Knowledge pills: an evaluation of teaching videos for self-learning in the university setting

Píldoras de conocimiento: evaluación de los vídeos docentes para el autoaprendizaje en el contexto universitario

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Abstract:

Citizens' immersion in interactive media, especially that of young people, suggests the need to review and adapt the teaching methodologies used in universities, bringing them closer to informal learning environments. This work focuses on assessing teaching pills as a resource in the university setting by means of case analysis. Firstly, by means of a questionnaire, the utility and difficulty expressed by students faced with teaching by audiovisual pills is evaluated, as is the relation between these two variables. Audience reception of the videos is then analysed using the YouTube Analytics tool. The results demonstrate a favourable opinion of utility, a medium-high level of difficulty and the lack of any relation between the two variables. Furthermore, the results show a common viewing pattern characterised by a drop in audience during the first second, sustained attention maintained for the following minutes, with peaks in viewing figures attributable to the repetition of specific fragments, and a loss of audience in the final moments. Despite the limitations inherent to the sample type, we conclude that a time limit on teaching videos is not determinant for their viewing, interest in the content having greater relevance.

Keywords:

Advertising; knowledge pills; video tutorial; YouTube; self-learning.

Resumen:

La inmersión en los medios interactivos de la ciudadanía, especialmente en los jóvenes, plantea la necesidad de revisar y adaptar las metodologías docentes aplicadas en el ámbito universitario acercándolas a los entornos de aprendizaje informales. El presente trabajo tiene como objetivo conocer la valoración de las píldoras docentes como recurso dentro del entorno académico mediante la metodología del análisis de caso. Para ello, primero se evalúa la utilidad y dificultad manifestada por los estudiantes en la enseñanza a través de píldoras audiovisuales y la relación de ambas variables mediante un cuestionario. Posteriormente, se analiza la recepción de estos vídeos con la herramienta YouTube Analytics. Los resultados ponen de manifiesto una evaluación favorable de la utilidad, un grado medio-alto de dificultad y la no existencia de relación entre ambas variables. Además, los resultados muestran un patrón común de visionado caracterizado por una caída de audiencia durante el primer segundo, una atención sostenida que se mantiene durante los minutos siguientes, con picos de visionado atribuibles a repeticiones de fragmentos concretos y una pérdida de audiencias en los momentos finales. A pesar de las limitaciones derivadas del tipo de muestra, se concluye que la limitación de tiempo en los vídeos docentes no es determinante para su visionado, tomando relevancia el interés por el contenido.

Palabras clave:

Publicidad; píldoras de conocimiento; video tutoriales; YouTube; autoaprendizaje.

1. Introduction

It is an undeniable fact that the internet is part of our daily lives, the data indicates that the medium has achieved 85.1% penetration (AIMC, 2021) and that the average time spent on it is over four hours a day (AIMC, 2020a). Figures that grow if we speak of younger groups such as university students, in which case penetration is above 95% (AIMC, 2021).

We are faced with a digital generation marked by the use of technology which defines practically every part of their lives. One of the fields where the internet has made the greatest impact is education, developing a new relationship between students and educational institutions. 60.2% of users employ the network for education (Fundación Telefónica, 2020), 26.8% of the population used online learning materials (Telefónica Fundación, 2021) and "eight out of ten users surf the internet to access educational videos", a figure that increases in higher education circles, approaching 95% (Fundación Telefónica, 2017). Although students do not see the media primarily as a learning space and associate it more with entertainment, fun and pleasure (Pereira et al., 2019), the truth is that the internet and especially the social networks can be considered to be a learning space (Pujol, 2018). According to the latest study by the Spanish Social Networks Observatory, 66% of users utilize them to get information and, of these, 61% acquire knowledge from them (IAB, 2021).

The Web 2.0 holds a basic space in the education of the young, providing "meanings and signifiers, messages and content with assessments of reality and which, directly or indirectly, have influence over their young followers" regardless of the language or content developed on these platforms (Arellano et al., 2020interaction and consumption of media and content. YouTube has become one of the platforms most used by these, which requires investigating the repercussions exerted by these influencers on children. In the present work, an analysis of the main YouTubers followed by children of Primary Education in Spain is carried out. It has used a quantitative methodology to know the main YouTubers, and qualitative, to analyze the profiles of these influencers. The results indicate the predilection Spanish YouTubers and that most use videogames or jokes associated with their channels. Finally, a reflection is offered on the content consumed by children on the Internet through these channels, providing pedagogical proposals to develop an adequate media education for psychosocial child development." (Arellano et al., 2020, 1455). But, apart from influence on issues such as socialisation and relationships, they are also knowledge aggregators, particularly through blogs, whose educational terminology would be edublogs (Durán Medina, 2011)realised by the author of the article, whose general mission is not another one but to contribute to a possible improvement of the quality in education. Method: In this case it has been chosen to equip to the questionnaire used with the greater rigor, possible reliability and validity by means of a method of experts, the Delphi method, using like source of intelligence a group of people to whom a lifted knowledge of the matter assumes that is going away to try. Results: In order to realise the descriptive analysis of data, tables of frequency with graphs has been used, measures of central tendency, histograms, variability, asymmetry and curtosis. Of equal way, diverse tests have been carried out that have helped in the investigation of the subject that occupies to us. On the one hand, relations of contents settled down to each other trying to discover the existence or not of this dependency. Later, the coefficients of correlation were found out by means of nonparametric and parametric models of regression, being able to be used the results obtained for the possible predictions. Discussion or Conclusion: The use of edublog, independent of other many variables (as they can be sex, the obligatory nature of the studies, type of locality, level of use, etc. or via platforms such as YouTube, considered adequate for gaining new knowledge and learning from experts (Pujol, 2018) and which over recent years are no longer seen as passive sources but as apt for the development of more proactive strategies for informal learning (Gutiérrez et al., 2018). However, there is some distance between what the student experiences in and out of the classroom, and numerous authors call for the uniting of both experiences by the creation of a model in which the formal and informal provide real opportunities (Erstad & Sefton-Green, 2012; Sloep & Berlanga, 2011; Pereira et al. 2019, among others).

In order to mitigate the above, digitalization is increasingly common in classroom practice, more so since the start of the pandemic. Tirado Lara & Roque Hernández (2019) insist on the importance of the development of IT skills in all aspects of education, be they

formal or informal, and there are authors who call for the utilization of available resources in the informal sphere as they encourage a favourable attitude toward learning (Costa et al., 2013). This development involves, among other aspects, the use of new multi-media languages which surpass traditional print media and their verbal codes (Gisbert Cervera & Esteve Mon, 2011). Therefore, we no longer speak of teacher-centric classes as the only way to transmit knowledge, and more collaborative and enriching methodologies are being brought in which seek significant learning. In this sense, platforms such as YouTube mix entertainment with education whilst maintaining their own aesthetic and narrative style (Gutiérrez et al., 2018).

Among these new practices we find e-learning, which is more than merely passing from off-line to on-line content and seeks the optimization and redesign of the student's regular tasks through the use of IT (Bozkurt & Sharma, 2020; García-Peñalvo, 2020; Duart, 2005; Luo et al., 2017). In order to effect this redesign and optimisation, educative innovation is presented as a necessity and, partly, a demand to achieve quality education which is not commonly detailed or explained in specific terms (Peris Reig, 2020), but which is vitally important for the improvement of an educational system in constant flux (Lara et al., 2018).

This application of innovative methodology in the classroom calls for greater student involvement, which should not be limited to receiving lectures in class, as his/her training will be taking place in interactive virtual spaces in which the pupil will be responsible for their own learning (Martínez Sánchez, 2008). In this way, the student is placed at the centre of the educational process and learning occurs through interaction with the materials (López Noruego, 2013; Zabalza, 2004). It is here where platforms and communities come into play, as the learner utilises them to direct his/her own learning, configuring what are termed as "personal learning environments" (Salinas, 2013), reflecting more efficient results within the educational process (Leibowitzet al., 2016). These new methodologies also modify the educator's work as, instead of focusing on the transmission of content, he/she will help to perfect the students' skills (Lara et al., 2018).

There are many forms and methodologies to adopt within e-learning. In this study we focus on one of the key tools in the self-learning process: videos. Online videos are one of the commonest activities across the network, 77.7% of users watch them (AIMC, 2020b), which explains why traditional written media, such as newspapers, employ video through YouTube to complete their articles and make them more eye-catching (Santín & Álvarez-Monzoncillo, 2019).

For this study, audio-visual educational pills related to advertising have been developed and have been posted on an edublog and on YouTube. The work strives to analyse the experience and to offer assistance to other educators employing tools of this type.

1.1. Theorical framework

IT has entered the classroom using diverse forms and perspectives, which has resulted in numerous studies and focuses relating IT to the educational environment. Using Duart's (2005) generic classification as a starting point, we differentiate between IT related to organizational aspects, administrative models, and practices associated with learning and teaching. Tapia Cortes (2020) determined that the latter have received least attention in the literature.

This study focuses on practices associated with learning and teaching, more specifically, on two of the dimensions proposed by Bruce & Levin (1997), communication, as video is a medium of information transmission, and the construction of knowledge, as when utilizing audio-visual language, message reception is facilitated and the learning process is favoured. Narrowing that down

somewhat more and following Santiago Benítez et al., (2013), we can speak of a mediated interaction, as no manipulation of the video is required, it should merely be watched.

Costa et al. (2014) conclude that the use of technology which the students are already familiar with can improve educational results. Speaking specifically of the utilisation of social networks for educational ends, Izquierdo & Gallardo (2020)dinamismo y mutabilidad, lo que requiere una observación análoga de las mismas. Este trabajo se centra en las culturas de aprendizaje informal juvenil emergentes, tomando como objetivo principal reconocer y caracterizar una nueva figura en medios sociales en línea: el estudigramer. Empleando cuestionarios (N=256 argue that WhatsApp and YouTube make the greatest contribution to this end, the latter being especially appropriate for "full explanations of complex matters", as the opportunity exists to repeat said explanation. The study also maintains that social networks offer speed and collaboration to the educational process, although there is a danger from the distraction offered by these platforms.

Furthermore, watching videos is one of the most frequent activities on the network (AIMC, 2020b), being a key element in informal learning. Data shows that 42.5% of users consult video tutorials (AIMC, 2020b). The majority of these are seen on YouTube, top of the ranking among the most visited websites (AIMC, 2021) and third among social networks (IAB, 2021). 73% of the population dedicate at least 15 minutes a day to YouTube (AIMC, 2020b).

YouTube offers different learning methodologies that escape academic control, giving opportunities for informal learning by the young. An example would be booktuber communities which promote reading and favour reflection and interpretation, creating collaborative and participative synergies among equals (Vizcaíno-Verdú et al., 2019). Another study pointing to the value of YouTube as a diffusion platform is that by Vizcaíno-Verdú et al. (2020) which, after analysing specific channels, concludes that despite university professors' reticence about the use of youtubers, these communicated knowledge both rigorously and attractively. Along these lines, we could speak of how YouTube contributes to the development of what is termed citizen science, which is more related to matters of health, geography, environmental care, and biodiversity, amongst other areas (Bautista-Puig et al., 2019)society, and policy in the dual pursuit of more democratic research and decision-making informed by sound evidence. It is both an aim and an enabler of open science (OS. Finally, Marques Moreira et al. (2019) analyse an educational channel with over three million hits, concluding that this non-formal learning does not displace formal learning but should only be utilized as a complementary space and as an encourager of learning.

Studies into the classroom utilisation of videos detect a lessor use in the world of universities (30%) than in secondary education (50%) (Izquierdo & Gallardo, 2020)dinamismo y mutabilidad, lo que requiere una observación análoga de las mismas. Este trabajo se centra en las culturas de aprendizaje informal juvenil emergentes, tomando como objetivo principal reconocer y caracterizar una nueva figura en medios sociales en línea: el estudigramer. Empleando cuestionarios (N=256. Other analyses demonstrate the utility of video pointing out, for example, that it helps to understand concepts and offers the possibility of them being seen on different devices: phones, tablets, laptops (Hernández et al., 2014). Its aptitude for learning quantitative subjects is also indicated (De La Fuente Sánchez et al., 2018). Nevertheless, it is necessary to adapt to the format and to create didactic discourses with audio-visual languages (Gertrudix et al,2017). Experiences applied in degree courses have been positive, as seen in the results of Estévez-García & González-González (2014) which show better performance among students utilising educational videos as opposed to traditional notes. More recently, Ortega Fernández et al. (2021) note the benefits in terms of motivation and the favouring of autonomous

learning by the student who uses audio-visuals integrated in social networks. In general, university students react positively to the utilisation of knowledge pills due to their versatility and educational possibilities (Bustamante et al. 2016). Their use has been applied to specific methodologies such as flipped classrooms (Martínez Abad & Hernández Ramos, 2016) and to improve academic results and student involvement (Carballido-Landeira, 2020 and Monedero et al. (2020).

A final key question in this approach is the ideal length of a video. Some studies argue that this is a vital element, particularly in the moment before viewing, concluding that it is unlikely videos of over four minutes will be watched, unless they are obligatory (Clossen, 2018). Guo et al.(2014) study 6.9 million viewings of videos on edXMOOC and determine that educational videos should be specifically planned to that end. They also state that the instructor's intervention at key moments is more interesting than content made of slides alone and that shorter videos are more attractive, recommending a length of less than 6 minutes. The TechSmith (2021) reports argue along the same lines, after analysing educational and informative videos, they established that users prefer videos of between three and six minutes, although the recommended length should be determined by the subject matter. Lastly, Berg et al., (2014) say that subtitles improve comprehension and attention as well as offering the option of audio-free viewing. Students, according to this study, take this type of activity as a complement to in-person conferences.

1.2. Approach & objectives

The objective is to evaluate audio-visual teaching pills as a resource in an academic setting. Specifically, we evaluate the utility and difficulty experienced by students of teaching via audio-visual pills, the relationship between the pills' usefulness and the difficulty perceived in the task, and the audience reception to the videos to determine the ideal length in an academic setting.

2. Method

2.1. Context

This study is part of a Teaching Innovation Project with the aim of gaining competences in one of the most specialised activities in the Advertising sector, media planning and the follow-up of advertising campaigns. The participants in the project were third- and fourth-year students of the Advertising & PR degree of the University of Valladolid matriculated in the obligatory subjects of Research into Advertising Efficacy, and Advertising Media: research, planning & management, as well as the second cycle optional course, the Reception Studies Laboratory, together with students from ESIC Business & Marketing School, again studying Advertising & PR, matriculated in Strategic Advertising Planning. The project, developed by five professors, had a total of 525 participants (440 from the UVa and 85 from ESIC). It is a case study based on the follow-up of viewing of the videos and their assessment by means of a survey.

2.2. Procedure

Several teaching actions have been implemented within the project's framework, nonetheless, the study is focused on audio-visual knowledge pills as an educational action. The videos are short pieces explaining different aspects of media planning such as media selection and planning, or visual presentation of information relevant to the campaign. A total of seven pills (P) were developed,

although the first had two videos. The material utilized was as follows: P1. Budget distribution by media (video-1 & video-2); P2. How to make an exterior media plan; P3. Multimedia audience & strategic planning; P4. Graphic media plan; P5. How to make a television plan; P6. Campaign timeline; and P7. How to make a radio plan. Length goes from the less than three minutes of the first video of P1, up to the almost twelve minutes for P7. To disseminate the pills and to make them accessible to students in both faculties, we used *Blog-para-estudiantes-de-publicidad* (https://bit.ly/3fAQxwR) and the YouTube channel *Comunica-con-e* (https://bit.ly/3yqpknO). These tools, apart from helping with the learning process (Lara, 2005), allow for a break from the pressure of academic programs, from the idea of lineal learning and from the physical, economic and time barriers students may face (Jou, 2009). The blog utilised in the project had 81,222 visits from June 1, 2020 to June 30, 2021, mainly by women (70.9%) and the young (64.2% of 18-34 years of age) (YouTube Analytics). Within the study, the blog has been used to spread the content developed for the project and so that this content was presented in a student-friendly setting.

The project started in the 19/20 academic year with the creation and distribution of the first three pills, one of them with two videos. Another four were added in 20/21. Although all the subjects are in the same field, content differs so that each subject applied those most suited to their needs. The following procedure was followed:

Explanation of the pill's content in the classroom.

Posting of the pill on *Blog-para-estudiantes-de-publicidad* and the YouTube channel *Comunica-con-e.*

A practical exercise in the classroom supported by the teacher.

Joint correction of the exercise in class.

Once the action was completed, the students were asked to hand in work based on the pills' content, worth 10% or 20% of the course total, they viewed the videos independently.

2.3. Instrument & sample

To assess the students' opinions of the usefulness and difficulty of the knowledge pills a questionnaire was utilised, -self-administered via *Google Forms*— in which all the students who took part in the project were invited to participate. The questionnaire was filled in by 199 students (37.9% of the members of the Teaching Innovation Projects), 40 were matriculated in Strategic Advertising Planning, 24 in the Reception Studies Laboratory, 64 in Advertising Media: research, planning & management and finally, 114 in Research into Advertising Efficacy.

The questionnaire, apart from data on the group and subject, included a question on the utility of each pill, measured on a Likert-type scale with a score of 1 – 4, given in increasing order: Not Useful, Slightly Useful, Somewhat Useful, Quite Useful. The second question, concerning the difficulty of each pill's content, used the same type of four-point scale, the categories being Not Difficult, Slightly Difficult, Somewhat Difficult, Quite Difficult. The results were analysed together having confirmed there were no differences arising from the study centre or subject studied.

Reception of the pills was evaluated using the data provided by YouTube Analytics from the first posting of the videos in November 2020 until the end of the second term in June 2021. Data was compiled on impressions, viewing, average viewing time, and per-

centage of the video watched. Analysis was also performed of viewing reception during each piece in order to determine at what moment there was a change in viewing tendency.

3. Results

The following is a description of the results obtained in the follow-up survey on the usefulness and difficulty of the video, which serves to put the first two goals to the test. Using the viewing data, we analysed reception of the videos and its relation to length, in line with the study's third objective.

3.1. Assessment of the teaching pills

Results concerning the usefulness of the pills are shown in Table 1. It can be seen that most students considered the pills proposed to be quite useful. P5, on How to make a television plan, had the highest evaluation, 72.9% seeing it as quite useful, P7, on how to make a radio plan, came second (67.8% quite useful), then P4, on graphic media plans (67.3%), and then P1 on budget distribution (66.2%).

Table 1. Distribution of frequency & average score of the pills' usefulness

	1 Not use- ful	2 Slightly useful	3 Some- what useful	4 Quite use- ful	Average score (typical deviation)
P1: Budget distribution (vídeo-1 & vídeo-2)	0.6%	3.9%	29.2%	66.2%	3.61 (.598)
P2: How to make an exterior media plan (vídeo-3)	1.3%	6.5%	27.7%	64.5%	3.55 (.676)
P3: Multimedia audience & strategic planning (vídeo-4)	2.0%	4.7%	30.4%	62.8%	3.54 (.684)
P4: Graphic media plan (vídeo-5)	1.3%	3.9%	27.5%	67.3%	3.61 (.631)
P5: How to make a TV plan (vídeo-6)	0.6%	4.5%	21.9%	72.9%	3.67 (.593)
P6: Campaign timeline (vídeo-7)	0.5%	5.3%	35.8%	58.4%	3.52 (.623)
P7: How to make a radio plan (vídeo-8)	0.7%	5.3%	26.3%	67.8%	3.61 (.620)

Source: created by the authors

Regarding difficulty in applying the pills (Table 2), a fairly homogeneous assessment can be observed, the answers are distributed almost equally between the presence and absence of a certain degree of difficulty. Taking the halfway point on the scale, at 2.5, we see that the average score on difficulty is around that figure, it is worth noting that P3, on multimedia audiencia (2.63) and P7, on how to make a radio plan (2.63), presented the highest difficulty for a larger number of students.

Table 2. Distribution of frequency & average score of the pills' difficulty

	1 Not difficult	2 Slightly difficult	3 Somewhat difficult	4 Quite difficult	Average score (typical deviation)
P1: Budget distribution (video-1 & video-2)	13.0%	39.9%	39.1%	8.0%	2.42 (.818)
P2: How to make an exterior media plan (video-3)	10.4%	37.5%	42.5%	9.7%	2.51 (.811)
P3: Multimedia audience & strategic planning (video-4)	11.9%	31.0%	39.7%	17.5%	2.63 (.910)
P4: Graphic media plan (video-5)	12.1%	37.9%	41.4%	8.6%	2.46 (.817)
P5: How to make a TV plan (video-6)	11.9%	37.1%	39.9%	11.2%	2.50 (.846)
P6: Campaign timeline (video-7)	12.9%	40.4%	38.0%	8.8%	2.43 (.825)
P7: How to make a radio plan (video-8)	10.6%	31.9%	41.1%	16.3%	2.63 (.882)

Source: created by the authors

3.2. Teaching pills' usefulness related to difficulty

To check if there is any relation between the pills' usefulness and the perceived difficulty of their content, analysis was carried out utilizing Spearman's rho correlation coefficient. The results (Table 3) show that the correlation coefficients are very low and do not demonstrate statistical relevance, that is to say, there is no relation between the difficulty of the pills' content and their practical evaluation.

Table 3. Spearman's rho coefficient correlation between usefulness & difficulty in the pills

	Difficulty P1	Dificulty P2	Dificulty P3	Dificulty P4	Dificulty P5	Dificulty P6	Dificulty P7
Usefulness Pill 1: Budget distribution (video-1 & video-2)	-.114 (.185)						
Usefulness P2: How to make an exterior media plan (video-3)		-.052 (.551)					
Usefulness P3: Multimedia audience & strategic planning (video-4)			.048 (.594)				
Usefulness P4: Graphic media plan (video 5)				.025 (.766)			
Usefulness P5: How to make a TV plan (video-6)					-.057 (.500)		
Usefulness P6: Campaign timeline (video-7)						.034 (.658)	
Usefulness P7: How to make a radio plan (video-8)							. 0 7 3 (.394)

Source: created by the authors

3.3. Reception of the teaching pills & optimal length

As stated above, the videos have different lengths, the average duration being 8 minutes, 13 seconds. Once seen that the perceived difficulty of each pill is comparable, although the requirements may vary depending on the content, it can be said that the different topics are equivalent from the students' point of view. Thus, we proceeded to analyse the reception of each video and check if the length of the audio-visual tutorials has any effect on how students make the most of these resources.

Table 4 contains the data compiled about reception. The number of viewings of each video tells us how many people have been exposed to its content, regardless of its length or of any repetitions. Each viewing corresponds to a unique user who has seen each teaching pill. Utilising this parameter, we can see that most of the videos have received between 200 and 300 visits. The most visited, P6, on how to make a TV plan, has been seen by the highest number of students (n= 394) and the least watched was the second video of P1 as well as that of P3 with fewer than 200 viewings.

Table 4. Register of the pills' reception

| Video title	Posted	Length	Impressions	Total viewings	Impressions /Viewings	Average viewing time	Average % watched (%)
P1: Budget distribution by media (vídeo-1)	Dec 3, 2019	2:52	968	275	3.5	1:45	61.31
P1: Budget distribution by media (vídeo-2)	Dec 3, 2019	3:45	567	172	3.3	1:30	40.26
P2: How to make an exterior media plan	Dec 6, 2020	6:35	439	121	3.6	2:30	38.19
P3: Multimedia audience & strategic planning	Nov 26, 2020	9:39	512	194	2.6	3:04	31.78
P4: Graphic media plan	Dec 3, 2019	9:40	955	202	4.7	2:32	26.23
P5: How to make a TV plan	Dec 3, 2019	10:06	766	394	1.9	3:41	36.50
P6: Campaign timeline	Nov 17, 2020	11:31	672	233	2.9	3:18	28.71
P7: How to make a radio plan	Dec 1, 2020	11:36	788	297	2.7	4:20	37.41
Total (Media)		**8:13**	**683,78**	**223.00**	**3.07**	**2:50**	**36.40**

Source: created by the authors

Turning to impressions, the second reception parameter, we see that pills 1 and 5 have been watched on more than 950 occasions, pills 6 and 8 are over 750 and only one of them comes in below 500.The ratio between impressions and viewings gives an idea of the number of times content has been repeated by the same person. The first three pills have been repeated an average of between 3.3 and 3.6 times. The video on graphic media planning (P2), which has been watched by a lower number of students, is the one with the highest ratio of repetitions (4.7). The rest of the videos reach an average of fewer than 3 repetitions. Taken together, a certain balance is revealed in the viewing of audio-visual content developed for this teaching exercise, though it is true that P5, on TV media plans, stands out as regards the number of viewings and impressions, we should remember that it also came top in terms of usefulness.

Another of the references for studying the videos' reception is average viewing time. As shown in Table 4, the times are between the minute and a half of P2 and the four minutes, twenty seconds of P8, the average being 3 minutes, 50 seconds. The differences in the length of the videos suggest analysing the percentage viewed of each video, this metric being proportional to the length of each video. In this case, it is clear that the shorter videos achieve a higher viewing percentage, averaging 40-60%. The other videos, with a length of around 10 minutes, have a lower viewing percentage, of 26.2% - 37.4% of the content, although that should be qualified

by pointing out that pills 5 and 7 achieve viewing percentages similar to those of shorter duration (36.5% and 37.4%, respectively). Therefore, average viewing time is proportional to a video's length, the longer pills being viewed for longer, but, at the same time, in the longer videos a lower proportion of the content is viewed. Nevertheless, the differential between the longest and shortest videos is slight.

To dig deeper into these differences, we analysed each video's reception curve. Figures 1 and 2 show reception, taking the length of each video expressed in percentage as their base. All the videos present a fall in the first seconds of their viewing, corresponding to viewers who discontinue during the first 30 seconds. The percentage fall is between 30% and 40% for the videos analysed, except in the first video of P1, where audience loss was around 20%.

Figure 1. Percentage of absolute audience retention by video, pills 1, 2 & 3
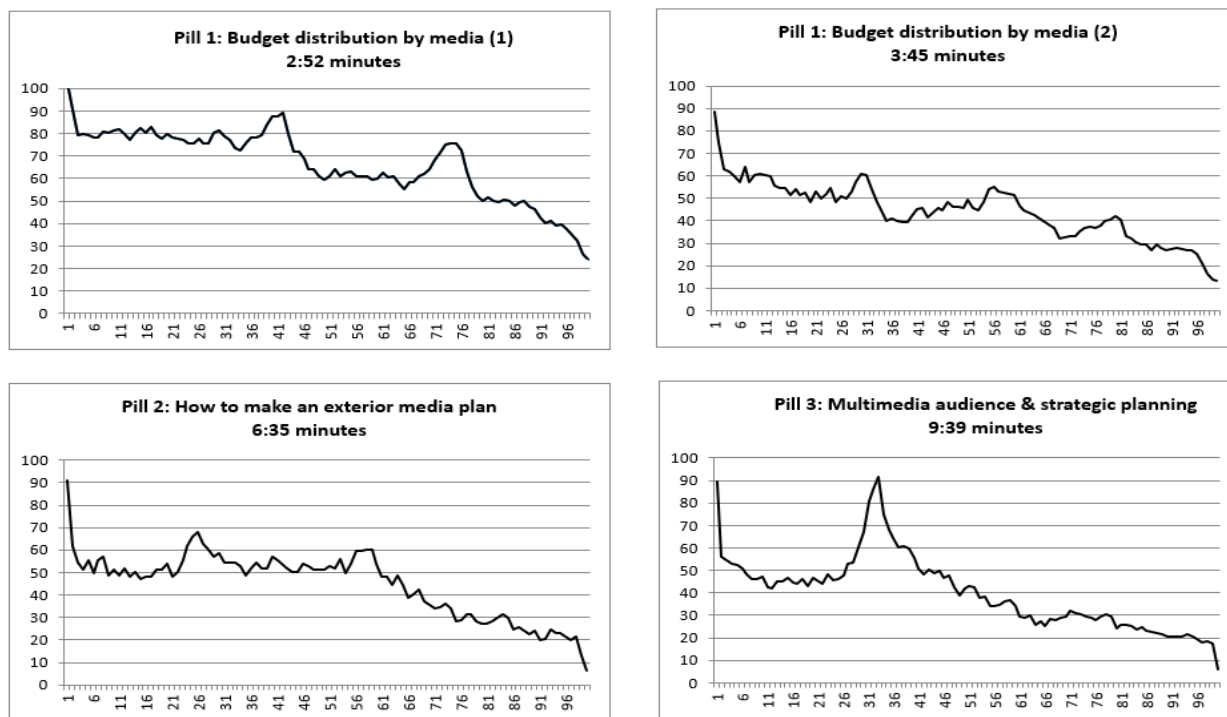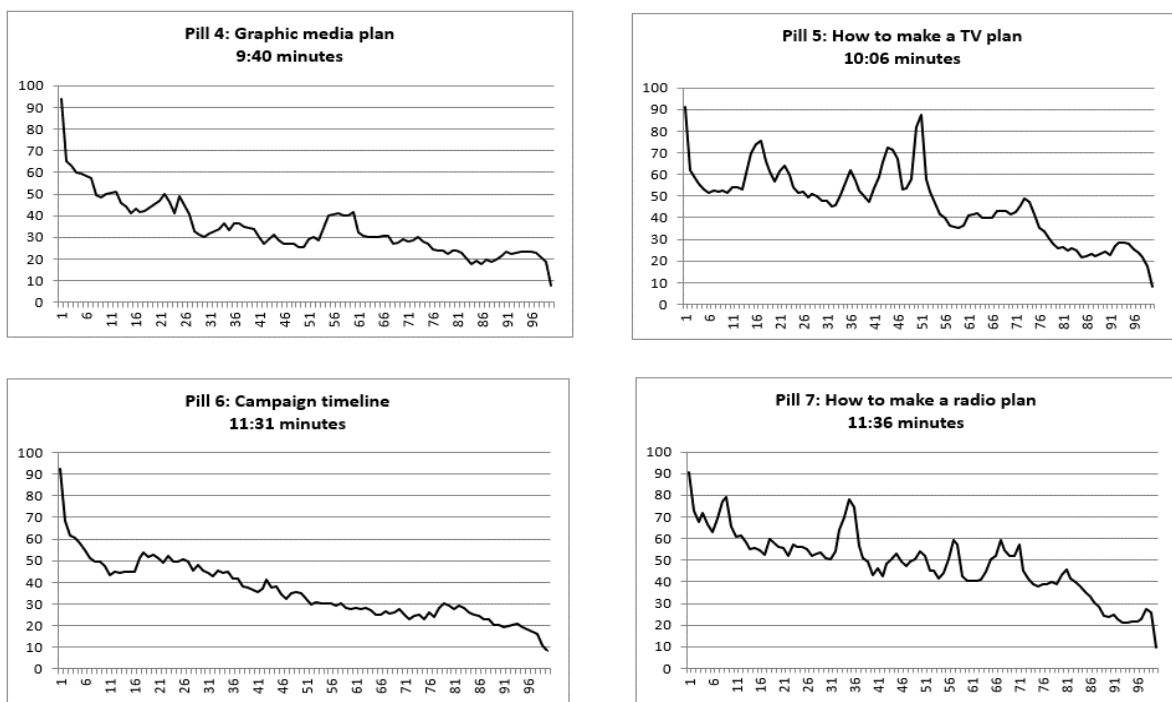

Source: created by the authors

The peaks in audience indicate that fragments of the video have been viewed again. The reception curves of pills 1 (videos 1 & 2), 2 and 4 are similar, presenting slight audience peaks during their viewing, combined with small, sharper falls. P6 presents a reception curve without peaks, unlike that seen for the other videos, it is understood by this that the students found it easier to follow.

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Pills 3,5 and 7 show greater audience oscillation, indicative of viewers returning several times to certain fragments of the video. For example, P3 presents a progressive fall in audience with a sharp peak after approximately 30% of the video, coinciding with a new part that which is not covered in any of the other pills, which is the reference to how to make Excel graphs. Thus, it may be that these rises are due to more complicated content or that it was presented more quickly and was therefore more difficult to take on board after a single viewing.

Figure 2. Percentage of absolute audience retention by video, pills 4, 5 & 6

Source: created by the authors

Taken together, the reception curves do not seem to reflect a differentiated pattern in relation to pill length. Viewing and the rise and fall in audience would seem to be related to the content being shown. An example of that can be seen in pills 6 and 7, both of a similar length, but with completely different reception patterns, as commented previously.

To finish this analysis, we have drawn up a summary of each pill's audience retention utilising four points of analysis, corresponding to the four audience quartiles accumulated, showing the minute related to each quartile (Table 5). The first point covers 75% of the audience, as mentioned above, there was considerable abandonment of the videos during the first moments of emission, with

the exception of the first video. The second quartile covers the first moment in which audience retention reaches 50%. At this point two different patterns can be discerned, pills 1 and 5 retain half of their audience for over two minutes and P7 for four minutes. In contrast, the other videos keep half of their audience for less than a minute, although, as described in Figures 1 and 2, there is a momentary recuperation of audience when parts of the video are repeated. The third quartile informs us of when audience retention reaches 25%, where a difference from previous patterns is apparent, the minute-count is proportional to the video's length. As the videos get longer this portion of the audience is retained for longer. The last reference comes from audience retention at the end of the emission, which, excepting the first video, is quite low.

Table 5. Audience retention as percentage by quartiles

	% Retention minute 0	Quartile-1 minute	Quartile-2 minute	Quartile-3 minute	Quartile-4 final minute	% Audience retention
P1: Budget distribution by media(video-1)	102.93	0:46	2:16	2:49	2:52	24.18
P1: Budget distribution by media (video-2)	88.3	0	0:45	3:34	3:45	13.45
P2: How to make an exterior media plan	90.91	0	0:28	5:40	6:35	6.61
P3: Multimedia audience & strategic planning	89.69	0	0:29	7:55	9:39	6.19
P4: Graphic media plan	94	0	0:52	7:09	9:40	7.50
P5: How to make a TV plan	91.26	0	2:44	9:36	10:06	8.23
P6: Campaign timeline	92.27	0	0:41	9:40	11:31	8.15
P7: How to make a radio plan	90.44	0:07	4:18	11:22	11:36	9.90

Source: created by the authors

4. Discussion and Conclusions

This study has served as a reference to evaluate a teaching tool destined to consolidate self-learning by students in the university setting. Teaching videos represent a methodological modality which competes directly with one of the most popular formats in the interactive medium. The fact of turning to this format and making it accessible through the blog and YouTube opens its access to a wider community, as can be seen in the number of visits, and serves as a bridge connecting with learning in informal settings, just as recommended in the literature (Gutiérrez et al., 2018; Pereira et al. 2019; or Vizcaíno-Verdú et al.,2020).

One element to determine when creating audio-visual material is its suitability, that is, whether the content generated is perceived as adequate by its target audience, in this case, students of the Advertising & PR degree (Gertrudix et al., 2017). The positive assessment of the usefulness of the teaching pills supports the supposition that they are suitable for the purpose for which they were created. The difficulty parameter would seem to point in the same direction to understand the objectives linked to each knowledge pill, something to be taken into consideration due to the complexity of this type of topic in comparison with others in the same degree (Martín-García et al. 2020).

Perhaps the most difficult question concerns the length of the videos, to approach this question we have turned to viewing-pattern analysis of the teaching material, which has thrown up some interesting points to be borne in mind in future studies. Certain common regularities can be observed, which could be utilised to interpret the reception of other teaching videos, such as audience loss when the video starts, repeated viewings of parts of the videos, or audience loss as their end comes in sight. Interest in the content is possibly the key variable for reception patterns, being decisive both at the beginning and as it is about to end. This feature of reception may allow for practical applications for teaching improvements and innovation to be surmised, in particular the rewinding of videos, given that this has considerable potential for detecting points where greater difficulty or greater interest was encountered.

Finally, the study makes an interesting contribution concerning video length, although this matter is not conclusively resolved. Experience outside the academic setting suggests short videos, and the few existing references in the university setting support a length of between four and six minutes (Closen, 2018; TechSmith, 2021). The results of our study suggest length of teaching videos should not be set to a single standard, half of the videos lasted around 10 minutes, with good reception results, similar to the shorter videos. Differences in reception can be attributed more to the differences in content than to duration.

Finally, we should point out the work's limitations. It is a case study, which, despite counting on a wide sample of participants, having been implemented in several subjects and by various teachers, is limited to a single academic course which may limit the generalisation of the results. However, it is still an exploratory study covering the reception of teaching videos from a descriptive base, in an area of few academic references, thus it would be advisable to replicate the analysis from other similar experiences and broadened to other teaching disciplines.

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6. Specific contributions from each author

	Name and Surname
Concept and design of the work	Ana Pastor, Belinda De Frutos and Noemí Martín
Methodology	Belinda De Frutos and Noemí Martín
Data collection and analysis	Belinda De Frutos, Noemí Martín and Belén Ávila
Discussion and conclusions	Ana Pastor and Belinda De Frutos
Writing, formatting, revision and approval of versions	Ana Pastor and Belén Ávila

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