The student as a prosumer of educational audio-visual resources: a higher education hybrid learning experience

Julio Navio-Marco[a]*; Luis M Ruiz-Gómez[a]; Raquel Arguedas-Sanz[b] and Carmen López-Martín[b]

[a] *Management and Business Organization Department, UNED University, Madrid , Spain;*

[b]*Business Economy and Accounting Department, UNED University, Madrid , Spain*

* *Facultad de CC Económicas y Empresariales, Department of Management and Business Organisation (UNED). Paseo Senda del Rey 11, 28040 Madrid, Spain*

The rise of the student as prosumer (producer-consumer) of educational content is a novel development that has hitherto been the subject of very little research, especially in relation to the generation of digital contents, and materials for online and hybrid education in particular. This article analyses whether there are patterns of behaviour and different perceptions associated with different groups of students in their role as producers and/or users in the field of active learning in hybrid university education systems. To this end, the research has been conducted with a group of engineering students at one of the largest blended learning universities in Europe. The results indicate higher levels of involvement in, and appreciation of, the experience in content producers compared with mere content consumers, but the students' environment and personal attitudes (such as their availability and degree of professional dedication) in relation to this type of education, the profile of which is often quite distinct from that of traditional learning, may differentiate their

interest and appreciation of these activities, which are more creative and probably more demanding.

Keywords: prosumer, blended learning, digital content, high education, video resources

1. Introduction

In digital environments, it is becoming more and more frequent to observe the phenomenon of Prosumerism, an expression that refers to people who produce some of the goods and services that are used for their own consumption (Toffler, 1980). "Prosumers" are proactive persons, always keen to acquire knowledge and hear new opinions, sharing their viewpoints and experiences with others (Bandulet & Morasch, 2005; Ramos Serrano, 2007). In Higher Education, prosumerism has been associated with a change towards teaching and learning activities focused on the learner, placing special emphasis on student participation and the co-production of knowledge (Cullen, 2020). This concept can be linked to a focus on "learning by practice", which can be also applied in the digital field. In this way, when producing digital content, students show a higher degree of sophistication in their thought processes and attention to detail, which in many cases leads to a higher level of academic performance (e.g., Bates, Galloway & McBride, 2012; Hardy et al., 2014; Fellenz, 2004).

To encourage students' involvement so as to achieve a more complete and lasting educational process through "learning by practice" corresponds ultimately to constructivist theories which place the emphasis on the students themselves and their central role in generating their own knowledge and their own education. This involvement on the part of the student is especially important in hybrid (also called blended) educational environments, in which the motivation and self-regulation of the learner are key factors in the success of the educational experience (Fang, et al, 2022).

In the educational field we thus see an interconnection between the increasing trend towards prosumerism, the rise of constructivist theories and the acceptance of "learning by practice" as a strategy for consolidating the acquisition of knowledge and the educational process, combined with the requirement in on-line and blended education to concern and involve the student in an original and stimulating way. All of this comes at a time when video technologies have been one of the most widespread in the educational field due to the pandemic (Al-Nuaimi, Al-Kabi & Al-Emran, 2021).

Despite this combination of factors, research into the effects of the appearance of the prosumer student is still in its infancy. The scant literature relating to the educational domain concentrates on the teacher as the prosumer rather than on the student, as for example in a study to determine whether the concept of teacher-prosumers, as consumers of the media and creators of their own educational resources, encouraged the initial stage

of training teaching staff during the pandemic (Triviño-Cabrera, Chaves-Guerrero & Alejo-Lozano, 2021). It is also very limited in scope if we confine it to the production and use of digital resources: Learner-Generated Digital Media in all the disciplines of higher education can be considered as under-researched and under-analysed (Potter & McDougall, 2017; Reyna & Meier, 2018; Reyna et al., 2021). In most cases such material focuses on face-to-face education, and especially on "flipped classroom" experiences (González Fernández & Huerta Gaytán, 2019; Vasilchenko, Cajander & Daniels, 2020: Lin et al., 2022), but not on online or blended learning, where it can have an even more relevant role for getting students involved, achieving the best impact possible on their educational experience and creating a sense of community. In addition, recent studies are beginning to take an interest in the subject. Thus, Yu (2022) states that student consider multimedia-equipped explanations to be better for student generated questions (as compared to text-based explanations), and Seo et al. (2021) observe the impact of learning context on engagement in active learning with online videos.

This research contributes to mitigating these shortcomings, in particular by asking questions about the differences in the learning experience of the student who prepares materials (prosumers) to help their peers, compared to that of the student who simply uses these materials. In particular, the question that would be posed as the centre of this research would be: Are there behaviour patterns and different perceptions associated with different groups of students in their role as producers and / or users in the preparation of digital materials for the learning community, in hybrid tertiary education? It seems logical to expect, despite the limited previous research on the subject, that more engaged learners who produce content may be more motivated, and ultimately achieve better academic results, but there may be contextual factors which, as we shall see, may condition them. For this, the experiment was carried out with a group of engineering students, to improve the level of performance and satisfaction throughout the educational process.

The rest of the article is structured as follows: in Section 2, after this introduction, the theoretical framework is presented; section 3 includes a description of the methodology and of the data used, together with the results of the study. The article finishes with some conclusions, limitations of the study, and new lines of research.

2. Theoretical framework

Constructivist theory emphasises the role of individuals in the creation of their own meaning, on the basis of knowledge within its context (Mueller & Anderson, 2014). The term is rooted in Piaget's theory of cognitive development (Piaget, 1969/1967) and Bruner's (1996) approach to discovery learning, among others. The constructivist stance maintains that learning is a process of constructing meaning; it is how people make sense of their experience (Merriam & Caffarella, 1999). Within constructivism there are various intellectual tendencies: Piaget empathises how humans build meaning from the interaction of their ideas and experiences, while Vygotsky´s theory of social constructivism (1978) suggests that cognitive development is primarily a function of external factors such as cultural, historical, and social interaction rather than an individual construction. Vygotsky considers that Piaget's focuses too much on internal processes of

individuals. Social constructivists state that meaningful learning occurs when individuals are engaged in social activities such as interaction and collaboration (Amineh & Asl, 2015; Qureshi et al., 2021).

The educational communities that students enter form, therefore, a fundamental part of this context, so that these theoretical foundations become interlinked with the concepts of Communities of Practice (CoP) and Communities of Research (CoR) which have been used to understand the social aspects of the training of educational communities (Bozkurt & Keefer, 2017; Navio-Marco & Solorzano-García, 2019). While the CoR focus more on the construction of presence in terms of pedagogical perspectives (Garrison, 2007) and the CoP focus more on community-based learning initiatives (Lave & Wenger, 1991; Wenger, 1998), both currents have also established links with blended learning through the need to create links, community and interaction in the educational collective.

These theories converge with other tendencies such as *Contributing Student Pedagogy*, CSP (Collis & Moonen, 2005), authors who insist on the role of involving students in the educational process as co-creators of learning resources. CSP introduces practical aspects of social constructivism by combining the learning of content with the development of interpersonal skills. To achieve student participation in the educational experience through authorship of content has a positive effect on educational results (Bryson & Han, 2007; Falkner & Falkner, 2012; Martin-García et al., 2020). In the same way, the growing use in education of *Personalised Learning Environments*, PLE, has been perceived as a sign of the application of constructivist pedagogy, which emphasises the need for a change in the educator's role from a transmitter of information to a facilitator of the production of knowledge. Students, who were previously mere consumers of knowledge, thus become producers through the creation and interchanging of content (Atwell, 2007).

It is necessary to encourage to a greater extent "student empowerment" (Amo et al., 2013), placing greater emphasis on the ecosystem, learning between peers, collaborative learning and the social networks (Solórzano-García & Navío-Marco, 2021). The need is thus emphasised to promote processes of self-regulation on the part of the student, especially in on-line and hybrid educational environments (Shea et al., 2013; Pool, Reitsma & van den Berg, 2017), making students responsible for developing their own learning tools, environments, networks and communities. This is in turn linked to evidence pointing to greater participation on the part of students, better learning and interaction between peers, an improvement in creativity and self-confidence, higher student performance and higher levels of student satisfaction (Wilson, 2014). In general, it is understood that satisfaction corresponds to the extent to which students have enjoyed their studies (Bedggood & Donovan, 2012), and is the product of factors such as participation and development of abilities (Fisher, Perényi & Birdthistle, 2018).

Additionally, the concept of *Students as Partners* (SaP) embraces the students and teaching staff of educational institutions, involving them in this type of collaboration (Mercer-Mapstone et al., 2017). Positive effects such as motivation, responsibility and involvement are observed among students (Sather et al., 2014; Werder & Otis, 2010).

Finally, another current of research centres on the digital resources generated by the student (*Learner-Generated Digital Media,* LGDM) in which this digital content, developed by the students, displays their learning process (Reyna, Hanham, & Meier, 2018). It is an original focus to promote research skills and active learning (Hoban et al., 2015), in the field of engineering also (Anuradha & Rengaraj, 2017). In particular, the creation of videos involves a higher level of understanding and higher levels of cognitive processing to explain a topic to other students, and also to create and evaluate (Rodriguez et al, 2012; Engin, 2014). This corresponds to the taxonomy of Bloom (Holtzblatt & Tschakert, 2011; Engin, 2014) in the highest levels of cognitive processing. Some studies have explicitly conducted research into the role of students as prosumers of video material. Specifically, Engin (2014) analysed the videos created by students as a resource for the learning of second languages and found tensions between students as producers and students as consumers with respect to the evaluation of the material produced by the students and the learning process using them.

This need to concern the student is even more pressing in hybrid and on-line education, where it is difficult to guarantee the involvement of the learner (Kaur, 2013). Being committed is considered a relevant factor for explaining students' performance and satisfaction (Fisher, Perényi, & Birdthistle, 2018). With respect to motivating students, educational strategies that have aimed to encourage students' motivation have also developed in on-line and blended mode (Boelens, De Wever & Voet, 2017), but there are still comparably few studies that actually proposed approaches for curating students' self-regulation behavior in the online component of blended learning, as Rasheed, Kamsin & Abdullah (2020) observe in their recent systematic review of the challenges in the online component of blended learning. These authors identify five inductive categories of challenges for this type of education (self-regulation challenges, technological, literacy and competency challenges, students' isolation challenges, technological sufficiency challenges and technological complexity challenges). Some of them can be addressed with activities like the one proposed and tested in this research.

On the other hand, existing blended learning approaches for scaffolding self-regulation strategies have mainly concentrated on defining solutions and techniques related to online help-seeking self-regulation, and have not introduced approaches for other self-regulation strategies, more importantly online peer-learning self-regulation strategy (Rasheed, Kamsin & Abdullah, 2021). It is therefore worth exploring the role that peer learners can play in preparing useful materials for students in the context of hybrid learning.

3. Methodology and data

A non-probability sampling was conducted for choosing the individuals. In particular, purposive sampling techniques have been used to select the students. Purposive sampling is done based on that there is homogeneity within a population under study and if population units are distributed randomly, selection of units from any section of such a population provides a random sample.

The population under study consisted of 50 students, equivalent to all the students who participated in the project. It was a voluntary pedagogical innovation activity consisting of the practical application and assimilation of content and the resolution of economic problems. The activity formed part of the Business Administration subject and involved the preparation of videos during the 2020/2021 academic year. The subject concerned forms part of the Engineering degree course at one of the largest universities employing blended methodology in Europe. The number of students registered for the 2020/2021 course was 177, of whom 50 students participated voluntarily in the project: 4 as producers of content, 35 as users and 11 in both roles (in the analysis they will be grouped together as: 35 users and 15 producers), although all the material was available for the 177 students registered.

The questionnaire was created using Google Docs forms. The analysis was conducted via a procedure separated into two stages. First, a univariate analysis was conducted of the students' sociological characteristics and initial academic data, together with a descriptive analysis of the various items of the survey in order to assess the evaluation of the activity by both the producers and the users of the content. In the second stage a bivariate analysis was conducted to detect the possible relationship between the evaluations obtained and the various classification criteria of the participants. F-statistic from the ANOVA test was presented. When the classification characteristic was dichotomous the t-statistic was used.

4. Empirical analysis and results

Once the project had come to an end, the participants completed an anonymous survey in order to give their opinion concerning the functioning of the activity undertaken. 100% of replies were received. The questionnaire establishes three clearly differentiated sections: the first of these aims to obtain and analyse the sociological, academic and professional profile of the person, together with a question referring to her role (producer/user) in the project (8 questions). The second section, consisting of 39 questions, aims to elicit an evaluation of the activity undertaken by the students who are content producers. Finally, the objective of the third section of the questionnaire, consisting of 14 questions, is to analyse the activity proposed from the viewpoint of the content user.

4.1. Univariate analysis of the questionnaire

The content of the questionnaire applied to this research was validated beforehand. For this purpose, Cronbach's alpha (Cronbach, 1951)[1] has been used as it is one of the most widely used measures to quantify the internal consistency of surveys. Cronbach's alpha is considered a measure of the reliability of the scale or internal consistency and is used to assess whether multiple-question surveys are reliable. Cronbach's Alpha

---

[1] Cronbach's alpha can be obtained with any software for statistics and data science (SPSS, Matlab, Excel, Stata, etc.). In particular, R is a free software environment for statistical computing and allows to obtain easily this parameter and some other indicators of psychometric reliability with the alpha() function of the psych package.

coefficient ranges from 0 to 1. The closer it is to 1, the more consistent the items will be with each other. In this work, the results for Alpha-Cronbach are showed in Tables 2 and 3. Both values are close to 1 (α=0.988 for the section of the questionnaire concerning the producer and 0.902 for the section of the questionnaire concerning the user). These results guarantee the scale reliability.

Before analysing the results obtained in the survey, it was checked whether the sample size of students who had agreed to take part in the project was statistically significant in relation to the target population. For this purpose, we calculate the sampling error, which stands for the deviation of the selected sample from the true characteristics, behaviours or qualities of the entire population. This error is always committed since there is a loss of representativeness at the moment the elements of the sample are chosen.

The total number of students enrolled in the subject, in the academic year 2020/21, was 177, of which 26 dropped out. The total number of students who really prepared the subject and took the final exam at the end of the semester was 151. The number of students who participated voluntarily in the project and conducted the survey was 50. Thus, the sample size represented 33% of population size. Traditionally, researchers figure out the required sample size before running the trial, but since it is a voluntary activity, the sample size was determined by the willingness of the students to participate[2]. Acceptable limit of sampling error which, generally when its value is not available, a value that varies between 1% (0.01) and 9% (0.09) is usually used in Social Sciences. In this case, we analyse the suitability of the sample by calculating the sampling error made when assuming the sample size of 50 students. For a confidence level of 90%, the sampling error committed in the analysis for the entire sample is ±0.09. Therefore, tthe sample of students who have voluntarily participated in the project could be considered representative since the assumed error is within the acceptable limits for the sampling error.

Table 1 summarises the sociological and professional profiles of the students who completed the activity.

---

[2] The sample size is limited, but not substantially different to other similar experiences such as worked example videos (WEV) for blended learning in undergraduate engineering (see, Pickering & Dawes, 2020, for a review), or several similar pilots projects in tertiary hybrid education (Camacho, et al., 2016; Martín-García, López-Martín & Arguedas-Sanz, 2020; Acosta-Rodríguez, Moreno-Santana & Axpe-Caballero, 2017, as examples).

Table 1. Personal, academic and professional details

Sex		Total	%
	Male	37	76%
	Woman	13	24%
Age			
	30 or under	16	32%
	Over 30	34	68%
Role played in the project			
	User	35	70%
	Producer	15	30%
Currently works			
	Full-time	41	82%
	Part-time	6	12%
	No	3	6%
Obligations limiting their dedication to the course			
	Work	17	34%
	Work and dependent persons	30	60%
	No obligation	3	6%
Training with which they initiated the studies currently ongoing			
	Evaluation for University Access	16	32%
	University Access Course for over-25s	7	14%
	FP 2 vocational training	18	36%
	University degree	5	10%
	University honours degree	4	8%
First year of registration in the subject			
	Yes	40	80%
	No	10	20%
Number of subjects currently studying			
	1	4	8%
	2	7	14%
	3	10	20%
	4	11	22%
	5	5	10%
	6	4	8%
	7	2	4%
	8	4	8%
	9	1	2%
	10	2	4%

A descriptive statistical analysis was conducted to evaluate the year. The items, means, averages and standard deviations for the items are indicated in Tables 2 and 3.

Table 2. Descriptive statistics for the evaluation of the year, project and activities. PRODUCERS

Item	Evaluation of the additional continuous assessment activity	Mean	Average	Standard Deviation	Cronbach's α
					0.988
1	The production of content through video recording:				
	a. It increases my motivation for the subject	4.36	5	0.79	
	b. It increases my performance in the subject	4.36	5	0.73	
	c. I assume my own responsibility for my learning process	4.27	5	1.03	
	d. It increases creativity	4.27	5	0.98	
	e. It uses technology to construct useful and significant knowledge	4.23	5	1.11	
	f. It develops my capacity for communication and the transmission of knowledge	4.36	5	0.79	
2	The capacity to produce and modify content together with recording videos has helped me to:				
	a. Establish content as part of the learning process	4.48	5	0.75	
	b. Summarise the basic concepts of the assigned exercise	4.52	5	0.60	
	c. Improve my capacity for oral expression concerning an economic topic	4.38	5	0.92	
	d. Improve my results in the assessment of the subject	4.40	5	0.75	
3	Participation in the proposed activity enabled me to:				
	a. Have more confidence in my ability to take on a new learning process	3.83	4	1.03	
	b. Improve my capacity to solve problems in a systematic way	4.00	4	0.74	
	c. Develop my capacity to search for and manage information	4.05	4	0.90	
4	In relation to the competences acquired through the preparation and recording of the video, I consider that it has enabled me to:				
	a. Improve my capacity for analysis and synthesis	3.95	4	0.80	
	b. Improve my management of information	4.10	4	0.72	
	c. Increase my autonomy	3.81	4	1.21	
	d. Encourage active learning	4.19	4	0.68	
	e. Improve my oral communication	4.20	4	0.77	
5	I consider that the production of content encourages my abilities that are best orientated towards employment	3.96	4	0.77	
6	I am favourable to my video being included in an archive for the virtual course for this subject in future academic years	4.76	5	0.70	
7	I am favourable to sharing the video that I have recorded:				
	a. Only with my classmates from the subject this academic year	3.60	4	1.64	
	b. With students for this subject registered in future academic years.	4.27	5	1.28	
	c. Only with classmates from my degree course	3.15	4	1.60	
	d. Only with registered students irrespective of the degree they study for	3.55	4	1.53	
8	I am in favour of sharing my video on social networks	3.55	4	1.34	
9	Which social networks I would use to share my recording:				
	a. Facebook	1.84	1	1.42	
	b. Instagram	2.37	1	1.71	
	c. YouTube	3.64	4	1.59	
	d. Twitter	2.25	1	1.77	
	e. Linkedin	2.70	2	1.81	
	f. Other	1.72	1	1.32	
10	The stages of the activity that involved most effort and/or time:				
	a. The selection of the information	3.42	3	1.12	
	b. The structuring and summarising of the content to be developed	4.00	4	0.97	
	c. The preparation of the content	3.65	4	1.18	
	d. Learning how to use the device to record the video	2.45	2	1.23	
	e. The recording of the video	3.00	3	1.17	
	f. Adjusting the content and recording in the time available	3.30	4	1.42	
	g. Producing an educational resource that favours collaborative environments	3.55	4	1.00	
11	I would participate again in preparing and recording video content	4.82	5	0.50	

Source: Preparation on the basis of the questionnaire results

Table 3. Descriptive statistics for the evaluation of the year, project and activities. CONTENT USERS

		Mean	Average	Standard Deviation	Cronbach's α
Item	**Evaluation of the additional continuous assessment activity**				0.902
12	As a user of videos recorded by other students, to what extent did this help you to:				
	a. Better understand the theoretical and practical concepts of the subject	4.25	4	0,76	
	b. Complement the didactic material provided for the subject	4.31	4	0,78	
	c. Improve learning planning	3.94	4	1,12	
	d. Have greater flexibility and self-regulation in the learning process	4.04	4	1,07	
	e. Improve your performance in the subject	4.15	4	0,88	
13	Consider that you have digital skills to search for and identify useful information	4.35	4	0.73	
14	The skills proposed have enabled you to develop competences that with traditional methodological approaches are more difficult to achieve	4.08	4	0.94	
15	Learning through video content seemed more effective than only using printed material	4.58	5	0.74	
16	To what extent do you consider that including learning resources such as videos give the following benefits:				
	a. An improvement in the retention of information through the showing of videos	4.40	4	0,61	
	b. Greater permanence in educational content by allowing for its exchanging and conservation	4.25	5	0,93	
	c. Providing feedback from the learning process	4.45	5	0,72	
	d. They are reusable and can be improved/corrected through the publishing process	4.49	5	0,62	
17	It is important to encourage models in which information circulates at the same level, generating user networks to create collaborative learning environments	4.60	5	0.54	
19	Levels of overall satisfaction with the activity/project:	4.42	5	0.71	

Source: Preparation on the basis of the questionnaire results.

4.1.1 Evaluation of the Producers

All the characteristics of the course associated with the production and modification of content and the recording of videos were evaluated very favourably by the students (with average scores of over 4.23 on a scale of 5). The most highly appreciated item was usefulness for summarising the basic concepts of the exercise analysed (4.52), followed by the possibility of establishing content as part of the learning process (4.48) and improving the results for the assessment of the subject (4.40). High levels of satisfaction also reflected items linked to improved motivation, performance and the ability to communicate and transmit knowledge. With respect to the skills acquired with the preparation of the videos, the results were also very satisfactory, with a range of averages between 4.2 and 3.8. The skills most valued by students were, in the following order: improved oral communication, the encouragement of active learning, information management, the capacity for analysis and synthesis, and increased autonomy. Also noteworthy was the evaluation of content producers with respect to the encouragement of skills more orientated towards the employability of students (3.96 on average).

The majority of producer-participants were favourable to video forming part of an archive stored for the virtual course for the subject for future academic years (4.76). This reply is coherent with the opinion that such content be shared preferably with students of

the subject concerned for future academic years (4.27) compared with the possibility of sharing it with classmates from the whole degree course (3.15) or with students of the university, irrespective of their degree course (3.55). With respect to the possibility of sharing the video on social networks, they were favourable, with an average of 3.55.

Participants indicate that producing educational resources to favour collaborative environments (3.55), structuring and synthesis (4) and the preparation of content (3.65) were the three stages that caused most difficulties for producers, while learning how to use the device to record videos (2.45) was the least difficult, probably because of the strong digital skills enjoyed by students in these degree courses.

4.1.2 Evaluation of the Users

The evaluations of content users were very high is all items in the questionnaire, with averages higher than 4.04, except in relation to the improvement of learning planning which, even so, was 3.94. This item is probably perceived as a superior advantage in the case of those students who were producers in addition to being users, since they were necessarily the ones who had to plan the activities to be undertaken.

The highest score (4.60) was given to the item that it is important to create collaborative learning environments through models in which information can circulate at the same level, generating user networks. The second highest score (4.58) was for the comment that learning through video content is more effective than that based exclusively on printed media, which leads to reflect not only on the educational resources offered during the learning process but also the suitability of evaluation systems that incorporate digital innovations. The final question in the questionnaire, which enquired about the overall level of satisfaction with the activity obtained an average score of 4.42 out of 5, illustrative of the positive evaluation of the project. This evaluation increases up to 4.82 when the producers were asked if they would participate again in the project.

4.2. Bivariate analysis

In this section the results are presented of the crosses between the interest variables when at least one of the said variables is qualitative or, if it is quantitative, has been collected or codified in various modes (for example, age).

A) *Comparison of the equality of the average evaluations of the different items in the questionnaire on the part of the content users.*

Table 4 displays the results obtained for the case of *evaluation of the activity on the part of the users* in function of the variables of Table 1. It is observed that no differences of evaluation are detected for any item when the results are analysed as grouped together by gender and obligations. On the other hand, significant differences have been found between the groups generated in the following cases:

- A difference is detected in the evaluation of two points between students who are not working (5.00), who evaluate more positively *having greater flexibility and self-*

regulation in the learning process (item 12d) than students who work part-time (3.00). The said difference of averages is significant (value of the ANOVA statistic of 4.28 with p-value= 0.02). The same difference of evaluation is also detected between the different age groups and depending on whether students are repeating the subject or it is the first year that they have registered. There is thus a considerable difference in average evaluation between the age group of [30,45) years with an evaluation of flexibility and self-regulation that allows the activity a score of 4.52 compared with the older age group of [50,65) years, who only evaluate this item with 3.20.

- *Improving learning planning* (item 12c). As in the case of the previous item, differences are detected between the average evaluation among the age groups of [30,45) years with an average of 4.27 and the age group [50,65) years, who are the stratum who value the least learning planning (2.38). In the same way, content producers, with an average of 4.47 display a greater evaluation of the question concerning improved learning planning compared with those who have participated in the activity exclusively as users (3.59).

- *Improving their performance in the subject* (item 12e). The students who accede to Engineering studies after an honours degree evaluate very positively (4.75) the effect that the activity has on performance in the subject.

- In the same way, significant differences have been detected between users and producers of content. In particular, the average evaluation made by content producers concerning how participation in the activity has improved their learning planning (item 12c), the effectiveness that the preparation of videos has had on the learning process compared with printed materials (item 15), the improvement in the retention of information through showing videos (item 16a), and the degree of overall satisfaction with the activity (item 19) is higher than is the case of students who have participated as content users.

Table 4: Evaluation of the content users

Items*	12a	12b	12c	12d	12e	13	14	15	16a	16b	16c	16d	17	19
Sex														
Male	4.17	4.25	3.86	4.09	4.17	4.42	4.08	4.56	4.40	4.25	4.46	4.49	4.53	4.39
Woman	4.50	4.50	4.17	3.92	4.08	4.17	4.08	4.67	4.42	4.25	4.42	4.50	4.83	4.50
t-test	1.77	0.93	0.67	0.51	0.03	1.06	0.00	0.20	0.07	0.00	0.00	0.02	3.06	0.22
(p-value)	0.19	0.34	0.42	0.70	0.85	0.31	1.00	0.66	0.80	1.00	1.00	0.89	0.09	0.64
Obligations limiting their dedication to the course														
Work	4.12	4.24	3.88	3.94	3.94	4.59	4.00	4.41	4.47	4.18	4.53	4.65	4.71	4.18
Work and dependent person	4.28	4.31	3.90	4.04	4.21	4.21	4.10	4.69	4.39	4.24	4.36	4.39	4.52	4.52
No obligation	5.00	5.00	5.00	5.00	5.00	4.50	4.50	4.50	4.00	5.00	5.00	4.50	5.00	5.00
ANOVA	1.27	0.86	0.94	0.88	1.39	1.54	0.26	0.76	0.55	0.69	1.13	1.01	1.25	2.03
(p-value)	0.29	0.43	0.40	0.42	0.26	0.23	0.77	0.47	0.58	0.51	0.33	0.37	0.30	0.14
Currently works														
Part-time	4.00	3.83	3.17	3.00	3.67	4.67	4.33	4.67	4.67	4.33	4.83	4.67	4.83	4.33
Full-time	4.25	4.35	4.00	4.16	4.18	4.30	4.03	4.58	4.38	4.20	4.36	4.46	4.55	4.40
No work	5.00	5.00	5.00	5.00	5.00	4.50	4.50	4.50	4.00	5.00	5.00	4.50	5.00	5.00
ANOVA	1.32	2.06	2.55	4.28	1.84	0.69	0.47	0.05	1.00	0.72	1.96	0.31	1.32	0.72
(p-value)	0.28	0.14	0.09	**0.02**	0.17	0.51	0.63	0.95	0.38	0.49	0.15	0.77	0.28	0.49
Age														
[18.30)	4.07	4.07	4.07	3.80	3.80	4.40	4.13	4.47	4.40	4.27	4.60	4.53	4.73	4.13
[30. 45)	4.50	4.59	4.27	4.52	4.45	4.36	4.41	4.77	4.52	4.45	4.52	4.57	4.59	4.64

[45. 50)	4.00	4.00	3.40	3.60	3.60	4.60	3.80	4.40	4.00	4.20	4.20	4.20	4.40	4.40
[50. 65)	4.00	4.17	2.83	3.20	4.40	4.00	3.00	4.33	4.33	3.50	4.00	4.33	4.50	4.33
ANOVA	1.54	1.89	3.56	3.89	2.47	0.67	4.52	0.93	0.69	1.72	1.11	0.56	0.60	1.59
(p-value)	0.22	0.15	**0.02**	**0.02**	0.07	0.58	**0.01**	0.43	0.56	0.18	0.35	0.65	0.62	0.21
Previous university studies														
No	4.31	4.36	4.00	4.14	4.24	4.31	4.08	4.62	4.37	4.23	4.45	4.39	4.56	4.44
Yes	4.00	4.11	3.67	3.67	3.78	4.56	4.11	4.44	4.56	4.33	4.44	4.89	4.78	4.33
t-test	1.21	0.74	0.64	1.22	1.71	0.84	0.01	0.39	0.88	0.09	0.02	5.31	1.17	0.15
(p-value)	0.28	0.39	0.43	0.28	0.20	0.36	0.92	0.54	0.35	0.77	0.90	**0.03**	0.29	0.70
Previous studies access to Engineering														
EvaU (*)	4.33	4.33	3.93	4.07	4.07	4.33	4.13	4.60	4.27	4.13	4.33	4.33	4.53	4.40
CAU (*)	4.17	4.17	3.50	3.80	4.00	4.17	4.67	4.67	4.60	4.17	4.40	4.40	4.50	4.50
FP II (*)	4.33	4.44	4.22	4.29	4.47	4.33	3.83	4.61	4.39	4.33	4.56	4.44	4.61	4.44
University Degree	3.60	3.60	3.40	3.20	3.00	4.60	4.20	4.40	4.40	4.20	4.40	4.80	4.60	4.20
University honours degree	4.50	4.75	4.00	4.25	4.75	4.50	4.00	4.50	4.75	4.50	4.50	5.00	5.00	4.50
ANOVA	1.09	1.47	0.83	0.95	3.18	0.38	0.92	0.14	0.62	0.14	0.33	1.38	0.67	0.26
(p-value)	0.38	0.22	0.54	0.46	**0.02**	0.86	0.48	0.98	0.68	0.98	0.89	0.25	0.65	0.93
First year of registration in the subject														
Yes	4.34	4.42	4.08	4.19	4.29	4.45	4.18	4.66	4.51	4.37	4.57	4.57	4.68	4.53
No	3.90	3.90	3.40	3.44	3.56	4.00	3.70	4.30	4.00	3.80	4.00	4.20	4.30	4.00
t-test	2.80	3.78	3.04	4.59	7.02	3.12	2.15	1.89	4.68	3.06	4.30	2.66	4.37	4.70
(p-value)	0.10	0.06	0.09	**0.04**	**0.01**	0.08	0.15	0.18	**0.04**	0.09	**0.04**	0.11	**0.04**	**0.04**
Rol played in the project														
User	4.07	4.17	3.59	3.75	3.96	4.48	4.07	4.45	4.24	4.24	4.38	4.48	4.55	4.24
Producer	4.53	4.53	4.47	4.50	4.42	4.16	4.11	4.79	4.67	4.26	4.56	4.50	4.68	4.68
t-test	3.76	3.79	5.47	3.17	2.36	0.17	0.15	4.65	6.17	0.03	0.01	0.43	0.10	5.90
(p-value)	0.06	0.06	**0.02**	0.08	0.13	0.68	0.70	**0.04**	**0.02**	0.87	0.94	0.51	0.75	**0.02**

Note: In order to evaluate the activity a Likert scale was used ranging from 1 to 5, where 1 indicates that they disagreed totally with the statement and 5 indicates that they were totally in agreement. In bold type are presented the cases in which the null hypothesis of equality of averages in each question has been rejected with a level of significance of 5%. (*) See Table 3, where are collected the questions in the questionnaire corresponding to content users.

(*) EvaU: Evaluation for University Access; CAU (25 years): University Access Course for oer-25s): FP II (FP vocational training)

b) *Comparison of the equality of the average evaluation of the different items in the questionnaire on the part of the content producers.*

Of the 27 questions presented to analyse the evaluation of the content producers who participated in the activity, we can conclude that significant differences have not been detected between the average evaluation for the various questions when we undertake an analysis filtered by gender, age and previous university training (the hypothesis of equality of average evaluation was rejected in only one of these cases - see Table 5).

Differences in average evaluation were detected between students who have employment obligations and those who do not; thus the students who are currently only studying evaluate with a higher average score than students who are working part-time, the effect that the activity has had on the development of their capacity for communication and transmission of knowledge and their capacity to use knowledge to solve problems in a systematic way, together with an improvement in their ability to conduct an oral exposition of the subject of Business Administration in addition to having confidence in the abilities developed to approach new learning experiences. The personal obligations that limit the time for the study, together with the employment situation of those

participating in the survey, have involved a greater effort from the student (items 10b, 10c, 10f, 10g).

Table 5: Evaluation of the content producer

Item (Table 2)	1a	1b	1c	1d	1e	1f	2a	2b	2c	2d	3a	3b	3c	4a	4b	4c	4d	4e	5	10a	10b	10c	10d	10e	10f	10g	11
Sex																											
Male	4.20	4.27	4.27	4.20	4.13	4.33	4.29	4.43	4.36	4.46	3.93	4.00	4.13	3.86	4.00	3.79	4.00	4.23	3.87	3.77	4.07	3.57	2.43	3.14	3.36	3.71	4.73
Woman	4.71	4.57	4.29	4.43	4.43	4.43	4.86	4.71	4.43	4.29	3.63	4.00	3.86	4.14	4.29	3.86	4.57	4.14	4.13	2.67	3.83	3.83	2.50	2.67	3.17	3.17	5.00
t-test	2.13	0.83	0.00	0.25	0.33	0.07	2.98	1.06	0.03	0.17	0.46	0.00	0.44	0.58	0.77	0.02	3.75	0.00	0.58	5.35	0.24	0.20	0.01	0.68	0.07	1.28	1.38
(p-value)	0.16	0.37	0.97	0.62	0.57	0.80	0.10	0.32	0.87	0.69	0.51	1.00	0.52	0.46	0.39	0.90	0.07	1.00	0.46	**0.03**	0.63	0.66	0.91	0.42	0.79	0.27	0.26
Obligations limiting their dedication to the course																											
Work	4.20	4.20	4.20	4.00	4.40	3.80	5.00	4.75	4.00	4.50	3.33	3.67	3.80	4.00	4.25	3.75	4.25	4.00	3.83	4.00	4.25	3.75	2.25	2.25	2.75	3.75	4.67
Work and dependent person	4.47	4.40	4.27	4.27	4.20	4.53	4.33	4.40	4.40	4.36	3.93	4.07	4.13	3.93	4.07	3.73	4.13	4.21	3.93	3.50	4.21	3.93	2.43	3.21	3.79	3.71	4.86
No obligation	4.00	4.50	4.50	5.00	4.00	4.50	4.50	5.00	5.00	4.50	4.50	4.50	4.00	4.00	4.00	4.50	4.50	4.50	4.50	2.00	2.00	1.50	3.00	3.00	1.00	2.00	5.00
ANOVA	0.42	0.17	0.06	0.72	0.10	1.77	1.29	1.26	0.78	0.10	1.22	1.15	0.24	0.01	0.12	0.34	0.26	0.25	0.56	2.65	8.30	5.45	0.23	1.06	5.55	3.34	0.42
(p-value)	0.66	0.85	0.95	0.50	0.91	0.20	0.30	0.31	0.47	0.91	0.32	0.34	0.79	0.99	0.89	0.72	0.78	0.78	0.58	0.10	**0.00**	**0.01**	0.80	0.37	**0.01**	0.06	0.66
Currently works																											
Part-time	4.00	4.00	3.50	4.00	3.50	3.00	5.00	4.00	2.00	3.00	2.33	3.00	3.00	3.00	4.00	2.00	4.00	3.00	4.00	3.00	4.00	4.00	3.00	2.00	2.00	3.00	4.33
Full-time	4.44	4.39	4.33	4.22	4.33	4.50	4.44	4.50	4.44	4.47	4.00	4.11	4.17	4.00	4.12	3.83	4.17	4.24	3.89	3.63	4.24	3.88	2.35	3.06	3.65	3.76	4.88
No work	4.00	4.50	4.50	5.00	4.00	4.50	4.50	5.00	5.00	4.50	4.50	4.50	4.00	4.00	4.00	4.50	4.50	4.50	4.50	2.00	2.00	1.50	3.00	3.00	1.00	2.00	5.00
ANOVA	0.49	0.28	0.62	0.62	0.53	4.32	0.24	1.02	5.61	2.02	5.37	4.50	1.61	0.71	0.03	1.53	0.24	1.29	0.55	2.41	8.39	5.38	0.33	0.36	5.10	3.84	1.80
(p-value)	0.62	0.76	0.55	0.55	0.60	**0.03**	0.79	0.38	**0.01**	0.16	**0.01**	**0.02**	0.23	0.50	0.97	0.24	0.79	0.30	0.58	0.12	**0.00**	**0.02**	0.73	0.70	**0.02**	**0.04**	0.19
Age																											
[18,30)	4.38	4.25	4.38	4.38	4.38	4.13	4.86	4.71	4.14	4.57	3.89	4.00	4.00	4.00	4.29	4.14	4.43	4.29	4.11	3.43	3.57	3.14	2.57	2.43	2.86	3.43	4.78
[30, 45)	4.36	4.36	4.45	4.45	4.36	4.64	4.45	4.55	4.64	4.27	3.91	4.18	4.18	4.00	4.10	3.82	4.27	4.10	3.82	3.33	4.30	4.10	2.70	3.40	3.90	3.70	4.80
[45, 50)	4.50	4.50	4.50	3.50	3.00	4.00	3.50	4.00	4.50	5.00	3.50	3.50	4.00	3.50	4.00	4.00	3.50	5.00	4.50	3.50	3.50	3.00	1.50	3.00	3.00	3.50	5.00
[50, 65)	4.00	5.00	1.00	3.00	4.00	4.00	4.00	4.00	3.00	4.00	3.00	3.00	3.00	4.00	3.00	1.00	3.00	3.00	3.00	4.00	5.00	4.00	1.00	3.00	1.00	3.00	5.00
ANOVA	0.08	0.31	6.09	1.14	0.92	0.88	2.21	1.00	1.24	0.30	0.29	1.16	0.51	0.21	1.00	2.42	2.52	1.89	1.11	0.08	1.37	1.18	1.02	0.94	2.01	0.19	0.14
(p-value)	0.97	0.82	**0.00**	0.36	0.45	0.47	0.12	0.42	0.33	0.82	0.84	0.35	0.68	0.89	0.42	0.10	0.09	0.17	0.37	0.97	0.29	0.35	0.41	0.45	0.15	0.91	0.94
Previous university studies																											
No	4.32	4.37	4.16	4.32	4.11	4.37	4.39	4.44	4.33	4.29	3.79	4.00	3.95	3.83	4.00	3.67	4.11	4.12	3.95	3.19	3.88	3.65	2.47	3.06	3.24	3.41	4.78
Yes	4.67	4.33	5.00	4.00	5.00	4.33	5.00	5.00	4.67	5.00	4.00	4.00	4.67	4.67	4.67	4.67	4.67	4.67	4.00	4.67	4.67	3.67	2.33	2.67	3.67	4.33	5.00
t-test	0.50	0.01	1.79	0.26	1.74	0.00	1.78	2.34	0.33	2.65	0.13	0.00	1.72	3.04	2.51	1.83	1.79	1.57	0.01	5.31	1.72	0.00	0.03	0.28	0.23	2.32	0.63
(p-valuer)	0.49	0.94	0.20	0.62	0.20	0.95	0.20	0.14	0.57	0.12	0.72	1.00	0.20	0.10	0.13	0.19	0.20	0.23	0.90	**0.03**	0.21	0.98	0.86	0.61	0.64	0.14	0.44
Previous studies access to Engineering																											
EvaU	4.00	4.14	4.14	4.14	3.43	3.86	4.33	4.33	4.00	4.00	3.29	3.86	3.43	3.67	3.67	3.67	4.17	3.67	4.43	3.40	4.00	3.40	2.80	3.60	2.80	3.00	4.67

CAU	4.33	4.33	4.33	3.67	4.00	4.67	3.67	4.33	5.00	4.67	3.33	4.00	4.67	3.67	4.50	3.67	3.67	5.00	4.00	4.00	4.00	3.67	2.33	3.33	3.67	4.33	4.67
FP II	4.56	4.56	4.11	4.67	4.67	4.67	4.67	4.56	4.33	4.38	4.33	4.11	4.11	4.00	4.11	3.67	4.22	4.22	3.56	2.75	3.78	3.78	2.33	2.67	3.33	3.33	4.89
University Degree	4.50	4.50	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.00	4.00	5.00	5.00	5.00	5.00	5.00	5.00	4.33	4.50	4.50	3.50	2.00	2.50	4.00	4.50	5.00
University honours degree	5.00	4.00	5.00	2.00	5.00	3.00	5.00	5.00	4.00	5.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	3.00	5.00	5.00	4.00	3.00	3.00	3.00	4.00	5.00
ANOVA	0.90	0.58	0.46	2.91	2.38	3.78	1.52	0.82	0.97	1.40	1.13	0.08	3.27	1.94	1.36	0.68	1.45	1.00	1.85	1.74	0.34	0.47	0.24	0.52	0.84	1.65	0.35
(p-value)	0.51	0.72	0.80	**0.05**	0.09	**0.02**	0.24	0.56	0.47	0.28	0.38	0.99	**0.03**	0.15	0.30	0.65	0.26	0.45	0.16	0.19	0.88	0.79	0.94	0.76	0.55	0.21	0.88
Previous studies access to Engineering																											
Yes	4.32	4.32	4.37	4.26	4.42	4.42	4.50	4.61	4.56	4.59	3.90	4.05	4.16	4.06	4.12	3.89	4.22	4.29	3.90	3.44	3.94	3.71	2.35	2.88	3.35	3.53	4.79
No	4.67	4.67	3.67	4.33	3.00	4.00	4.33	4.00	3.33	3.33	3.33	3.67	3.33	3.33	4.00	3.33	4.00	3.67	4.33	3.33	4.33	3.33	3.00	3.67	3.00	3.67	5.00
t-test	0.50	0.59	1.21	0.01	5.07	0.73	0.12	2.91	5.57	10.26	0.78	0.69	2.32	2.20	0.06	0.53	0.27	1.28	0.83	0.04	0.40	0.24	0.69	1.16	0.15	0.05	0.45
(p-value)	0.49	0.45	0.28	0.91	**0.04**	0.40	0.73	0.11	**0.03**	**0.00**	0.39	0.42	0.14	0.16	0.81	0.48	0.61	0.27	0.37	0.85	0.54	0.63	0.42	0.30	0.70	0.83	0.51
Previous studies access to Engineering																											
User	5.00	4.00	5.00	2.00	5.00	3.00	5.00	5.00	4.00	5.00	3.00	3.00	4.00	4.00	4.00	4.00	4.00	4.00	3.00	5.00	5.00	4.00	3.00	3.00	3.00	4.00	5.00
Producer	4.33	4.38	4.24	4.38	4.19	4.43	4.45	4.50	4.40	4.37	3.90	4.10	4.05	3.95	4.11	3.80	4.20	4.21	4.05	3.33	3.95	3.63	2.42	3.00	3.32	3.53	4.80
t-test	0.10	0.95	0.85	6.59	0.06	5.04	0.29	0.01	0.13	1.27	1.25	0.34	0.12	0.58	0.97	3.02	0.01	1.77	0.58	0.66	1.13	0.29	0.09	0.00	0.29	0.14	2.69
(p.-value)	0.76	0.34	0.37	**0.02**	0.81	**0.04**	0.59	0.91	0.72	0.27	0.28	0.57	0.74	0.45	0.34	0.10	0.92	0.20	0.45	0.43	0.30	0.60	0.76	1.00	0.60	0.71	0.12

Table 6: Willingness to share prepared content

Item*	6	7a	7b	7c	7d	8	9a	9b	9c	9d	9e	9f
Sex												
Male	4.86	3.79	4.33	3.29	3.40	3.33	2.23	2.54	3.67	2.79	2.71	2.08
Woman	4.57	3.17	4.14	2.83	3.86	4.00	1.00	2.00	3.57	1.00	2.67	1.00
t-test	0.77	0.39	0.10	0.14	0.41	1.20	4.12	0.40	0.02	5.20	0.00	3.01
(p-value)	0.39	0.54	0.75	0.71	0.53	0.29	0.06	0.54	0.90	**0.04**	0.96	0.10
Obligations limiting their dedication to the course												
Work	4.25	3.80	3.60	3.20	2.20	2.60	1.00	2.00	3.40	1.75	3.00	1.00
Work and dependent person	4.87	3.38	4.40	2.92	3.87	3.73	2.14	2.38	3.60	2.29	2.85	2.08
No obligation	5.00	4.50	5.00	4.50	4.50	4.50	1.00	3.00	4.50	3.00	1.00	1.00
ANOVA	1.41	0.55	1.10	1.00	3.19	2.12	0.44	0.21	0.33	0.32	0.99	1.41
(p-value)	0.27	0.58	0.35	0.39	0.06	0.15	0.65	0.81	0.72	0.73	0.39	0.27
Currently works												
Part-time	2.00	4.00	2.00	3.00	1.00	2.00	1.00	2.00	3.00	1.00	4.00	1.00
Full-time	4.89	3.44	4.44	3.00	3.72	3.61	2.00	2.31	3.61	2.24	2.75	1.87
No work	5.00	4.50	5.00	4.50	4.50	4.50	1.00	3.00	4.50	3.00	1.00	1.00
ANOVA	40.66	0.51	5.05	0.87	4.27	2.06	0.71	0.15	0.43	0.40	1.48	0.51
(p-value)	**0.00**	0.61	**0.02**	0.43	**0.03**	0.16	0.51	0.86	0.66	0.68	0.26	0.61
Age												
[18,30)	4.57	4.00	4.13	3.14	2.75	3.25	1.17	2.50	3.88	2.17	2.43	1.50
[30, 45)	4.82	3.30	4.55	3.30	4.27	4.09	2.20	2.40	3.73	2.36	3.10	1.78
[45, 50)	5.00	3.00	3.00	1.50	2.00	3.00	2.50	2.50	3.50	2.50	2.50	2.50
[50, 65)	5.00	5.00	5.00	5.00	5.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ANOVA	0.28	0.67	0.97	1.11	3.37	2.51	1.11	0.20	0.99	0.17	0.48	0.35
(p-value)	0.84	0.58	0.43	0.37	**0.04**	0.09	0.37	0.89	0.42	0.91	0.70	0.79
Previous university studies												
No	4.72	3.67	4.21	3.22	3.63	3.63	1.94	2.53	3.63	2.39	2.89	1.81
Yes	5.00	3.00	4.67	2.50	3.00	3.00	1.00	1.00	3.67	1.00	1.00	1.00
t-test	0.39	0.22	0.32	0.24	0.43	0.57	0.91	1.48	0.00	1.11	2.07	0.66
(p-value)	0.54	0.65	0.58	0.63	0.52	0.46	0.35	0.24	0.97	0.31	0.17	0.43
Previous studies access to Engineering												
EvaU (**)	4.50	3.43	3.86	3.14	3.29	3.43	1.33	2.17	3.86	2.33	2.86	1.67
CAU (**)	4.67	1.00	3.00	1.00	3.00	3.33	2.33	2.33	3.33	2.33	2.33	1.50
FP II (**)	4.89	4.44	4.89	3.78	4.11	3.89	2.25	2.88	3.56	2.44	3.13	2.00
University Degree	5.00	1.00	5.00	1.00	3.00	4.00	1.00	1.00	5.00	1.00	1.00	1.00
University honours degree	5.00	5.00	4.00	4.00	3.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ANOVA	0.36	4.90	1.75	2.50	0.38	0.93	0.89	0.39	1.02	0.29	0.66	0.20
(p-value)	0.87	**0.01**	0.18	0.08	0.86	0.49	0.51	0.85	0.44	0.91	0.66	0.96
First year of registration in the subject												
Yes	4.89	3.41	4.37	3.00	3.53	3.47	1.75	2.47	3.58	2.00	2.50	1.56
No	4.00	4.67	3.67	4.00	3.67	4.00	2.33	1.50	4.00	3.67	4.50	3.00
t-test	4.96	1.78	0.77	1.21	0.02	0.39	0.15	0.57	0.18	2.42	2.36	2.27
(p-value)	**0.04**	0.20	0.39	0.28	0.89	0.54	0.70	0.46	0.68	0.14	0.14	0.15
Rol played in the project												
User	5.00	5.00	4.00	4.00	3.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Producer	4.75	3.53	4.29	3.11	3.57	3.67	1.89	2.44	3.76	2.32	2.79	1.76
t-test	0.08	0.00	3.45	0.25	1.32	0.38	0.99	5.44	0.49	3.80	0.34	0.40
(p-value)	0.78	0.97	0.08	0.62	0.26	0.55	0.33	**0.03**	0.49	0.07	0.57	0.54

Note: (*) See Table 2, where each item is collected. (*) EvaU: Evaluation for University Access; CAU (25 years): University Access Course for oer-25s): FP II (FP vocational training)

Finally the results are presented concerning the willingness of students participating in the project to share their videos. The objective that is pursued is to explore the possibility of creating a community of collaborative learning. One of the aspects

currently most in demand on the part of employers is that the need for creative professionals with a capacity for teamwork requires a coherent response from the educational institutions. There are thus very good reasons to consider as of great potential value the creation of a community of knowledge in which all the participants are both creators and users of the content linked to a subject.

Table 6 presents the results obtained. With an evaluation of 4.76, students evaluate very positively the creation of an archive contain the videos created during the project so that they can be made available for students in future years. With regard to sharing content on the social networks. significant differences were only detected in the case of Instagram and Twitter. Producers evaluate more positively than users the option of sharing via Instagram, while males are more in favour than women of sharing content on Twitter.

5. Conclusions

COVID-19 pandemic has compelled higher education institutions to manage online education settings while preserving the quality of the learning experiences at an equal pace (AL-Nuaimi et al., 2022). These requirements extend to the digital content and materials to be managed, including those generated by learners, which can complement those provided by teachers and those provided on the different LMS platforms (Al-Nuaimi & Al-Emran, 2021)

Considering that the digital content generated by students engaged in university-level education is currently at an embryonic stage and that there is a deficit in terms of theoretical framework and research, the results of this article concerning the evaluations of producers and consumers, and the differences between the two, represent interesting discoveries for better exploring the potential of this trend and deciding how to promote its successful establishment at university level.

All the characteristics of the course associated with the production of content and the recording of the video were evaluated very favourably by the students, especially their usefulness for summarising the basic concepts and the possibility of establishing content as part of the learning process. The students recognised the improved oral communication, the encouragement of active learning, information management, the capacity for analysis and synthesis, and increased autonomy. The students emphasised the creation of collaborative learning environments through models in which information circulates at the same level generating user networks, and that learning through video content is perceived as more effective than that based exclusively on printed materials.

As has been indicated, better evaluations are observed in the case of content producers as compared with mere users. It is true that, in the case of producers, important differences in evaluation are detected between students who are not in employment, who evaluate more positively having digital resources available to approach new learning processes and to improve the capacity for the transmission of knowledge and for the resolution of problems in a systematic way, compared with students who work on a part-time basis.

5.1 Theoretical contributions

The article contributes to a better understanding of the phenomenon of prosumerism in education, and to get to know better the student producer of content, and the differences with the student who merely uses the content. In addition, the article contributes different findings to the literature on student-generated digital resources. The students' preference for this type of digital materials over printed materials was also noted.

Additionally, the study shows differences depending on students' background conditions. This result is particularly original because it highlights how the students' environments and personal situations in hybrid and on-line education, whose profiles are usually different from those in traditional education, can mark their interest in, and evaluation of, this type of activity. In these types of education it is positive to create an atmosphere of mutual achievement, collaboration, support, encouragement and effectiveness, as indicated by Awan et al. (2010), but it is also necessary to consider the peculiarities of the students who attend this types of education, since we have observed that their profile or situation may affect their perception of this type of more creative (and perhaps more demanding) activity.

Similarly to Dyson & Frawley (2018) by inviting students to construct a meaningful product or artefact, we also ask them to build mental models and understandings. Additionally, in developing these videos for the rest of the students to see, we recognize the social nature of learning, as theorized in socio-constructivism, which claims that students build understanding by interacting with a teacher and with more advanced peers (Vygotsky, 1978; Blau, Shamir-Inbal & Avdiel, 2020). In this sense, it connects with the Vygotsky´s theory of Zone of Proximal Development (ZPD) where "the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p. 86). ZPD refers to physical environment for peers' study where the role of more knowledgeable others is key for the success of the learning experience. In the blended and online learning environments, a similar Zone of Proximal Development should be created. The article therefore contributes to promoting this concept in non-face-to-face teaching.

5.2 Practical implications

We can see great potential in this type of educational experience, if it is used well. It can be a way to encourage students' motivation by means other than pedagogic activities, such as entrusting students with greater responsibility, encouraging their active participation, or developing a problem-based focus, as indicated by De George-Walker & Keeffe (2010) and Hoic-Bozic et al. (2009). As observed by Campbell, Heller & Pulse (2020), our results suggest that student-created video engaged students in an active learning activity. Also, we agree with Belt & Lowenthal (2021): student created videos were shown to lead to increased collaboration and skill development (i.e., technological competencies) among students. On the other hand, by acting as teachers of the content of the videos, students are forced to acquire in-depth knowledge of the subject matter, in

order to be able to teach it to others, which results in improvements in their own learning. As we expect a natural expansion of video conferencing, recorded video lectures and student generated videos in the educational field due to the pandemic (Al-Nuaimi, Al-Kabi & Al-Emran, 2021), the results of our study on student-generated audio-visual resources will be valuable in different hybrid and online educational environments.

It is therefore necessary to overcome any form of simplistic vision concerning the mere instrumental details of handling audio-visual resources, and to advance towards perspectives that facilitate their use in an intelligent way, while at the same time promoting the development of skills and attitudes that favour a critical and reflective spirit, civic and cultural commitment, and creative quality activities as indicated by Buckingham (2008), Ferrés & Piscitelli (2012) or Gozálvez & Aguaded (2012), while bearing in mind at all times the profiles of the students concerned.

5.3 Study limitations and directions for further research

In any event, this research has its limitations, the most important of which arises in particular from the still limited number of students participating. Fortunately this limitation will be reduced in future course registration processes, which will enable us to incorporate not only new data but also increasingly promising perspectives and nuances concerning the incorporation of these techniques in blended educational models.

One surprising result in relation to the method of disseminating the content is that significant differences were detected in the case of Instagram and Twitter. Producers evaluate more positively than users the option of sharing via Instagram, while males are more in favour than women of sharing content on Twitter. Exploring these differences and expanding on the specific influences that the use of these activities can have on hybrid and on-line learning processes opens up new routes of research since, as we observe, there are particular factors to these models of education that plead against the generalisation of uses and applications originating from traditional educational models, in favour of increasing research into this field, which is becoming increasingly pushful and dynamic.

References

Acosta Rodríguez, V. M.; Moreno Santana, A. M. & Axpe Caballero, M. Á. (2017). La detección e intervención en habilidades narrativas en niños con trastorno específico del lenguaje en contextos educativos. *Educación XX1*, 20(2), 387-404, https://doi.org/10.5944/educXX1.19053

Al-Nuaimi, M. N., & Al-Emran, M. (2021). Learning management systems and technology acceptance models: A systematic review. *Education and Information Technologies*, *26*(5), 5499-5533.

Al-Nuaimi, M. N., Al-Kabi, M. N., & Al-Emran, M. (2021). Digitizing Learning During the Outbreak of COVID-19 Pandemic: Lessons Learned from the Most Infected Countries. In *Emerging Technologies During the Era of COVID-19 Pandemic* (pp. 291-303). Springer, Cham.

AL-Nuaimi, M. N., Al Sawafi, O. S., Malik, S. I., Al-Emran, M., & Selim, Y. F. (2022). Evaluating the actual use of learning management systems during the covid-19 pandemic: an integrated theoretical model. *Interactive Learning Environments*, 1-26.

Amineh, R. J., & Asl, H. D. (2015). Review of constructivism and social constructivism. *Journal of Social Sciences, Literature and Languages*, *1*(1), 9-16.

Amo, D., Casany, M. J., & Alier, M. (2014). Approaches for quality in pedagogical and design fundamentals in MOOCS. *Teoría de La Educación. Educación y Cultura En La Sociedad de La Información*, *15*(1), 70–89. http://www.redalyc.org/articulo.oa?id=201030471005

Anuradha, V., & Rengaraj, M. (2017). Storytelling: Creating a Positive Attitude Toward Narration Among Engineering Graduates. *IUP Journal of English Studies*, *12*(1). http://search.ebscohost.com/login.aspx?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=09733728&AN=122924573&h=NtA7iVP5TE6i14BsrOBDyJZhVI291HoIpSWJZShkj6QVRxbkILoXTGaZ8OjC2yNM6yBOPOoY516qDEnuBLdVog%3D%3D&crl=c

Bandulet, M., & Morasch, K. (2005). Would you like to be a prosumer? Information revelation, personalization and price discrimination in electronic markets. In *International Journal of the Economics of Business* 2 (2) 251–271. https://doi.org/10.1080/13571510500128038

Bates, S. P., Galloway, R. K., & McBride, K. L. (2012). Student-generated content: Using PeerWise to enhance engagement and outcomes in introductory physics courses. *AIP Conference Proceedings*, *1413*(1), 123–126. https://doi.org/10.1063/1.3680009

Bedggood, R. E., & Donovan, J. D. (2012). University performance evaluations: What are we really measuring? *Studies in Higher Education*, *37*(7), 825–842. https://doi.org/10.1080/03075079.2010.549221

Belt, E. S., & Lowenthal, P. R. (2021). Video use in online and blended courses: A qualitative synthesis. *Distance Education*, *42*(3), 410-440.

Blau, I., Shamir-Inbal, T., & Avdiel, O. (2020). How does the pedagogical design of a technology-enhanced collaborative academic course promote digital literacies, self-regulation, and perceived learning of students?. *The internet and higher education,* 45, 100722.

Boelens, R., De Wever, B., & Voet, M. (2017). Four key challenges to the design of blended learning: A systematic literature review. In *Educational Research Review* (Vol. 22, pp. 1–18). Elsevier Ltd. https://doi.org/10.1016/j.edurev.2017.06.001

Bozkurt, A., & Keefer, J. (2018). Participatory learning culture and community formation in connectivist MOOCs. *Interactive Learning Environments*, *26*(6), 776–788. https://doi.org/10.1080/10494820.2017.1412988

Bruner, J. S. (1996). The culture of education. Cambridge: Harvard University Press.

Bryson, C., & Hand, L. (2007). The role of engagement in inspiring teaching and learning. *Innovations in Education and Teaching International*, *44*(4), 349–362. https://doi.org/10.1080/14703290701602748

Camacho, M.M., Urquía, E.; Pascual, D. & Rivero, M.J. (2016). Recursos multimedia para el aprendizaje de Contabilidad Financiera en los grados bilingües. *Educación XXI*, 19(1), 63-89.

Campbell, L. O., Heller, S., & Pulse, L. (2020). Student-created video: An active learning approach in online environments. *Interactive Learning Environments*, 1-10.

Collis, B., & Moonen, J. C. (2005). An on-going journey: Technology as a learning workbench. *University of Twente.* https://research.utwente.nl/en/publications/an-on-going-journey-technology-as-a-learning-workbench

Cook-Sather, A. (2014). Student-faculty partnership in explorations of pedagogical practice: a threshold concept in academic development. *International Journal for Academic Development*, *19*(3), 186–198. https://doi.org/10.1080/1360144X.2013.805694

Cronbach, L.J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16 (3), 297-334

Cullen, J. (2020). Prosumerism in Higher Education—Does It Meet the Disability Test? In *Lecture Notes in Educational Technology* (pp. 105–121). Springer. https://doi.org/10.1007/978-981-15-4276-3_7

Dart, S., Pickering, E., & Dawes, L. (2020). Worked example videos for blended learning in undergraduate engineering. *AEE Journal*, 8(2).

Dyson, L. E., & Frawley, J. K. (2018). A student-generated video careers project: understanding the learning processes in and out of the classroom. *International Journal of Mobile and Blended Learning (IJMBL)*, *10*(4), 32-51.

Engin, M. (2014). Extending the flipped classroom model: Developing second language writing skills through student-created digital videos. *Journal of the Scholarship of Teaching and Learning*, *14*(5), 12–26. https://doi.org/10.14434/josotlv14i5.12829

Falkner, K., & Falkner, N. J. G. (2012). Supporting and structuring "contributing student pedagogy" in Computer Science curricula. *Computer Science Education*, *22*(4), 413–443. https://doi.org/10.1080/08993408.2012.727713

Fang, J. W., He, L. Y., Hwang, G. J., Zhu, X. W., Bian, C. N., & Fu, Q. K. (2022). A concept mapping-based self-regulated learning approach to promoting students' learning achievement and self-regulation in STEM activities. *Interactive Learning Environments*, 1-23.

Fellenz, M. R. (2004). Using assessment to support higher level learning: The multiple choice item development assignment. *Assessment and Evaluation in Higher Education*, *29*(6), 703–719. https://doi.org/10.1080/0260293042000227245

Fisher, R., Perényi, Á., & Birdthistle, N. (2018). The positive relationship between flipped and blended learning and student engagement, performance and satisfaction. *Active Learning in Higher Education*. https://doi.org/10.1177/1469787418801702

Fisher, R., Perényi, Á., & Birdthistle, N. (2018). The positive relationship between flipped and blended learning and student engagement, performance and satisfaction. *Active Learning in Higher Education*. https://doi.org/10.1177/1469787418801702

Garrison, D. R. (2007). Online Community of Inquiry Review: Social, Cognitive, and Teaching Presence Issues. In *ERIC*. https://eric.ed.gov/?id=EJ842688

George-Walker, D., & Keeffe, M. (2010). Self-determined blended learning: a case study of blended learning design: a case study of blended learning design. *Higher Education Research & Development*, *29*(1), 1–13. https://acquire.cqu.edu.au/articles/journal_contribution/Self_determined_blended_l earning_a_case_study_of_blended_learning_design_a_case_study_of_blended_lea rning_design/13404713/1

González Fernández, M. O., & Huerta Gaytán, P. (2019). Experiencia del aula invertida para promover estudiantes prosumidores del nivel superior. *RIED. Revista Iberoamericana de Educación a Distancia*, *22*(2), 245. https://doi.org/10.5944/ried.22.2.23065

Hardy, J., Bates, S. P., Casey, M. M., Galloway, K. W., Galloway, R. K., Kay, A. E., Kirsop, P., & McQueen, H. A. (2014). Student-Generated Content: Enhancing learning through sharing multiple-choice questions. *International Journal of Science Education*, *36*(13), 2180–2194. https://doi.org/10.1080/09500693.2014.916831

Hoban, G., Nielsen, W., & Shepherd, A. (2015). *Student-generated digital media in science education: Learning, explaining and communicating content* (Routledge (ed.)). https://books.google.com/books?hl=es&lr=&id=MAcXCgAAQBAJ&oi=fnd&pg= PP1&ots=iRKB1OEcCd&sig=X31B4Rq_oazJdxajSCVNTNkdxYc

Hoic-Bozic, N., Mornar, V., & Boticki, I. (2008). A blended learning approach to course design and implementation. *IEEE Transactions on Education*, *52*(1), 19–30. https://ieeexplore.ieee.org/abstract/document/4544803/

Honey, M., & Kanter, D. (2013). *Design, make, play: Growing the next generation of STEM innovators* (Routledge ed.). https://books.google.com/books?hl=es&lr=&id=4iAmadd3AJYC&oi=fnd&pg=PR 3&dq=Design,+make,+play:+Growing+the+next+generation+of+STEM+innovato rs&ots=XMfpPbmita&sig=UN_euSFm7ZT1UTlrNJ5MmQ7o47E

Kaur, M. (2013). Blended Learning - Its Challenges and Future. *Procedia - Social and Behavioral Sciences, 93, 612–617.*

Lave, J., & Wenger, E. (1991). Situated Learning. In *Situated Learning*. Cambridge University Press. https://doi.org/10.1017/cbo9780511815355

Lin, G. Y., Wang, Y. S., & Lee, Y. N. (2022). Investigating factors affecting learning satisfaction and perceived learning in flipped classrooms: the mediating effect of interaction. *Interactive Learning Environments*, 1-22.

Martín-García, R.; López-Martín, C. & Arguedas-Sanz, R. (2020): "Collaborative Learning Communities for Sustainable Employment through Visual Tools". Special Issue Online and Ubiquitous Training, Mobile Technology in Education and Sustainability. *Sustainability*, 12(6), 2569. https://doi.org/10.3390/su12062569

Martínez-Caro, E., & Campuzano-Bolarín, F. (2011). Factors affecting students' satisfaction in engineering disciplines: traditional vs. blended approaches. *European Journal of Engineering Education*, *36*(5), 473–483. https://doi.org/10.1080/03043797.2011.619647

Mercer-Mapstone, L., Dvorakova, S. L., Matthews, K. E., Abbot, S., Cheng, B., Felten, P., Knorr, K., Marquis, E., Shammas, R., & Swaim, K. (2017). A Systematic Literature Review of Students as Partners in Higher Education. *International Journal for Students as Partners*, *1*(1). https://doi.org/10.15173/ijsap.v1i1.3119

Merriam, S.B. & Caffarella, R.S. (1999). *Learning in adulthood: A comprehensive guide* San Francisco: Jossey-Bass Publishers

Mueller, S., & Anderson, A. R. (2014). Understanding the entrepreneurial learning process and its impact on students' personal development: A European perspective. *International Journal of Management Education*, *12*(3), 500–511. https://doi.org/10.1016/j.ijme.2014.05.003

Navío-Marco, J., & Solórzano-García, M. (2021). Student's social e-reputation ("karma") as motivational factor in MOOC learning. *Interactive Learning Environments*, *29*(3), 458-472.

Nielsen, L. (2012). *Five reasons I'm not flipping over the flipped classroom*. Technology and Learning. https://scholar.google.com/scholar?hl=es&as_sdt=0,5&lookup=0&q=Five+reasons+I%27m+not+flipping+over+the+flipped+classroom

Piaget, J. (1969). *Biología y conocimiento: Ensayo sobre las relaciones entre las regulaciones orgánicas y los procesos cognoscitivos* (F. González, Trad.). Siglo Veintiuno de España Editores. (Original book published in 1967)

Pool, J., Reitsma, G., & Van den Berg, D. (2017). Revised Community of Inquiry: Examining Learning Presence in a Blended Mode of Delivery. *Online Learning*, *21*(3). https://doi.org/10.24059/olj.v21i3.866

Potter, J., & McDougall, J. (2017). *Digital media, culture and education: Theorising third space literacies* (Springer (ed.)). https://books.google.com/books?hl=es&lr=&id=uq_HDgAAQBAJ&oi=fnd&pg=PP3&ots=4HnQC8-DWG&sig=Zw_dNvPwpWf7xUtRjCfNPCYXvTw

Qureshi, M. A., Khaskheli, A., Qureshi, J. A., Raza, S. A., & Yousufi, S. Q. (2021). Factors affecting students' learning performance through collaborative learning and engagement. *Interactive Learning Environments*, 1-21.

Rasheed, R. A., Kamsin, A., & Abdullah, N. A. (2020). Challenges in the online component of blended learning: A systematic review. *Computers & Education*, 144, 103701.

Ramos-Serrano, M. (2007). Comunicación viral y creatividad. *Revista Creatividad y Sociedad*, *11*, 202–226. www.marinaramos.net

Rasheed, R. A., Kamsin, A., & Abdullah, N. A. (2021). An Approach for Scaffolding Students Peer-Learning Self-Regulation Strategy in the Online Component of Blended Learning. *IEEE Access*, *9*, 30721-30738.

Reyna, J., Hanham, J., Vlachopoulos, P., & Meier, P. (2021). A systematic approach to designing, implementing, and evaluating learner-generated digital media (LGDM) assignments and its effect on self-regulation in tertiary science education. *Research in Science Education*, *51*(6), 1501-1527.

Reyna, J., & Meier, P. (2018). Using the Learner-Generated Digital Media (LGDM) framework in tertiary science education: A pilot study. *Education Sciences*, *8*(3), 106. https://doi.org/10.3390/educsci8030106

Shea, P., Hayes, S., Uzuner Smith, S., Vickers, J., Bidjerano, T., Gozza-Cohen, M., Jian, S. B., Pickett, A. M., Wilde, J., & Tseng, C. H. (2013). Online learner self-regulation: Learning presence viewed through quantitative content- and social network analysis. *International Review of Research in Open and Distance Learning*, *14*(3), 427–461. https://doi.org/10.19173/irrodl.v14i3.1466

Seo, K., Dodson, S., Harandi, N. M., Roberson, N., Fels, S., & Roll, I. (2021). Active learning with online video: The impact of learning context on engagement. *Computers & Education*, *165*, 104132.

Solórzano-García, M., & Navío-Marco, J. (2019). Developing social entrepreneurs through distance education: The value of commitment and interactivity with the learning community. *International Journal of Mobile Learning and Organisation*, *13*(1), 30–50. https://doi.org/10.1504/IJMLO.2019.096466

Toffler, A., & Alvin, T. (1980). *The third wave* (Bantam books, Vol. 484). https://pdfs.semanticscholar.org/f16d/b4a85e2a9170a0fbef8d686ac22b2ec73550.pdf

Triviño-Cabrera, L., Chaves-Guerrero, E. I., & Alejo-Lozano, L. (2021). The figure of the teacher-prosumer for the development of an innovative, sustainable, and committed education in times of COVID-19. *Sustainability*, *13*(3), 1–18. https://doi.org/10.3390/su13031128

Vasilchenko, A., Cajander, A., & Daniels, M. (2020). Students as Prosumers: Learning from Peer-Produced Materials in a Computing Science Course. *Proceedings - Frontiers in Education Conference, FIE*, *2020-October*. https://doi.org/10.1109/FIE44824.2020.9274042

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge: Harvard University Press.

Wenger, E. (1998). *Communities of practice: Learning as a social system*. Systems Thinker.

Werder, C., & Otis, M. M. (2010). Engaging student voices in the study of teaching and learning. In *Stylus*.

Yu, F. Y. (2022). An online learning system supporting student-generated explanations for questions: design, development, and pedagogical potential. *Interactive Learning Environments*, 30 (5), 782-802.