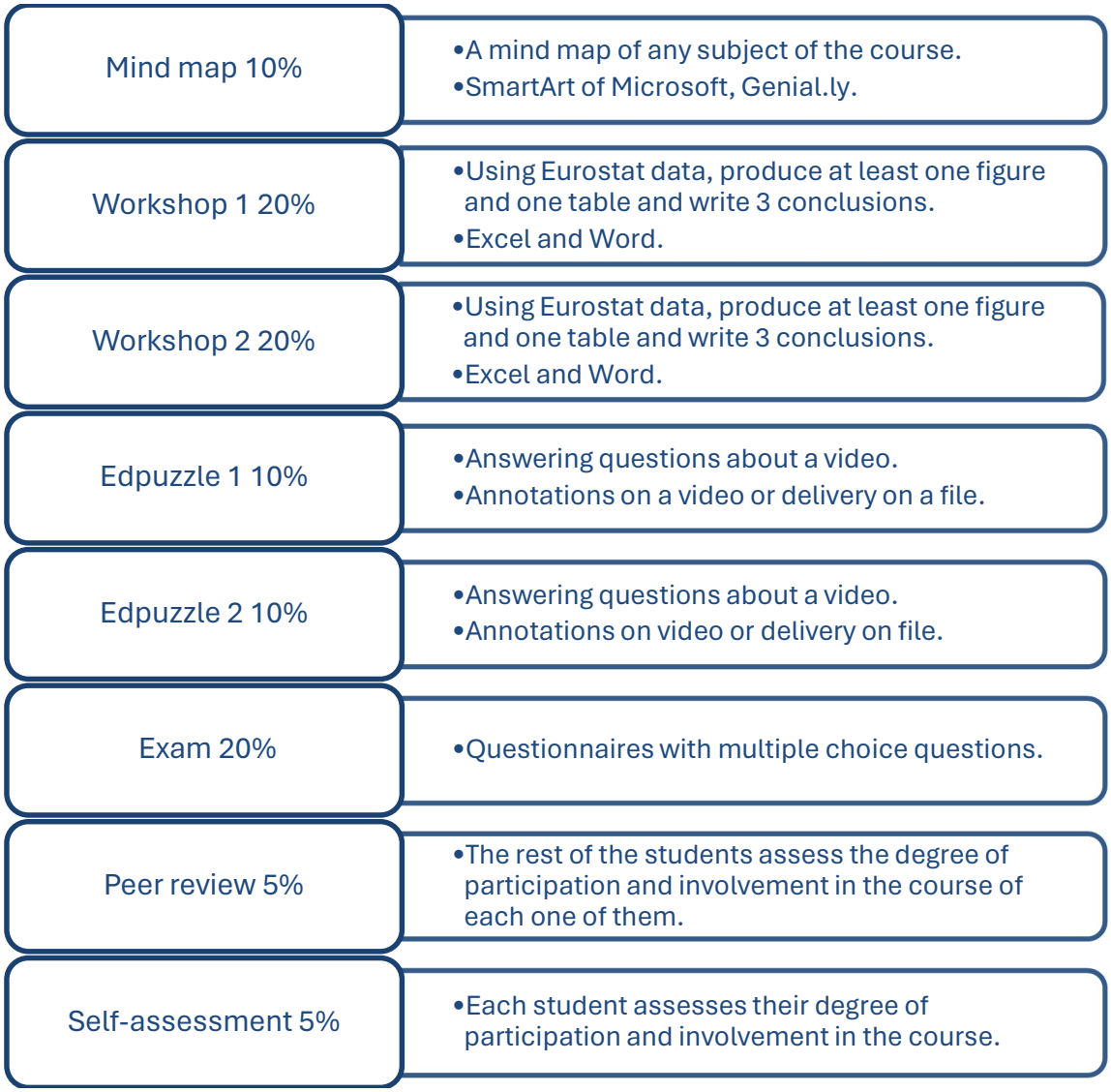
IV. RESULTS

Figure 1 illustrates the designed activities for assessing the learning process of students in Open Macroeconomics in the 2020-2021 year. On the right side of the figure are described briefly the activities and the e-learning tools that could be used. For that, we worked with a Moodle platform at the UGR. As observed, the e-learning assessment system resulting from the above procedures meets the characteristics most valued by students of the playful activity of watching a movie (Mashup technique). They are varied, each of them represents a low percentage of the total score, none is mandatory (choice), and it is not necessary to obtain a minimum grade in any activity (the grade is added). The mind map and the two workshops can be carried out in teams of two people. Some activities are

longer and others shorter. Some activities are better known, and others are more innovative. The planning of the realization was consecutive, and the delivery dates were agreed upon with the students.

Figure 1

Assessment activities for training in an e-learning environment



Subsequently, to evaluate the resulting assessment system, a survey was carried out, in which the participants assessed the social presence or accompaniment of the lecturer throughout the process of assessment (items 1-3), how the designed assessment system contributed to the development of their skills (items 3-6), and the effectiveness and degree of satisfaction with the assessment activities designed (items 7-9). Table 1 indicates that the results of the survey are very positive. On a scale of 0 to 10 points, the average evaluation of all the items is high.

Table 1

Valuation of the new assessment system for Open Macroeconomics, 2020-2021 course (N=8)

Items in the survey	M	SD	Min
1. Do you think the objectives of the activity (what had to be done) have been clear?	9.7	0.5	9
2. Do you think that the quantity and quality of the material received have been adequate?	9.6	0.8	8
3. Assess the attention received by the lecturer in the development of the activities.	10.0	0.0	10
4. Have the activities contributed to the development of your ability to manage information?	9.6	0.5	9
5. Have the activities contributed to developing your capacities of analysis and synthesis?	9.0	0.8	8
6. Have the activities contributed to improving your skills in the use of computer programmes?	8.9	1.1	7
7. Have the activities made it easier for you to understand the theoretical concepts studied?	9.3	0.8	8
8. Assess the usefulness of the assessment system as a learning method.	9.6	0.5	9
9. What is your general satisfaction degree with the assessment system?	9.6	0.5	9

Note. Answer from 0 to 10. 0 being the worst opinion and 10 being the most favourable. M=mean, SD=standard deviation, Min=minimum value. Maximum value is 10.

Table 2 shows the marks achieved by students in Open Macroeconomics in the academic year 2020-2021, in terms of self-assessment, peer review and the total mark after adding up the marks of all the activities carried out. As can be seen, in a marking scale from 0 to 10, students have been more demanding of themselves. Self-assessment had the lowest mean. The average score of the group is quite high (8.6 out of 10).

Table 2

Self-assessment, peer review and total marks achieved in Open Macroeconomics, 2020-2021 course (N=8)

Mark concept	M	SD	Min
Assess your involvement and collaboration in carrying out the activities (SELF-ASSESSMENT)	8.4	1	7
Rate the degree of collaboration and involvement of your classmates in general in the fulfilment of the activities (PEER REVIEW)	9.1	0.4	9
Total marks achieved	8.6	1.5	5.5

Note. 0-10 marking scale. M=mean, SD=standard deviation, Min=minimum value. Maximum value is 10.

V. DISCUSSION

For students to be actively involved in the learning process, the assessment system should meet various characteristics (Gallego-Arrufat and Cebrián-de-la-Serna, 2018; Gallego Arrufat and Raposo-Rivas, 2014). Firstly, before the start of the course, objectives and expected outcomes must be explicitly established. Secondly, motivating activities

must be designed. Finally, a feedforward and feedback dialogue between the lecturer and the students must be maintained. To achieve these three pillars, it was necessary to have the social presence of the lecturer throughout the entire process, accompanied with tutorials by videoconferences, emails and participation in the Moodle platform forums.

The good results in terms of student satisfaction with the new assessment system indicate that these objectives have largely been achieved. In addition, it is worth noting that the new assessment system allows developing a 360º evaluation model in which all parties are involved, as well as an ipsative assessment in which the evolution and effort of each student is followed.

To sum up, this assessment system, designed to train and motivate students in their learning in an online setting, could also be implemented in a face-to-face classroom setting.

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