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Digital Videos in Accounting Education: A Study on Perceived Use and Satisfaction in the Light of Connectivism

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Abstract

In the light of the connectivism theory, the objective was to analyze the perception of use and satisfaction of accounting students about Edpuzzle, a digital video application. This tool was employed in four accounting courses using the cell phones of 92 students. A questionnaire was administered on-site and was structured in two parts. The first contained questions about the respondent's profile, and the second about the use and satisfaction with Edpuzzle. The results indicated that students liked to use Edpuzzle and felt satisfied, especially those under 21 years old. We also noticed significant correlations among the questions. For example, the positive association between interactivity and appropriateness of use of the Edpuzzle stands out. It is concluded, therefore, that the results corroborate the connectivism theory, which sustains that knowledge must suffer updates as the environment changes and that sharing is crucial for the creation of networks that feed each other. Edpuzzle helps in this regard.

Introduction

The use of technologies in teaching makes it possible to open up more creative learning paths and methods, joining more effective techniques that seek to increase access to quality education (D'Aquila, Wang & Mattia, 2019; Holtzblatt & Tschakert, 2011). The importance of integrating new technological tools into accounting education is reinforced by the fact that graduates are being subjected to workplaces that are increasingly equipped with technologies and require digital literacy skills from their professionals (Watty, Mckay & Ngo, 2016). Thus, rapid advances in education, aligned with the profession, demand innovative educational methods, and technologies have become an enriching direction for the accounting class (Joseph & Rahmat, 2018).

Among the various technological resources that can be used in the interaction of technology with classroom learning, digital videos are verified as an effective tool in accounting education (D'Aquila et al., 2019; Kaciuba, 2012). The employment of this technology has been positively evaluated in face-to-face teaching, especially in the pedagogical, motivational and student satisfaction spheres (Rezaie & Barani, 2011; Holtzblatt & Tschakert, 2011; Sargent, Borthick & Lederberg, 2011). Furthermore, studies such as those by Wakefield, Tyler, Dyson, and Frawley (2017) and D'Aquila et al. (2019) have identified improvements in the performance of accounting

students who have made use of digital videos as an aid to their studies.

In view of the considerations raised above, it is argued that there are different tools that enable the interaction of digital videos with classroom learning and, in this scenario, Edpuzzle stands out for its versatility involving audiovisual content (Pueo, Jimenez-Olmedo, Penichet-Tomás & Carbonell-Martínez, 2017). It is an online platform that allows teachers to edit videos, adding audio tracks, assessment quizzes, or text comments made by the teacher (Baker, 2016). Furthermore, Edpuzzle provides multiple access possibilities for students, such as through computers and apps installed on smartphones (Juanes & Ruisoto, 2018).

The present research seeks to contribute to gaps that still exist regarding the use and applications of Edpuzzle as a technological tool, involving digital videos, with the use of learners' smartphones in the learning environment (Palma, Tobías, Prieto, Prieto, León, & Ruiz, 2018; Prieto et al., 2016; Berwanger, 2019). Studies in the accounting literature that have made use of Edpuzzle technology are quite a few. Noteworthy is the work of Serçemeli, Günbaş, and Baydaş (2018), which found that its use brought satisfactory results when analyzed with accounting students. Thus, given the potential seen in previous studies on mobile digital technologies (Palma et al., 2018), and the effects of the Edpuzzle tool on enhancing digital videos (Mischel, 2018; Pueo et al., 2017), the present study aims to *analyze accounting students' perception of the use and satisfaction with Edpuzzle in face-to-face teaching at a public higher education institution in light of the connectivism theory.*

As a contribution, this study intends to verify the usefulness and satisfaction regarding the digital videos in the classroom environment, using the students' smartphones. Furthermore, no studies were identified in the reviewed accounting literature that proposed to examine the satisfaction regarding the use of the Edpuzzle, being pertinent, therefore, more studies involving such construct. It is noteworthy that the Edpuzzle not only displays videos, but also allows its customization by the teacher, thus allowing a different possibility of investigation than the one found in the literature.

Relevant Literature

Connectivism

Connectivism, as a learning theory, was proposed by Siemens (2005) when he noticed that the existing theories, essentially behaviorist, cognitivist, and constructivist, were developed in previous moments in which the impact of sophisticated technological resources - especially those of the last four decades - were not felt. Siemens (2005) argues that learning theories should reflect and be adjusted to social environments as they change. Connectivism theory seeks to explain how the Internet has enabled new forms of learning, especially when information is generated and shared in this virtual environment among agents of the educational process. Peer interaction is a key component of connectivism, as it is seen as necessary to enable and drive learning (Siemens, 2005; Downes, 2010). Thus, it is essential that the academic environment be conducive to the exchange of experiences and content among those involved in the teaching-learning process. Some technologies that support connectivist learning are social networks (e.g., Facebook), digital videos (e.g., Youtube), web browsers (e.g., Google Chrome) and e-mails (e.g., Outlook).

In addition to peer interaction and information sharing, it is pertinent to note that connectivism represents the integration of principles explored by chaos, networks, complexity, and self-organization (Siemens, 2005). Learning occurs when there is a change of fundamental characteristics in the chaotic environment (everything is connected to everything else). The application of connectivism can be seen in organizations where information and knowledge flows are crucial to their effectiveness and performance, particularly in a knowledge economy (Siemens, 2005). There is frequent flow - arrival and updating - of information that individuals need to keep an eye on to stay current and constantly learn.

The starting point of connectivism is the individual himself, who possesses personal knowledge. This, in turn, is made available to others, being seen as part of a network that is created from the interactions and exchanges of individual experiences. The individual knowledge feeds the network, which feeds back into the personal knowledge, making it a cycle in which learning is frequently fed (Siemens, 2005). Therefore, the exchange of experiences between the agents of the learning environment enables the formation of a network capable of developing the feedback of the learning of its participants. For example, learners exchange experiences and comments in an online discussion forum. Other individuals read these experiences and comments, learn and provide their own so that others can learn from their individual knowledge. It is posited that in the network, there are no definitive groups, there are only people who may have more common interests (Downes, 2010).

As defined by Siemens (2005), the following principles are considered connectivist: (i) Learning and knowledge rest on the diversity of opinion; (ii) Learning is a process of connecting specialized nodes or sources of information; (iii) Learning can reside in non-human devices/applications; (iv) The ability to know more is more critical than what is currently known; (v) Nurturing and maintaining connections is necessary to facilitate continuous learning; (vi) The ability to see connections between fields, ideas, and concepts is an essential skill; (vii) Currency (accurate and up-to-date knowledge) is the intent of all connectivist learning activities; and (viii) Decision making is itself a learning process. The choice of what to learn and the meaning of the information received are viewed through the lens of the changing reality. While there is a right answer now, tomorrow it may be wrong due to changes in the information climate that affect the decision.

Aligning with connectivism, digital videos are technological resources that can be used as vehicles for communication and information sharing, and are consistent with the key principles and definitions of that theory. Based on connectivism and its principles, digital videos were used in the field of accounting education. Connectivism supports the use of digital videos in the teaching-learning process because, first, it is a technological resource and, second, it is a knowledge sharing in an online platform. Additionally, classroom interactions among student's to discuss the themes of the videos fortify their learning since they form a network from the student's individual knowledge.

Advantages and Disadvantages of Using Digital Video

The insertion of new technologies into universities has been progressively changing the teaching and learning methodologies, seeking to connect teachers, students and information (Bravo-Ibarra, Enache, Fernández-

Alarcón, & Simó-Guzmán, 2010). Since the 2000s, new technological resources, such as smartphones and tablets, have enhanced social interaction and enabled the integration of videos in education (Yousef, Chatti, & Schroeder, 2014). Digital videos, therefore, are complementary tools in the educational process, requiring new conceptualizations of learning for both teachers and studentss (Duffy, 2008).

A vast literature advocates the insertion of digital videos in the teaching and learning process, being that they have advantages over graphic and textual media (Joseph & Rahmat, 2018), contribute to improving learner engagement, and provide diverse learning experiences and authentic social collaborations (Bruce & Chiu, 2015). More specifically, researchers indicate that digital videos can be used as motivational tools (Holtzblatt & Tschakert, 2011; Bravo-Ibarra et al., 2010) and for increasing student satisfaction (Rezaie & Barani, 2011; Rodrigues, 2016), as well as providing an improvement in academic performance (Sargent et al., 2011; Wakefield et al., 2017; D'Aquila et al., 2019).

The presence of digital videos in learning environments presents itself as an evolving reality, observing a vast literature that points to positive results regarding their use in education. It is worth noting that adaptation to this new technology requires care related to the practical and pedagogical impacts (Duffy, 2008), in this way, some disadvantages and challenges are verified in previous studies, such as those of Laaser and Toloza (2017), who identified that the interaction of digital videos in the learning process is inefficient regarding its exploration involving media, besides reinforcing the need for teacher support, which serves as a foundation for the stimulation of student's. In the same vein, Bravo-Ibarra et al. (2010) state that the use of short videos promoted dynamism during classes, but they do not offer a global view of the content, requiring teacher support. Therefore, digital videos should not be seen as the main means of learning or as a substitute for the teacher.

In this perspective, advantages and disadvantages are observed regarding the incorporation of digital videos in education; however, regardless of the educational methodology employed, the student's involvement is fundamental for his/her learning (D'Aquila et al., 2019). In light of this context, it is argued that among the distinct tools driving digital videos, Edpuzzle stands out for its versatility in creating audiovisual content (Singh, Abdellahi, Maher, & Latulipe, 2016), as well as being a free online source for sharing videos, liable to be accessed by different devices, such as tablets, laptops, and smartphones (Mischel, 2018; Baker, 2016). This way of using videos is compatible with the theory of connectivism.

The use of the Edpuzzle tool has been encouraged by several authors from a variety of educational fields (Palma et al., 2018; Pueo et al., 2017; Navarro, 2015), including initial studies related to accounting education (Serçemeli et al., 2018). It is, therefore, a tool that makes it possible to make videos interactive in an easy and effective way, making it possible to make cuts, add audio notes to explain the video, quizzes that can be inserted in different sections, feedback from the answers, as well as making it possible to completely replace the original audio of the selected video with explanations from the lecturer (Graham, 2016; Mischel, 2018). The choice of audiovisual resource can be made on online sites such as YouTube, or even insert a personal video made by the teacher, which can be edited within the Edpuzzle tool (Alvarado, Coelho, & Dougherty, 2016).

Moreover, it is also an effective technology within student assessment systems (Juanes & Ruisoto, 2018), enabling educators to assess learners in a simple way, since Edpuzzle provides performance statistics for student's, showing which ones completed the tasks proposed in the video, as well as the number of correct answers, the proportion of times the video was watched, and even shows which parts were better or worse answered by each student (Palma et al., 2018). Thus, in view of the potentials presented in previous literature, and considering that alternative methodologies allow recreating the learning environment (Pueo et al., 2017), Edpuzzle stands out as a tool to be investigated in many different educational areas, including accounting.

Related Research

Constantly, teachers seek new educational methodologies with the intention of involving the student more in the learning process. The insertion of technologies has been highlighted as a potential means of access to the most diverse student populations (Revere & Kovach, 2011). Digital videos present themselves as a modern instructional toolkit (Graham, 2016; Baker, 2016), being investigated by authors in various areas of education, most notably Holtzblatt and Tschakert (2011), Sargent et al. (2011), Pueo et al. (2017), Karaca and Ocak (2017), Serçemeli et al. (2018), and D'Aquila et al. (2019).

Holtzblatt and Tschakert (2011) investigated how digital video can improve student dedication towards the accounting course. The authors made use of videos addressing the adoption of International Financial Reporting Standards (IFRS) in a graduate course in international accounting and observed, in their first experience, that students were more attentive, and the videos stimulated class discussions and increased student interest and engagement. In addition, the authors surveyed a list of recommended videos for teaching a range of accounting content, and proposed a competition of videos produced by graduate students, in which they had contact with several IFRS experts. The results reveal that the students improved their understanding in the subject matter, their technological skills to carry out projects, and self-organization.

Sargent et al. (2011) conducted their study using two accounting classes at a university in the United States and, from this experience, they documented evidence to support a positive relationship between short digital videos and student performance. The students who used digital videos before the assessments had higher scores than those who did not use it.

In a quasi-experimental study, with computer engineering and mechanical engineering student's, Karaca and Ocak (2017) aimed to verify if the insertion of flipped classes with the use of the Edpuzzle tool in the experimental groups would have a significant difference in performance when compared to those in the control group that kept the traditional classes. It was found that the experimental group had a higher mean score than the control group, suggesting that the videos improve academic performance.

Also using a quasi-experiment, Pueo et al. (2017) conducted a survey of 67 physical education and sports student's using Edpuzzle as a treatment. Students were distributed into three homogeneous groups from the same class: one group was instructed to view the videos at home on the Edpuzzle platform, making use of the

flipped classroom methodology; the second group was instructed to perform the proposed activity by the traditional teaching method; and finally, the third group made use of a mixed model, which uses part of the Edpuzzle as a flipped classroom within the classroom itself. The results indicated that there was no significant difference in students' performance in the first and third groups, but the second group performed significantly worse than the others. The authors suggest that the success of the flipped classroom lies in the direct instruction that occurs with audiovisual support through the teaching videos, and not the relocation of the instructional location.

Aiming to verify the students' opinion regarding the joint use of the methodologies of the flipped classroom and Edpuzzle (digital videos), Serçemeli et al. (2018) conducted interviews with computerized accounting students and observed, in general, that student's expressed positive arguments regarding the employment of the proposed methods. The authors reinforce that, to use this teaching method, classes should be well designed, and the basic concepts of the content should be explained in videos of no more than five minutes.

Finally, D'Aquila et al. (2019) sought to identify in their study whether videos produced by faculty members and made available on the YouTube platform for access by accounting students could improve academic performance. The main purpose of the videos was to reinforce the material of the face-to-face classes, allowing the student to retake the content taught. The findings indicated that the use of the videos improved the students' performance, supporting that they used them mainly as a form of review for the exams. Furthermore, students said that they perceived the videos as useful to be used in the classroom, but did not express a desire for them to replace face-to-face classes.

Method

Context and Participants

The present study was developed in a public higher education institution (HEI) in Brazil that offers the undergraduate accounting program in the face-to-face mode. In this HEI, students from four disciplines - general accounting I, budgetary and governmental accounting, financial statement analysis, and forensic accounting - participated in the research that was conducted from October to December 2019. In all, the study involved 92 participants. Following the conventional ethical standards of scientific research, permission was obtained from the professors whose subjects were the targets of the present study, as well as the consent of the students. In addition, the research was also previously approved by the permanent committee for ethics in research involving human beings of the HEI.

Students' participation consisted of using the Edpuzzle (https://edpuzzle.com/) during a class in each of the respective subjects. This technological resource was chosen because (i) it allows the incorporation of digital videos, (ii) it allows the inclusion of questions as the student watches the video, (iii) it can engage students in an activity differentiated from traditional teaching, and (iv) it is a versatile technology that can be applied to different audiences.

Edpuzzle was used in courses from all periods of the accounting program. In *General Accounting I* (1st year), the theme of the video was equity. In *Budget and Governmental Accounting* (2nd year), the theme was fiscal balance. In *Financial Statement Analysis* (3rd year), the content was related to working capital and cash flow analysis. And, finally, in *Forensic Accounting* (4th year), the video was about an introductory content. It must be emphasized that the contents were new to the students and were agreed upon with the teacher of each subject for a better lesson planning. The versatility characteristic was particularly useful and relevant for this work, since the choice of utilizing Edpuzzle in subjects of different periods was deliberate, as we wanted to cover all course series.

Technical and usage instructions for the Edpuzzle were provided to the students by the subject teacher and the researchers. Consistent with contemporary reality, students used their own smartphones to perform the activity, following the Bring Your Own Device (BYOD) strategy (Kobus, Rietveld, & Van Ommeren, 2013). First, the Edpuzzle app was downloaded. Next, the students watched the videos and answered the questions that were included in them. And finally, they had the possibility to exchange experiences and thoughts about the contents of the videos among their classmates and with the teacher. This feature is consistent with connectivism (Siemens, 2005), where interaction with peers is one of the pillars of this theory.

We highlight that there were some significant challenges and barriers in the processes of implementing and using Edpuzzle in the classroom and that can serve as a warning to teachers who choose to use this technology. First, even with the researchers' explanation, difficulties arose in making the initial registration in the application. Secondly, the problem of internet access was notable and is a crucial condition for carrying out the activity properly. Third, the smartphone's battery and lack of memory created difficulties in using Edpuzzle. In these specific cases, the researchers lent their own devices in order to circumvent this situation. Fourth and last, it is indicated that the subject of forensic accounting was the last class of the day and, therefore, the students were anxious to leave and, for this reason, they were found to answer the questions quickly. Thus, the timing of the Edpuzzle use and the class schedule should be taken into consideration when planning the implementation of the use of technological resources.

Data Collection and Instrument

After the activity with Edpuzzle, the researchers applied questionnaires to collect data on student perception regarding the Edpuzzle, consistently with the objective of the study. It is relevant to mention that a pilot test was conducted with 16 students of the cost subject taught in the 2nd year of the course in the morning period. The results of the pilot test helped to refine the research instrument, as well as to provide an idea of how the actual application of the research would be performed. As pointed out by Cozby and Bates (2012), the pilot test is essential for research development since it allows researchers to identify weaknesses and implement improvements before the final execution.

The questionnaires were administered on-site and were structured in two parts. The first consisted of capturing the respondent's profile based on eight questions. The questions referred to gender, age, work status, family

income, participation in undergraduate research projects, dedication to studies, technical education in accounting and previous experience using Edpuzzle.

Table 1. Use and Satisfaction Questions

Use	Satisfaction
U1- The Edpuzzle is easy to use.	S1- The quantity of questions applied in the Edpuzzle was adequate.
U2 - The Edpuzzle helped me as didactic material.	S2- The time to answer the questions was satisfactory.
U3- The Edpuzzle made the class more interactive.	S3- I am satisfied with the questions prepared for use with the Edpuzzle.
U4- The Edpuzzle was beneficial to my learning.	S4- The instructions provided were satisfactory for proper handling of the Edpuzzle.
U5- The Edpuzzle should be used in other subjects.	S5- The Edpuzzle as a didactic material was adequate.
U6- The use of the Edpuzzle increased my learning ease compared to other subjects that do not use it.	S6- The Epuzzle as an interactive tool was adequate.
U7- The interaction of the videos and audio notes made by the teacher in the Edpuzzle helped my understanding (if there is an audio note from the teacher).	S7- The interactivity of the videos in the Edpuzzle increased my satisfaction in relation to the traditional classes.
U8- The use of the video in the Edpuzzle was a differential to improve my content assimilation.	S8- My satisfaction with the subject increased due to the use of the Edpuzzle.
U9- I believe that my grade on the exam could be better than expected if the use of the Edpuzzle was continuous in the learning interaction.	S9- I am satisfied with the integration of the Edpuzzle into the course.
U10- I remained more attentive when answering the questions within the Edpuzzle application.	S10- I am satisfied with the use of Edpuzzle.
U11- I tried my best to get the questions right.	
U12- The use of the video on the Edpuzzle helped me to remember the main points of the content taught, making it easier when answering the questions.	

In the second part, 12 questions about perceived use and ten 10 questions about satisfaction with Edpuzzle were included (Table 1), with which the students had to provide their level of agreement based on a five-point Likert-type scale, where **1-TD:** Totally Disagree; **2-D:** Disagree; **3-N:** Neither Agree nor Disagree; **4-A:** Agree and **5-TA:** Totally Agree. The sets of questions were adapted from Nasu (2017), who found adequate levels of reliability through Cronbach's alpha and who also researched the use of educational technology in accounting education.

Statistical Analysis

Statistical analyses were performed using the software R version 4.0.5 (R Core Team, 2021). Initially, an exploratory analysis of the students' academic profile and the questionnaire regarding the use and satisfaction with Edpuzzle was performed. To observe if there were correlations among the questions, Spearman correlation was used, since the hypothesis of normality and homogeneity of variances was not met as indicated by the Shapiro-Wilk's and Bartlett's tests. We used the Welch's two-sample t-test to investigate whether there were significant differences between students' answers by gender, age group and effort, which is an adaptation of the student's t-test, but is more conservative when the two samples have unequal variances and unequal sample sizes (Welch, 1947). The significance level adopted was 5%.

We noted that in addition to the results reported in section 4, univariate, bivariate and multivariate analyses were performed. The chi-square tests, in general, indicated no significant association between the respondent's profile variables and the Edpuzzle usage and satisfaction questions. Similarly, the correspondence analyses also showed no significant association between the respondent's profile and the categories of (TD, D, N, A, TA) Edpuzzle use and satisfaction questions. Furthermore, binomial and multinomial logistic regression model analyses did not indicate that respondents' characteristics were significantly related to the response categories of the usage and satisfaction questions. Nevertheless, the findings from the analyses reported in the following section provide interpretations that can help improve accounting education.

Results

Regarding the respondent's profile, it was observed that 55.44% were female and 44.56% male. Moreover, 95.65% of the students reported that their ages fall within the age range called Generation Z, or digital natives, which corresponds to those born from 1995 to 2012 (Singh, 2014), being the first generation born in a world connected to the Internet and in the era of smartphones (Williams, 2015), and only 4.36% of respondents admit ages above Generation Z. As for students' daily dedication to their studies, on average, they reported dedicating 2 hours and 37 minutes per day.

Consistent with this information, there is evidence that age, gender, and hours of study have a direct effect on student learning (Duff, 2004; Guney, 2009). Thus, considering that the perception of use that student's have about technological resources reflects in their levels of satisfaction and performance (da Costa, da Silva, Borges & Marques, 2021), we sought to verify possible significant differences by these variables. It was observed through Welch's t-test that there were no significant differences in the student's answers, considering the genders and the student's' effort ($p > 0.05$), both for the use and satisfaction questions.

As for age group, it was possible to observe significant differences between perceptions ($p < 0.05$). Table 2 reports the results. Regarding the usage questions, relevant differences were observed in questions U2 to U6 and U10, which are closely related to a beneficial view of the Edpuzzle as an educational technology. Concerning satisfaction, significant differences were found in questions S1 and S5 to S10, demonstrating a high satisfaction

when using the application.

The results may be related to the versatility made possible by Edpuzzle, which promotes a more active learning and allows students to conduct their studies in a more autonomous way (Navarro, 2015). This scenario is supported by connectivism, which argues that learning is distributed in a network of connections and helps the process of reflecting, deciding, and sharing knowledge (Siemens, 2005). Thus, it can be seen in Table 2 that the highest levels of agreement on the use of technology were reported by student's under 21 years old, who are part of Generation Z. Therefore, they are more sympathetic to the use of technological resources in teaching. Considering that traditional educational models sometimes fail to meet the expectations of the new generations (Vaughan, 2014), the use of Edpuzzle is suitable to make it more dynamic.

Table 2. Comparison of Student Responses between Age Groups

Questions Use	Median		Questions Satisfaction	Median	
	< 21 years (n=43)	> 21 years (n=49)		< 21 years (n=43)	> 21 years (n=49)
U1	5	5	S1*	5	5
U2*	5	4	S2	5	5
U3*	5	4	S3	5	5
U4*	5	4	S4	5	5
U5*	5	4	S5*	5	4
U6*	4	3	S6*	5	4
U7	5	4	S7*	5	4
U8	5	4	S8*	4	3
U9	5	4	S9*	5	4
U10*	5	4	S10*	5	4
U11	5	5			
U12	5	4			

It was observed that 90.21% of the students said they were working and 9.79% said otherwise. It was also found that 88.05% of students had never participated in undergraduate research projects, as opposed to 11.95% who had participated or were participating in such projects. It is worth noting that the participation of academics in undergraduate research projects may assist them in intellectual, cultural, and moral improvements, in addition to generating a better performance in the labor market (Zampieri et al., 2018).

It was also noticed that only 2.17% of the sample claimed to have technical training in accounting, while the other 97.83% said they did not have any. Regarding family income, 95.64% of the sample indicated earning an income of less than four minimum wages while 4.36% reported an income of more than four minimum wages. Finally, when asked about having used the Edpuzzle at some previous time, 98.92% of the sample said they had never had contact with this resource. Therefore, the use of the Edpuzzle was new for almost all the student's in the survey. For this reason, understanding student satisfaction regarding the use of technology can provide

evidence of its effectiveness in teaching (Beckert, Fauth, & Olsen, 2009).

Table 3 contains the relative frequency of the sample in relation to the questions about the use of the Edpuzzle application. It can be observed that the results reflect a high level of agreement, since the categories A and TA percentages higher than 60% in most statements when summed. For example, question U1 obtained 67.4% total agreement, indicating that students found Edpuzzle easy to use. Similar results were also verified in research such as that of Alvarado et al. (2016) and Baker (2016). Furthermore, question U3 obtained a percentage of 64.1% regarding the statement that the Edpuzzle made the class more interactive, this being one of the central objectives of this tool, that is, to make learning more active and interactive (Karaca & Ocak, 2017), representing a relevant advantage for increasing student involvement, stimulating their attention and motivation to the subject being taught (Graham, 2016). This point converges with connectivism (Siemens, 2005) in that it promotes the sharing of knowledge through digital technologies.

Table 3. Relative Frequencies Regarding the Perceptions of the Students

Questions (N = 92)	1-TD(%)	2-D(%)	3-N(%)	4-A(%)	5-TA(%)
U1	1.1	0.0	9.8	21.7	67.4
U2	1.1	4.3	28.3	21.7	44.6
U3	0.0	2.2	12.0	21.7	64.1
U4	1.1	2.2	21.7	23.9	51.1
U5	2.2	7.6	14.1	17.4	58.7
U6	7.6	13.0	28.3	22.8	28.3
U7	5.5	6.6	23.1	26.4	38.5
U8	2.2	8.7	18.5	23.9	46.7
U9	0.0	9.8	15.2	34.8	40.2
U10	2.2	10.9	21.7	21.7	43.5
U11	1.1	4.3	13.05	18.5	63.0
U12	2.2	2.2	16.3	31.5	47.8

In contrast, question U6 concentrated the highest percentage of non-agreement for the statement that the Edpuzzle increased the ease of learning in relation to subjects that do not use it, being understandable since this tool is prone to be used as a way to complement student knowledge (Pueo et al., 2017), being indispensable the explanations and exercise resolutions by teachers (Serçemeli et al., 2018). Previous studies support that Edpuzzle is an effective tool due to its versatility involving content provided by digital videos (Graham, 2016; Pueo et al., 2017; Palma et al., 2018). This result is congruent with Siemens' (2005) theory of connectivism and is aligned with the principle that knowledge can reside in non-human resources. Although the findings relate to the positive aspects of connectivist theory, it is pertinent to note that problems, such as poor internet connection and the absence of appropriate smartphones for conducting the activity, were reported, as well as in previous studies (Berwanger, 2019), which explains an increase in the percentage of disagreement regarding question U10, that the student remained more attentive when answering the questions within the Edpuzzle app.

In Table 4, the findings concerning the satisfaction questions are reported. In general, there is a strong agreement with the satisfaction questions. Specifically, S1 and S2 showed high percentages of agreement, indicating that the students were satisfied with the number of questions used in Edpuzzle and the time to answer them was adequate. Such results are fundamental given that satisfaction is directly related to student's motivation, influencing the later development of their professional life, as well as their learning (Marcuzzo, 2013). Therefore, it is reinforced that the use of short videos allows transmitting high-quality content, engaging students and positively influencing their performance (Sargent et al., 2011; Guo, Kim, & Rubin, 2014).

Positive results have been found with the use of videos of no more than five minutes in accounting education (Serçemeli et al., 2018). These benefits are related to the theory of connectivism (Siemens, 2005), as it is important to select what will be learned, especially when there are time limits. In addition, connectivism provides support for digital videos because, when used in teaching, they are resources that enable greater connections of information sources (video, faculty, peers), as well as foster the diversity of opinion about content.

Table 4. Relative Frequencies of Student Satisfaction

Questions (N = 92)	1-TD(%)	2-D(%)	3-N(%)	4-A(%)	5-TA(%)
S1	0.0	2.2	9.8	16.3	71.7
S2	0.0	2.2	3.3	20.9	73.6
S3	2.2	5.4	18.5	18.5	55.4
S4	1.1	2.2	13.0	22.8	60.9
S5	1.1	2.2	14.1	26.1	56.5
S6	0.0	2.2	15.4	30.8	51.6
S7	0.0	6.5	17.4	34.8	41.3
S8	4.3	7.6	33.7	28.3	26.1
S9	0.0	7.6	16.3	30.4	45.7
S10	0.0	3.3	16.3	32.6	47.8

The most expressive percentage of disagreement was found for S8, referring to the statement that the respondent's satisfaction regarding the course increased due to the use of Edpuzzle. Because it is a complementary tool (Pueo et al., 2017) and although it can be seen as useful, students did not express interest that they replace the didactic role of the teacher (D'Aquila et al., 2019). Thus, it is crucial to better understand the specific aspects that determine student satisfaction regarding the use of tools. In general, studies have reported high levels of satisfaction among accounting students (Rich, 2012; Rodrigues, 2016).

Figure 1 presents Spearman's correlation matrix. In general, the questions were significantly correlated. For instance, S5 and S6 were positively associated (coefficient = 0.70; $p < 0.01$), indicating that the satisfaction regarding the suitability of Edpuzzle as teaching material was related to its interactivity. Another significant correlation was verified between S8 and S9 (coefficient = 0.75; $p < 0.01$), suggesting that the students felt satisfied with the integration of the Edpuzzle into their classes. And, also, the relationship between S9 and S10

(coefficient = 0.77; $p < 0.01$) as it supports that the participants were satisfied with the Edpuzzle, thus demonstrating that Edpuzlle is a well-regarded tool among accounting students. The questions that did not present significant correlations ($p > 0.05$) are marked with the letter "X".

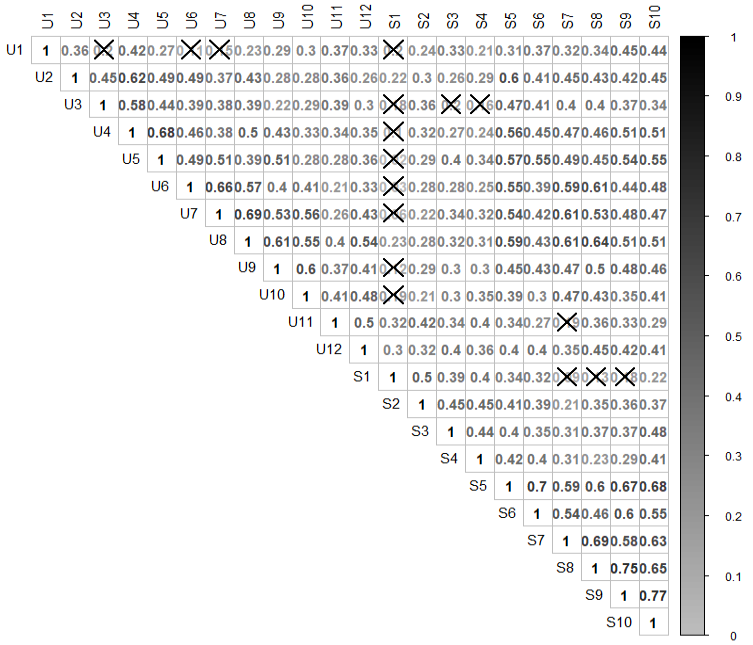

Figure 1. Representative Illustration of Spearman's Correlation Matrix

The results obtained from the correlation matrix are consistent with previous studies such as that of Rezaie and Barani (2011), Navarro (2015) and Alastuey and Galar (2017). Such findings are relevant to the accounting literature as satisfaction is considered a construct of student motivation (Bradford, 2011) and is argued to exert influence on their learning (Marcuzzo, 2013). Furthermore, understanding the learner's perception of the technological resource should be contextualized and is essential as it can impact their academic performance, as well as being linked to the satisfaction the learner expresses towards the teaching methodology used (Watty, et al., 2016; Beckert et al., 2009).

The findings coming from the correlation analysis between the usage and satisfaction questions are consistent with the connectivism theory proposed by Siemens (2005), as they show evidence that digital videos encourage greater engagement, interactivity, and knowledge sharing. Discussing the content learned from the videos with the teacher and peers makes the learner knowledge available to others. By connecting knowledge, learning is complemented, since each student can pay attention to different points in the video and contribute to the formation of an integrated network of knowledge by discussing them with the teacher and with classmates. It is also noteworthy that the producers of the accounting videos are transmitting knowledge to the student's who watch them, increasing the knowledge sharing network. A key point is that connectivism proposes that the network feeds back on itself so that new knowledge can be obtained. In this sense, digital videos can be re-watched because they are stored on an online platform, with caution when knowledge is updated, such as changes in legislation and accounting standards.

Conclusion

The study aimed to analyze the perception of accounting student's about the use and satisfaction with Edpuzzle in face-to-face teaching at a public higher education institution. In all, 92 students from the disciplines of General Accounting I, budgetary and Governmental Accounting, Financial Statement Analysis and Forensic Accounting participated in the research. The data were collected through questionnaires applied after using Edpuzzle. Descriptive and correlation analyses were produced using R version 4.0.5 software (R Core Team, 2021).

The descriptive statistics indicated that most students expressed significant levels of agreement regarding the use and satisfaction in the application of the Edpuzzle. These results suggest that such a technological resource was useful and satisfactory when employed in accounting education. Similarly, Spearman's correlation analysis between questions supported statistically relevant relationships. Noteworthy, for example, is the positive relationship between interactivity and appropriateness of Edpuzzle use. As students perceive that Edpuzzle increases interactivity in the classroom, its appropriateness also increases. The results support connectivism theory (Siemens, 2005), which holds that knowledge must undergo updates as the environment transforms and that sharing is essential to the creation of networks that feedback.

The findings of the present work have important implications. First, a theoretical contribution is that evidence has been found that digital videos are aligned, at least in a relevant part, with the principles of connectivism, a learning theory that intends to explain how the use of modern technologies has transformed the ways of learning (Siemens, 2005; Downes, 2010). Therefore, the application of the theory is expanded to Edpuzzle which use was in a specific area (accounting) and subareas (courses). According to the high levels of usefulness and satisfaction reported by students, the adoption of this technology by accounting faculty is encouraged, regardless of the teaching delivery mode. Third, it is stressed that videos are already available on online platforms, such as Youtube, and can be used in conjunction with Edpuzzle. This may reduce barriers to technology adoption, such as those reported by Watty et al. (2016).

The limitations of the research are listed next: 1. there are few studies that have investigated Edpuzzle in accounting education, according to the literature consulted. This point restricted the discussion of results in the field of accounting education; 2. There were time constraints and mobilization of faculty members who accepted the implementation of digital videos in their subjects. Even so, the research was able to be developed in four disciplines of the accounting course; 3. The measurement in the form of Likert-type agreement scales limited the forms of analysis. However, the results reported previously remain valid and useful. The use of objective and quantitative measurements can help to complement the results of this research.

Recommendations

As suggestions for future research, accounting education researchers can perform comparisons between different video editing and viewing applications, emphasizing their weaknesses and strengths. This kind of analysis can

help in choosing which digital video tool the teacher can adopt. Considering that the educational goals of teachers and subjects are not always consistent, the study of multiple audiovisual resources should be conducted. In addition, research that relates learning style to the use of digital videos, such as Edpuzzle, is recommended. Considering the assumption that students learn in different ways, it may be relevant to observe which learning style benefits most from digital videos. This may collaborate to choose other pedagogical methods throughout the class period to balance those most benefited by one method or another. Finally, experimental studies can be developed to establish whether digital videos produce more positive effects when used synchronously or asynchronously. This analysis can provide clues as to how the teacher should use this technology.

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