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**HOW EXTROVERSION AFFECTS STUDENT ATTITUDE  
TOWARD THE COMBINED USE OF A WIKI AND VIDEO  
RECORDING OF GROUP PRESENTATIONS**

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## HOW EXTROVERSION AFFECTS STUDENT ATTITUDE TOWARD THE COMBINED USE OF A WIKI AND VIDEO RECORDING OF GROUP PRESENTATIONS

### ABSTRACT

*The aim of this paper is to analyze the effect of extroversion on students' attitude toward the combined use of a wiki and the video recording of oral presentations to improve communication skills using a quantitative approach. The model includes stress because it is considered an important aspect in public speaking situations, especially so in a case like ours where the videos will be available to the class. The students' enjoyment and the relative advantages of the learning activity are also included because they may have an influence on satisfaction and course recommendation. A survey was carried out among first-year undergraduate students. Using partial least squares methodology, the results suggest that extrovert individuals perceive less stress and more enjoyment when performing this activity, which results in them having a better attitude toward it. A total mediation effect of enjoyment between extroversion and attitude is found. Our findings also confirm that stress acts as a barrier to satisfaction, but it does not create a negative reaction toward the activity. Finally, the results show the mediation effect of attitude between the perceived relative advantages and satisfaction and between enjoyment and satisfaction.*

### Keywords:

*Video recording, extroversion, stress, wiki, communication skills.*

## 1. Introduction

Video recording of oral presentations is one of the main activities that focuses on the training and assessment of communication skills. Although this methodology has been used for decades, it has recently attracted the attention of academics analyzing its effectiveness as an active learning method. Some recent research has found that the use of video recording allows students to evaluate their performance and make improvements for future presentations (Tugrul, 2012; Barry, 2012); helps teachers improve their feedback (Crook, Mauchline, Maw, Lawson, Drinkwater, Lundqvist et al., 2012); and increases students' active learning and their knowledge about their skills. In addition, information technologies have increased the effectiveness of this instrument and adapted it to the new learning environment. Wiki is a new technology that increases video effectiveness (Barry, 2012) because it is a web 2.0 platform that gives users free access to videos recorded in class, offers transparency and encourages interaction (Yuang & Kim, 2015).

Paul, Dawson, Laphear and Cheema (1998) investigated video recording feedback as a feasible and effective approach to teaching a lesson. Their results indicated that 69% of a class suffered anxiety about the use of a video camera. Anxiety, stress and public speaking apprehension are additional aspects to consider in this type of learning methodology. Although some research found that video recording had no influence on the level of communication apprehension (Dupagne, Stacks & Giroux, 2007), the free access that wiki provides for other users of the recorded performance may increase the level of stress of some individuals. Extroversion may explain differences in the level of stress experienced by individuals that participate in the video recording activity because it is an important personality trait in public speaking situations (MacIntyre & Thivierge, 1995; Rice &

Markey, 2009), social media technology use (Guadagno, Okdie & Eno, 2008; Seidman, 2013; Eftekhari, Fullwood & Morris, 2014) and, hence, the success of these methods for improving communication skills.

The aim of this research is twofold. We want to analyze, first, the effect of extroversion on students' attitude to video recordings that are uploaded on a wiki using a quantitative approach and, second, the influence of students' stress on attitude and satisfaction with this activity. For greater effectiveness, the video of the oral presentations is made available to students so they can see their own and their classmates' presentations through the wiki platform. To our knowledge, there is only one article that analyzes the effect of video recording students' presentations that are uploaded on a wiki (Barry, 2012). This paper focused on the combination of video recording and a wiki as an effective method for learning and for providing feedback about students' work, but the videos were not accessible to all the students and the study did not take into account either emotions or personality. So our study contributes to previous research by providing evidence of how extroversion, as a personality trait, influences attitude toward the combined use of a wiki and the video recording of group presentations for the learning of communication skills. This research also contributes by providing evidence of the effects of stress on attitude and satisfaction and the mediating effect of enjoyment between extroversion and attitude toward this learning activity. Finally, this paper confirms the importance of the relative advantages of the combined use of these two technologies to explain students' satisfaction.

The paper is structured as follows. Section 2 reviews the literature. Section 3 describes the complete model with the hypotheses to be tested. Section 4 explains the methodology used for the research. Section 5 presents the results and Section 6 offers a discussion of the

findings, presents the implications and limitations of the paper, and discusses future lines of research.

## **2. Literature review**

### ***2.1. Combined use of video recording and wiki as a learning tool***

Video recording has been used in education and medicine courses for decades. Videos can be employed for different purposes. In distance education and for online courses, educators provide video tutorials about different aspects on the content of the course (Van der Meij & Van der Meij, 2014; Chen & Wu, 2015).

Another use of videos is to provide students with details of their own performance in a simulation or oral presentation. In general, and in accordance with a meta-analytic study about video recording, the use of this technology allows better feedback, a greater acquisition of public speaking skills, better performance on objective tests, and more positive attitudes toward the course (Bourhis & Allen, 1998). Previous research has found that students who have taken part in video recording activities have increased their performance, their level of engagement and their involvement (Goldman, 2007; Barry, 2012). Furthermore, it has been found that watching videos increases students' retention of the main aspects of the presentation (Moreno & Valdez, 2007) and affects course satisfaction (Abdous & Yoshimura, 2010). Recent research has focused on the use of video recording for increasing the effectiveness of the feedback provided to students, showing that they perceive this feedback as more useful and of greater quality (Rodway-Dyer & Dunne, 2009; Abrahamson, 2010; O'Donogue & Cochrane, 2010; Barry, 2012; Crook et al., 2012).

The benefits of video recording are emphasized when this methodology is applied together with Internet technologies such as a wiki. A wiki is a web-based communication and collaboration tool. A review of the literature shows that wikis can be used for different purposes that can be combined. Wikis can be used as course management tools (Zorko, 2009), as collaborative tools (Li & Zhu, 2013; Malinen, 2015, Chu, Zhang, Chen, Chan, Lee & Lau, 2017), as research development environments (Alyousef & Picard, 2011; Roussinos & Jimoyiannis, 2011), as data collection and management tools (Hoffmann, 2008), and as work presentation environments (Barry, 2012). The latter use is less frequently adopted by educators despite its effectiveness in learning communication skills (Barry, 2012). From the students' point of view, a wiki adds transparency and access to the video recordings and assessments of their own and other students' performances in a timely and secure manner. From the teacher's perspective, this technology can offer the possibility of giving more accurate and timely feedback (Goldman, 2007; Crook et al., 2012, Barry, 2012).

## ***2.2. Personality and Web 2.0 technologies***

Personality is a very important psychographic variable which reflects the psychological characteristics that make each individual unique and that influences his/her responses when interpreting environmental stimuli (Kotler & Keller, 2009). Of the many ways to measure personality, researchers seem to agree on the use of the scale called the "Big Five Factor Structure" or the "Five Factor Structure", which collects five psychological traits: extroversion, agreeableness, conscientiousness, emotional stability (or neuroticism) and openness to experience.

In recent decades, various studies have emerged on the relationship between personality and the adoption of Web 2.0 platforms such as social networking sites and blogging (Krämer & Winter, 2008; Guadagno, et al., 2008; Seidman, 2013; Eftekhar et al., 2014). Results are not conclusive. While Krämer & Winter (2008) studied whether extroversion was a determinant factor of the form of self-presentation in a Web 2.0 platform, finding a positive relationship, Guadagno et al (2008) analyzed the five sorts of personality as predictors of blogging. They found that more open individuals were more likely to participate in blogs, but did not find this difference between extroverts and introverts. Eftekhar et al. (2014) analyzed whether personality influenced the way that users participated in Facebook, finding that extroverts, as outgoing and expressive individuals, uploaded a greater number of photos of their own social events to communicate with others. Neurotic users participated in Facebook seeking social support and increased popularity, and agreeable users expected to get more online attention by receiving more likes. More conscious and open users were more participative and tended to maintain existing connections. Extroversion was the most important personality trait to explain Facebook users' behavior. Seidman (2013) concluded that extroversion was positively related to communication through Facebook, since extroverts felt more confident talking to their friends about their authentic self.

In the context of higher education, personality has been included in the acceptance of different technologies related to active learning methodologies. Terzis et al. (2012) explored how students' personality traits affected the acceptance of computer-based assessment, and concluded that neuroticism had a significant negative effect on perceived usefulness and on goal expectancy, while extroversion and openness explained perceived



importance. Barnett, Pearson, Pearson & Kellermanns (2015) found that extroversion was significantly associated with the use of a web-based course, but not in the expected positive direction. They suggested that extroverts perform better in groups or on tasks requiring significant interaction with others. Additionally, conscientiousness and neuroticism had a direct effect on both perceived and actual use of the web course.

In sum, research on the relationship between personality characteristics and the use of new ICTs is not conclusive. Although the Big Five Factor Structure includes conscientiousness, agreeableness, openness to experience, extroversion and neuroticism traits, this research will focus on the role of extroversion because of the technology analyzed, the video recording of group oral presentations uploaded in a wiki. Public speaking can create apprehension and stress, and the experience of these feelings may depend on the individuals' level of extroversion. Extroversion involves attributes like enjoying looking for human interactions, talkativeness, assertiveness, as well as risk taking (Tosun & Lajunen, 2010). Little is known about the effect of personality on the video recording of students' activities or in the wiki context. Thus, this research will focus on the effect of extroversion and stress on students' attitude toward the combined use of video recordings and a wiki.

### **3. Hypotheses and model development**

The model and hypotheses proposed are based on the technology acceptance theory, because we are analyzing the combined use of two technologies (wiki and video recording) as a learning activity. According to previous research, there are some technology adoption characteristics and some individual characteristics that influence the acceptance of technology and, thus, the attitude toward it and the satisfaction with it. This research focuses on the relative advantages of the combined use of video recordings and a course

wiki, the perceived enjoyment of the activity and the stress suffered during the oral presentation as technology-related characteristics, and analyzes extroversion as an individual-related characteristic.

### **3.1. Extroversion**

An “extrovert” is “an individual in whom exists a diminution of the thought processes in relation to directly observable social behavior, with an accompanying tendency to make social contacts” (Freyd, 1924). As already mentioned, extroversion has a positive influence on the use of social networking sites and blogging (Kiesler, Kraut, Cummings, Boneva, Helgeson & Crawford, 2002; Ross, Orr, Sisic, Arseneault, Simmering, & Orr, 2009; Correa, Hinsley & Gil de Zúñiga, 2010), and it is also positively related to perceived enjoyment of blogging or similar web platforms (Wang, Ngai & Wei, 2012a; Wang, Lin & Liao, 2010, 2012b; Bouwan, Kommers & van Deursen, 2014).

Extroversion refers to a high level of activity (arousal), a tendency toward social behavior, assertiveness, the experience of positive emotions and impulsiveness (Busato, Prins, Elshout, & Hamaker, 2000). An extrovert will be energetic, talkative and sociable, will seek activity and excitement, will be assertive and will seek the company of others (Eftekhar et al., 2014). Social contact is valuable for them and they have a good time when they are with other people because they find social situations more pleasant than introverts do (Canli, 2006). Grubor and Hilnic (2010) showed that extrovert students enjoyed a role play activity more than introverts because they could display their performance to others. So extrovert individuals would not mind speaking in public, face-to face situations (Rice & Markey, 2009) or being video recorded. Our learning activity includes uploading the video on a wiki through which the teacher gives her feedback, with the result that all the students of the

class will be able to view all the videos after the activity together with the teacher's feedback. Therefore, extrovert individuals will suffer a lower level of stress during the oral presentation and will enjoy viewing themselves speaking in public (Seidman, 2013). Extroversion has also been positively associated with greater self-disclosure and posting pictures in social networking sites, as well as viewing others' Facebook pages (Amichai-Hamburger & Vinitzky, 2010; Gosling, Augustine, Vazire, Holtzman & Gaddis, 2011).

Previous research has found a positive correlation between the willingness to speak in public and extroversion, and a negative correlation between extroversion and public speaking anxiety (MacIntyre & Thivierge, 1995, Rice & Markey, 2009). Moreover, extroverts may become overly involved in performing an activity that allows them to express and display their characteristics, as prior articles have demonstrated with respect to social networks (Wilson, Fornasier & White, 2010; Amiel & Sargent, 2004; Eftekhar et al., 2014). As a consequence, extrovert students will enjoy the activity more, suffer less stress and show a better attitude toward the combined use of video recording and a wiki for the learning of communication skills. So, we propose:

*H1: The more extrovert a student is, the greater his/her enjoyment in the combined use of video recordings and a wiki.*

*H2: The more extrovert a student is, the less stress he/she suffers in the oral presentation.*

*H3: The more extrovert student is, the better his/her attitude toward the combined use of video recording and a wiki.*

### **3.2. Technology-related characteristics: Relative advantages, enjoyment and stress**

Previous research has found that the perceived usefulness and advantages of a technology for learning can also be a relevant factor in explaining the students' attitude toward Web 2.0 technologies (Lucia-Palacios, Pérez-López & Polo-Redondo, 2016). This paper focuses on the students' attitude and satisfaction with a learning activity based on technology, namely, the combined use of video recording and a wiki for the learning of communication skills. On the basis of the previous justification, it is proposed that when students perceive that the activity has advantages or is more useful, they will also show a better attitude toward it and will be more satisfied with it (Crook et al., 2012; Tugrul, 2012). Thus, we propose:

*H4: The greater the perceived relative advantages, a) the better the student's attitude toward the combined use of video recording and a wiki and b) the greater his/her satisfaction with the activity.*

Another technology-related characteristic is perceived enjoyment, which is the extent to which the activity is perceived to be personally enjoyable in its own right, aside from the instrumental value of the technology (Davis, Bagozzi & Warshaw, 1992). In our specific context of study, enjoyment refers to the intrinsic motivation of students to participate in the video recording of oral presentations, seeing them on a wiki and receiving feedback through the wiki. Previous research has already suggested that intrinsic motivations in e-learning activities do not only refer to technology acceptance, but to other factors related to the global activity, such as the topic of the lesson (Brom, Děchtěrenko, Frollová, Stárková, Bromová & D'Mello, 2017) and its general design (Um, Plass, Hayward & Homer, 2012). Peters, Barbier Faulx and Hansez (2012) considered that enjoyment was a prerequisite to understanding students' satisfaction and that it could improve learning. Virtanen,

Kääriäinen, Liikanen and Haavisto (2017) showed that enjoyment in a learning environment determines students' satisfaction with the instructions, feedback and technological methods used in the learning activity. As a consequence, we propose the following hypothesis:

*H5: The greater the student's perceived enjoyment during the activity, a) the better his/her attitude toward the combined use of video recording and a wiki and b) the greater his/her satisfaction with the activity.*

Previous research has shown that online video sharing increases the level of students' excitement, anxiety and stress when using Web 2.0 platforms such as Youtube, Skype, Facebook or Second Life because other people can see their performance (Yoo & Huang, 2011; Huang, Hood & Yoo, 2013). Oral presentations imply speaking in front of other individuals and being the focus of the audience's attention. The combined use of video recordings and a course wiki implies an abnormal situation in which students will be able to see their performance later on. It can also generate an uncomfortable situation for some individuals due to being observed by others. As a consequence, individuals who are overwhelmed or daunted by the activity will feel more pressure in performing it and suffer stress. This emotion will have a negative impact on the students' attitude toward video recording and, hence, a negative impact on their satisfaction with the activity.

The level of stress can be reduced if students perceive enjoyment during the activity. The relationship between enjoyment and stress has rarely been analyzed. We propose that a positive emotion such as enjoyment can act as an inhibitor of stress, so the more enjoyable the activity is perceived to be, the less stress suffered during the activity. Therefore, we propose:

*H6: The greater the perceived stress during the oral presentation, a) the worse the student's attitude toward the combined use of video recordings and a wiki and b) the lower his/her satisfaction with the activity*

*H7: The greater the student's perceived enjoyment, the lower his/her perceived stress in the oral presentation*

### **3.3. Attitude, satisfaction and recommendation**

Attitude toward behavior refers to the extent to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question (Taylor & Tood, 1995). According to different technology acceptance and diffusion models, having a positive attitude toward technology will positively influence technology acceptance and use. A positive attitude toward video recording will show a proactive attitude in its adoption (Chau & Tam, 1997). Following a similar idea, individuals with a positive attitude toward video recording will be more satisfied with that activity. Customer satisfaction is often defined in the marketing literature as a customer's overall evaluation of his/her purchase and consumption experience of a good or service (Cronin & Taylor, 1992). So, we propose:

*H8: A positive attitude toward the combined use of video recording and a wiki will positively influence the students' satisfaction with it.*

An important marketing outcome is recommendation. Recommendation implies positive word-of-mouth to others. Customer satisfaction is a prime determinant of customer retention, positive word of mouth, improved profits and lower marketing expenditures (Oliver, 1993, 1999; Palmatier, Dant, Grewal & Evans, 2006). Word-of-mouth is defined here as the extent to which a customer informs friends, relatives and colleagues about an

event/firm/brand that has created a certain level of satisfaction. Therefore, satisfaction and recommendation are positively correlated (Wangenheim & Bayón, 2007; De Matos & Rossi, 2008). So, we propose:

*H9: Satisfaction with the activity will positively influence the students' recommendation of the course*

Figure 1 shows the model to be tested.

FIGURE 1 HERE

## **4. Methods**

### ***4.1. Sample and data collection***

The participants were students in two groups studying the subject “Principles of Marketing,” a first-year undergraduate course in the second semester of an economics degree. Within their seminar groups, students were required to do research about a topic and develop an informative presentation (10–15 minutes’ duration) at the end of the semester. The activity that is analyzed in this research is an earlier oral presentation with the same characteristics that was proposed as a way of practicing for the final presentation. To increase the effectiveness of the activity, the oral presentation was recorded to provide the students with a video of their group presentation, which was uploaded to a class wiki platform created for this task, among others (e.g. comments uploaded by groups on news related to the subject). Prior to this activity, students signed a paper giving the teacher permission to record their presentations. The oral presentation was assessed by the teacher following a feedback sheet (rubric) which contained four criteria: format of the presentation, communication skills, time and preparation. The earlier presentation had no

summative assessment, but the teacher provided some formative feedback and a mark calculated with the rubric. The videos were recorded using a non-professional videocamera and were uploaded into the teacher's cloud platform to obtain a link for each video. That link was included in the page each student group had in the wiki. All the students had access to all the contents of the wiki, including other classmates' videos. Students could watch their oral presentation in the wiki, along with the teacher's comments, as many times as they wanted and where and when they wanted. Through the wiki, they could also access their colleagues' oral presentation videos and learn from them. Participants had 5 minutes to complete a survey that was administered after each group presentation had been completed. 106 students took part in the activity and completed the questionnaire.

#### ***4.2. Definition of the variables***

The measurement of the variables is carried out following previous research. The items used for each construct are measured using a seven-point Likert scale, from 1 “completely disagree” to 7 “completely agree.” Attitude toward the combined use of video recording and a wiki and satisfaction with the activity are the two main dependent variables of the study. Attitude is measured through a reflective construct based on four items (Lee, Cheung & Chen, 2005) and satisfaction with a reflective construct that contains four items and that has been used in previous research (Bhattacharjee, Limaven & Cheung, 2012). Recommendation is measured with a reflective construct that contains four items. This construct is based on a loyalty construct proposed by Zeithaml, Berry and Parasuraman (1996). To adapt their construct to our context of study, we eliminated two items (“Consider XYZ your first choice to buy services” and “Do more business with XYZ in the next few years”) as they were not suitable for the educational context. Their construct is



commonly used to measure loyalty. However, three of the four items of our construct – “I will say positive things about this subject to other people,” “I would recommend this subject to someone who seeks my advice,” “I will encourage friends and relatives to come to this course” – are more related to recommendation than to loyalty.

The independent constructs are also obtained from previous research. The construct related to the relative advantages of the combined use of video recording and a wiki is measured using scales confirmed in previous research (Lee et al., 2005; Bhattacharjee et al., 2012). However, five new items have been added to previous scales to adapt them to the context of our study. Enjoyment is a reflective measure that consists of three items (Lee et al., 2005). Extroversion is a reflective construct of six items obtained from the abbreviated form of the revised Eysenck Personality Questionnaire (EPQR-A), provided by Francis, Brown and Philipchalk (1992), which has been employed by other researchers (Lewis, Francis, Shevlin & Forrest, 2002; Shevlin, Bailey & Adamson, 2002). Perceived stress has been obtained from Gadzella’s student-life stress inventory (1991) and Cohen, Kamarck and Mermelstein (1983). Some items included in this construct are related to physical consequences, such as trembling, shaking or sweating, that are also included in the recent public speaking anxiety scale proposed by Bartholomay and Houlihan (2016).

Common method variance could pose a serious problem for findings when both independent and outcome variables are collected from the same source, as in this study. Harmon’s one-factor test was conducted and found that a single factor explained 16% of the variance while, when considering all the factors of the model, the variance explained increased to 73%. So the data does not have a method variance problem.

## 5. Results

### **5.1. Descriptive results**

On the course, 70% of the students were between 18 and 19 years old, 15% were 20 years old, 10% were 21 years old and 4% were more than 21 years old. There were 55.6% of males and 44.4% of females. The video recording of group oral presentations helped students improve their final presentations, as their marks showed (see Table 1).

TABLE 1 HERE

Figures 2 and 3 show the distribution of the marks of the two presentations. Results show that the marks in May are skewed to the right, so there is a clear improvement for the two classes.

FIGURE 2 HERE

FIGURE 3 HERE

### **5.2. Measurement model validation**

An exploratory factor analysis using SPSS was carried out to check the unidimensionality of the reflective constructs. Our factorial analysis confirmed that there were eight factors. Table 2 shows the results. We eliminated indicators with factor loadings of less than 0.7 on each factor (Carmines & Zeller, 1979). Following this criterion, we eliminated three items of the stress construct. Another quality criterion is based on Cronbach's alpha, the value of which should exceed the minimum of 0.7 (Nunnally, 1978). Table 2 shows that the factor loadings and Cronbach's alpha values are adequate. In our model the composite reliability index for all constructs exceeds the minimum acceptable value of 0.7 (Hair, Ringle & Sarstedt, 2011), confirming internal consistency.<sup>1</sup> As a means of evaluating discriminant

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<sup>1</sup>The model has also been tested using partial least squares (PLS) consistent for robustness of the results. The differences in the results are found in the stress construct. Using PLS consistent, item 5 must also be eliminated. The rest of the constructs and the results of the structural model are the same.

validity, Table 2 shows that the average variance extracted (AVE) of our measures exceeds the limit of 0.6 (Hair et al., 2011), and Table 3 compares the square root of the AVE (diagonal values) with the correlations among the reflective constructs.

#### TABLES 2 AND 3 HERE

Some recent criticism of Fornell and Larcker's (1981) criterion suggest that it does not reliably detect lack of discriminant validity in common research situations (Henseler, Ringle, & Sarstedt, 2015). Henseler et al. (2015) have suggested an alternative approach to assess discriminant validity, based on the multitrait–multimethod matrix: the heterotrait–monotrait (HTMT) ratio of correlations. Discriminant validity was tested using this new method (see Table 4). For the first criterion, if the HTMT value is greater than 0.85 (Kline, 2011), then discriminant validity is a problem. As shown in Table 4, all values are below 0.85, so there is discriminant validity among constructs.

#### TABLE 4 HERE

Table 5 shows some descriptive statistics (mean, standard deviation and frequencies) for the latent variables of the model. Advantages, satisfaction, recommendation and extroversion show means above 5. The results show that 50% of students would highly recommend the activity and the level of satisfaction with the activity is very high, with 66% of the students marking values between 5 and 7 in that variable. Related to extroversion, most students are between 4 and 6 (81.9%), indicating that there is a low proportion of introverts. Similar results are found regarding the perceived relative advantages, with 78% of the answers between the values of 4 and 6. Related to the stress perceived during the activity, the findings suggest that the level of stress is very low (values 1 and 2 of the scale

together make up 60% of the answers). Attitude and enjoyment show a greater level of dispersion in their answers.

TABLE 5 HERE

### ***5.3. Hypothesis testing***

Figure 4 shows the results of the conceptual model with the significant path coefficients. We used SmartPLS 3.0 M3 ([www.smartpls.de](http://www.smartpls.de)). The primary purpose of the partial least squares (PLS) approach is to predict the indicators by means of component expansion. Hair et al. (2011, p. 144) recommend the use of PLS if the goal is to predict key target constructs or to identify key ‘driver’ constructs, if the research is exploratory or if it is an extension of an existing structural theory.” To test predictive relevance, the SmartPLS software (Ringle, Wende & Will, 2005) provides the  $Q^2$  proposed by Stone-Geisser. Our models show positive  $Q^2$  values of the main dependent variables – attitude ( $Q^2=0.59$ ), satisfaction ( $Q^2=0.35$ ) and recommendation ( $Q^2=0.13$ ) – which suggests that the model has predictive validity.

Hypotheses H1, H2 and H3 are related to the effect of extroversion on enjoyment, stress and attitude, respectively. According to the results, H1 and H2 are supported because there is a positive and significant effect of extroversion on enjoyment and a negative and significant effect on stress. However, extroversion has no significant influence on attitude, rejecting H3. The results suggest that the relative advantages positively influence attitude toward video recording, but that they have no direct influence on satisfaction. Thus, H4a is supported but H4b is not. Positive effects of perceived enjoyment on attitude and satisfaction were proposed, but only the positive relationship between enjoyment and attitude is supported (H5a), while H5b is not supported. Related to the relationship between

stress and attitude (H6a) and stress and satisfaction (H6b), the findings show a non-significant relationship with attitude and a negative and direct effect on satisfaction. So the results only support H6b. Enjoyment was proposed as an inhibitor of stress. The results show a negative and significant relationship between these two variables, supporting H7. A positive relationship was proposed between attitude toward the combined use of video recording and a wiki and satisfaction with the activity. The results support this proposal (H8). Finally, the results support H9, as a positive and significant effect of satisfaction on recommendation is found.

FIGURE 4 HERE

Because we did not expect a non-significant relationship between relative advantages and satisfaction and between perceived enjoyment and satisfaction, we tested whether attitude might act as a mediator. For this analysis, the methodology proposed by Preacher and Hayes (2008) is used, with a bootstrapping of 5000 samples. Table 6 shows the results of the mediation analysis. In all cases, the value of  $R^2$  of satisfaction increases when the mediation effect is included in the model. The results show a total mediation effect of attitude. Attitude acts as a mediator between relative advantages and satisfaction, and between enjoyment and satisfaction. Similarly, because we did not expect extroversion not to be related to attitude, we tested the mediating effect of enjoyment in the relationship between extroversion and attitude (see Table 7). The results show that there is a total mediation effect of enjoyment in the relationship between these variables.

TABLES 6 AND 7 HERE

## 6. Discussion

### **6.1. General discussion**

The aim of this paper was to examine the effect of extroversion on students' attitude toward the combined use of video recording and a course wiki and the influence of students' stress on attitude and satisfaction with this combined use. Furthermore, we examine the influence of enjoyment and relative advantages on students' satisfaction and recommendation of the activity. To achieve these objectives, a survey of 106 undergraduate students was carried out after recording their presentations and uploading the videos to the class wiki.

Extroversion is a type of personality trait that is important in contexts of public speaking (MacIntyre & Thivierge, 1995; Wang & Liao, 2012). In our case, extroversion is important because students have to speak in public and their performance is recorded and put on the class wiki, so all their classmates can see it. Our findings show that very extrovert individuals have lower levels of stress during the activity, confirming previous research (MacIntyre & Thivierge, 1995). Extroversion has no direct effect on students' attitude toward the combined use of video recording and a wiki, which confirms previous research that suggests that extroverts are not more likely to be bloggers (Guadagno et al., 2008). Nevertheless, extroversion can influence attitude indirectly through perceived enjoyment of the activity. This result confirms previous research that found that extroversion has an impact on enjoyment (Wang et al., 2010, 2012b). Wang, Lin and Lao (2012b) found that extroversion influences perceived enjoyment and so suggested an indirect effect on blog intention. However, they did not test the mediation effect on perceived enjoyment. Our paper provides evidence of that mediation path, showing that enjoyment fully mediates the relationship between extroversion and attitude. Our results suggest that extroverts will perceive the activity as fun and not as an obstacle or as a nightmare because they are more

open to speaking in public, to seeing themselves on the wiki and being exposed to others. This enjoyment could also explain why extroverts use or participate in platforms that require interaction with others or self-display such as Facebook or other Web 2.0 platforms (Krämer & Winter, 2008; Seidman, 2013; Eftekhar et al. 2014). However, more research is needed to confirm the effects of self-display on perceived enjoyment for extrovert users in similar technologies such as Youtube.

We have proposed that stress is a feeling that can negatively influence students' attitude toward the use of video recording and a wiki and their satisfaction. A negative attitude is possibly explained by the stress being created by speaking in public and presenting the performance to the whole class (MacIntyre & Thivierge, 1995; Paul et al., 1998). However, our findings suggest that the stress suffered by students' during the activity has no effect on their attitude, although it does have a negative effect on their satisfaction with the activity. Students value the activity positively whatever the stress it may cause them. In fact, the mean of attitude was close to 5, indicating that, generally, the students had a positive attitude toward the combined use of a wiki and video recording. This result may be interpreted as indicating that attitude combines the cognitive evaluation (perceived relative advantages) with the positive feelings created by enjoyment, avoiding the negative ones created by stress.

Perceived enjoyment has rarely been analyzed in the study of video recordings. Crook et al. (2012) found that staff enjoyed using video for feedback. Our research does not analyze the perceived enjoyment of using video but of the combined use of a wiki and video recording, and that enjoyment has to be perceived by the students, not the staff. Tugrul (2012) also analyzed students' perceptions of video recordings and included enjoyment, but as part of a

construct called course evaluation, which also contained other aspects such as valueless versus valuable, good use of my time versus waste of my time, and desirable versus undesirable. Therefore, the effect of enjoyment cannot be assessed. However, these aspects have been widely included in the use of blogging, a technology in which the user also displays herself (Wang et al., 2010, 2012b; Wang & Liao, 2012). Our findings show that enjoyment is an antecedent of attitude but not of satisfaction, which confirms other studies that analyze the relationship between enjoyment, behavioral attitude and satisfaction on social media such as Facebook (Lee, Xiong & Hu, 2012). This non-significant effect could be explained because satisfaction was reached after students had seen the improvement in their marks in the final presentation. As the questionnaire was filled out in March, they had not realized the real benefits of the activity yet.

The results suggest that the perceived relative advantages and the enjoyment of the activity are key antecedents of a positive attitude toward the combined use of video recordings and a wiki. Additionally, attitude totally mediates the relationship between these two variables and satisfaction, which is a contribution to existing research. Previous articles on satisfaction with video recording have not analyzed this mediation effect, suggesting that perceived advantages of the activity and enjoyment can influence students' satisfaction directly (Crook et al., 2012; Tugrul, 2012; Barry, 2012). Finally, our research proposes a relationship between attitude and satisfaction, which is confirmed, and between satisfaction with the activity and course recommendation. This latter proposition is very important and allows us to provide practical implications for educators. However, the explained variance of recommendation is quite low and the correlation between this variable and satisfaction is also not very high. This result suggests that something is missing in the relationship



between satisfaction and recommendation. Satisfaction is not enough to ensure recommendation. Thus, future research should analyze additional factors that can influence students' propensity to recommend the course or to talk positively about it.

This article contributes to previous education research by providing new insights based on quantitative research into students' attitude toward the combined use of video recording and a wiki, their satisfaction with the activity and their intention to recommend the course. Research and conclusions about the use of these technologies have usually been based on qualitative studies and focused mainly on its effect on feedback quality or assessment. Our findings suggest that the video recording of group presentations and their uploading to a wiki also allows students' recommendation of the course to be influenced. Thus, this activity based on the combined use of these technologies can be used to engage students with the course. A second contribution of this research is the analysis of the antecedents of students' attitude toward the combined use of video recording and a wiki and the mediation effect of perceived enjoyment. Finally, little attention has been paid to the influence of personality on attitude toward video recording or a wiki. Extroversion has been analyzed in the context of public speaking and, recently, in technologies such as social media and blogging. The present research shows that extroversion is an important aspect to consider when video recording and a class wiki are used together because it influences the students' stress, which subsequently has a negative effect on satisfaction. At the same time, more extrovert students also perceived a greater level of enjoyment, which leads to a better attitude toward the activity.

In addition, our study contributes to the field of methodology by adopting the HTMT ratio of correlations (Henseler et al., 2015) to assess the discriminant validity of the construct.

Recently, Voorhees, Brady, Calantone and Ramirez (2016) also suggested using HTMT as a better method of assessing discriminant validity than the traditional Fornell and Larcker's (1981) criterion. Both these criteria can be used as complementary, the HTMT criterion being a little more restrictive and able to provide confirmation of the traditional method.

The results of our research allow us to provide some implications and suggestions for educators. Although this particular course is compulsory for undergraduate students, spreading positive word-of-mouth will increase interest in the course, the students' degree of engagement and the level of course attendance. So the combined use of a wiki and video recording of groups' presentations can be used as a tool for achieving these objectives. It is important for teachers or educators to highlight the advantages and usefulness of the activity, as they are key aspects for creating a positive attitude, satisfaction and recommendation. Enjoyment is another aspect that the educator may control. Teachers should try to make the activity fun and, at the same time, to reduce students' stress because this is a barrier to their satisfaction.

### ***6.2. Limitations and future research***

Our research is not lacking in limitations, offering future lines of research. First, the activity has only been carried out among first-year undergraduate students. Different results could be obtained if the activity were carried out among final-year undergraduate students or students of different degrees where oral communication skills are less important. Second, the study is cross-sectional. A longitudinal study could complement the results by providing an evolution of oral communication skills. Third, stress and attitude are the two main drivers of satisfaction. Although the research has focused on the antecedents of attitude, future research could focus on how to reduce the level of stress suffered by

students during the activity. The research has only included one personal characteristic (extroversion) but other aspects that can be controlled, such as the level of students' preparation and rehearsal, could be analyzed. Additionally, we have proposed a direct influence of extroversion on attitude, enjoyment and stress, but the moderating effect of this variable could also be examined. Finally, the study only examines satisfaction with the activity and course recommendation as outcomes. Other variables such as engagement with the course or performance improvement could be interesting for assessing the real usefulness of the activity.

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## TABLES

TABLE 1

**Improvement in the oral presentation activity**

Class	Mean		t-test mean difference
	A	B	A-B
Mark obtained in the recorded presentation (March)	6.66	7.22	-1.84*
Mark obtained in the final presentation (May)	7.84	8.00	-1.08
Improvement	17.3%	11.2%	0.858
N (number of groups)	17	11	

TABLE 2  
Measurement validation of reflective constructs

	Loadings	AVE	Composite Reliability	Cronbach's Alpha
ADVAN_1	0.731	0.650	0.937	0.922
ADVAN_2	0.791			
ADVAN_3	0.737			
ADVAN_4	0.778			
ADVAN_5	0.848			
ADVAN_6	0.813			
ADVAN_7	0.849			
ADVAN_8	0.889			
ATT_1	0.881	0.795	0.939	0.914
ATT_2	0.870			
ATT_3	0.914			
ATT_4	0.901			
ENJOY_1	0.943	0.792	0.919	0.868
ENJOY_2	0.926			
ENJOY_3	0.792			
EXTRO_1	0.837	0.656	0.884	0.825
EXTRO_2	0.811			
EXTRO_5	0.819			
EXTRO_6	0.769			
SAT_1	0.816	0.675	0.892	0.839
SAT_2	0.766			
SAT_3	0.902			
SAT_4	0.795			
RECOM_1	0.752	0.659	0.885	0.828
RECOM_2	0.859			
RECOM_3	0.799			
RECOM_4	0.833			
STRESS_1	eliminated	0.610	0.875	0.825
STRESS_2	eliminated			
STRESS_3	0.787			
STRESS_4	0.846			
STRESS_5	0.731			
STRESS_6	eliminated			
STRESS_7	0.740			
STRESS_8	eliminated			

TABLE 3  
Fornell and Lacker's (1981) criterion

	Attitude	Advantages	Enjoyment	Extroversion	Recommendation	Satisfaction	Stress
Attitude	<b>0.892</b>						
Advantages	0.726	<b>0.806</b>					
Enjoyment	0.785	0.554	<b>0.891</b>				
Extroversion	0.274	0.153	0.252	<b>0.810</b>			
Recommendation	0.315	0.410	0.117	0.213	<b>0.812</b>		
Satisfaction	0.627	0.492	0.521	0.309	0.393	<b>0.821</b>	
Stress	-0.232	-0.143	-0.246	-0.315	0.038	-0.276	<b>0.784</b>

TABLE 4  
HTMT criterion

	Attitude	Advantages	Enjoyment	Extroversion	Recommendation	Satisfaction	Stress
Attitude							
Advantages	0.788						
Enjoyment	0.837	0.611					
Extroversion	0.303	0.179	0.281				
Recommendation	0.370	0.470	0.163	0.283			
Satisfaction	0.728	0.564	0.633	0.391	0.465		
Stress	0.240	0.157	0.260	0.342	0.088	0.282	

TABLE 5  
Mean, standard deviation (SD) and frequency (%)

	Mean	SD	1	2	3	4	5	6	7
<b>Attitude</b>	4.67	1.4	3.8	8.5	11.3	29.2	21.7	17.9	7.5
<b>Advantages</b>	5.26	1.24	1	1.9	11.5	22.1	30.8	26	6.7
<b>Enjoyment</b>	4.33	1.52	7.6	12.4	13.3	21	28.6	16.2	1
<b>Extroversion</b>	5.28	1.16	0	1.9	10.5	21.9	26.7	33.3	5.7
<b>Recommendation</b>	5.58	1.11	0.9	1.9	2.8	18.9	25.5	39.6	10.4
<b>Satisfaction</b>	5.14	1.03	0	4.8	4.8	24.8	42.9	21	1.9
<b>Stress</b>	2.55	1.34	36.2	24.8	20	12.4	3.8	2.9	0

TABLE 6  
**Mediation effect of attitude**

Total effect		Direct effect of IVs		Indirect effect			
	Satisfaction (c path)	Satisfaction (c' path and b path)	Attitude (a path)		BC 95% Confidence interval		
					Indirect effect	Low	Upper
Relative advantages	0.2522***	0.0726	0.418***	Mediators			
Attitude		0.429***		Attitude	0.1796	0.03	0.339
Total effect		Direct effect of IVs		Indirect effect			
	Satisfaction (c path)	Satisfaction (c' path and b path)	Attitude (a path)		BC 95% Confidence interval		
					Indirect effect	Low	Upper
Enjoyment	0.336**	0.084	0.543***	Mediators			
Attitude		0.429***		Attitude	0.2234	0.054	0.414

\*\*\*significant at 1%, \*\* significant at 5%

IVs: Independent variables; BC: Bias Corrected.

TABLE 7  
**Mediation effect of enjoyment**

Total effect of extroversion		Direct effect of IVs		Indirect effect			
	Attitude (c path)	Attitude (c' path and b path)	Enjoyment (a path)		BC 95% Confidence interval		
					Indirect effect	Low	Upper
Extroversion	0.273**	0.068	0.250**	Mediators			
Enjoyment		0.531***		Enjoyment	0.1915	0.03	0.338

\*\*\*significant at 1%, \*\* significant at 5%

IVs: Independent variables; BC: Bias Corrected.

## FIGURES

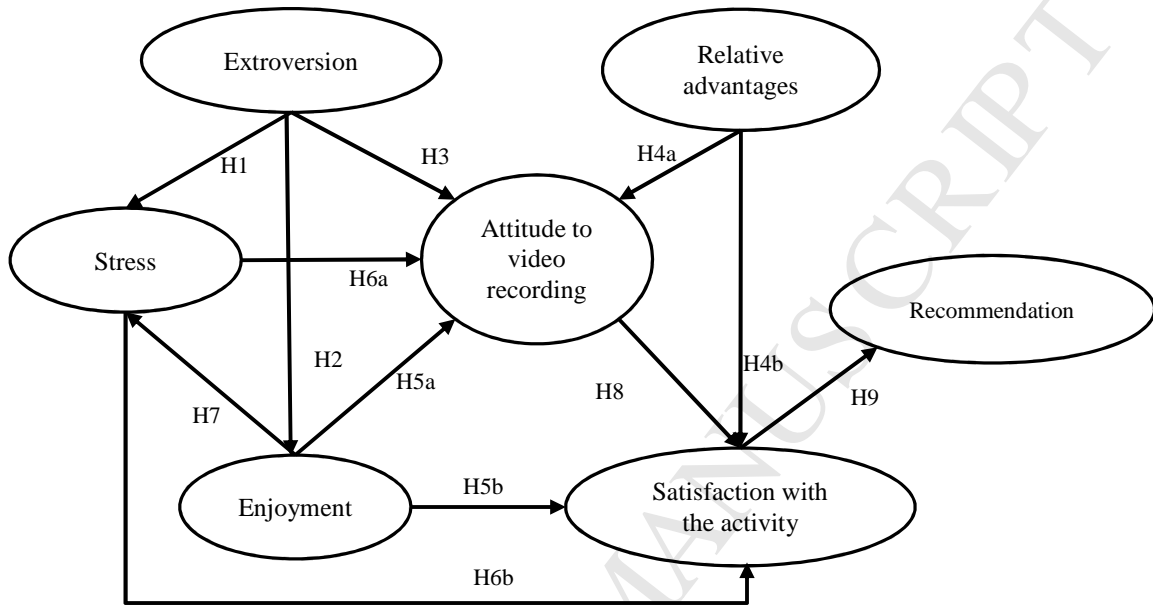
FIGURE 1  
Conceptual model



FIGURE 2  
**Comparison of distribution of marks for class A**

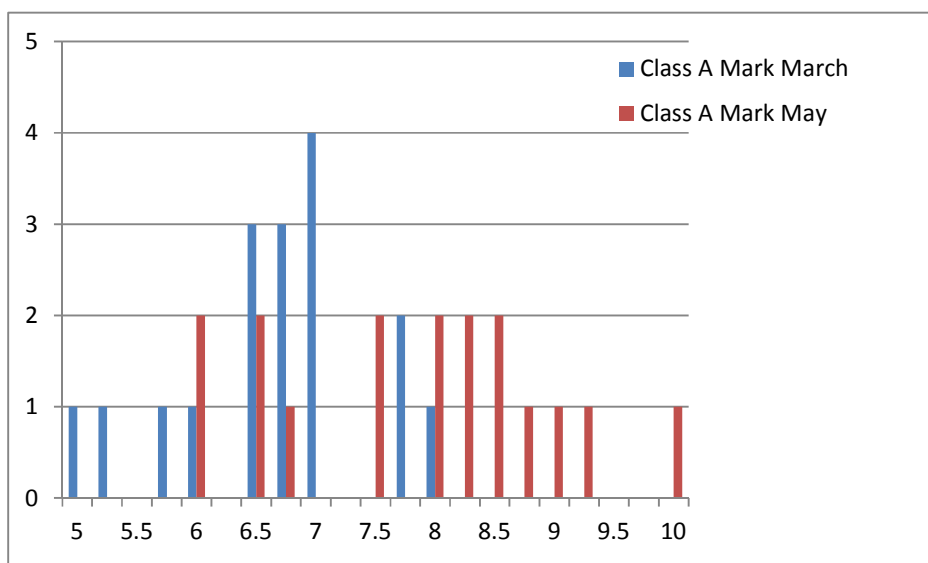


FIGURE 3  
**Comparison of distribution of marks for class B**

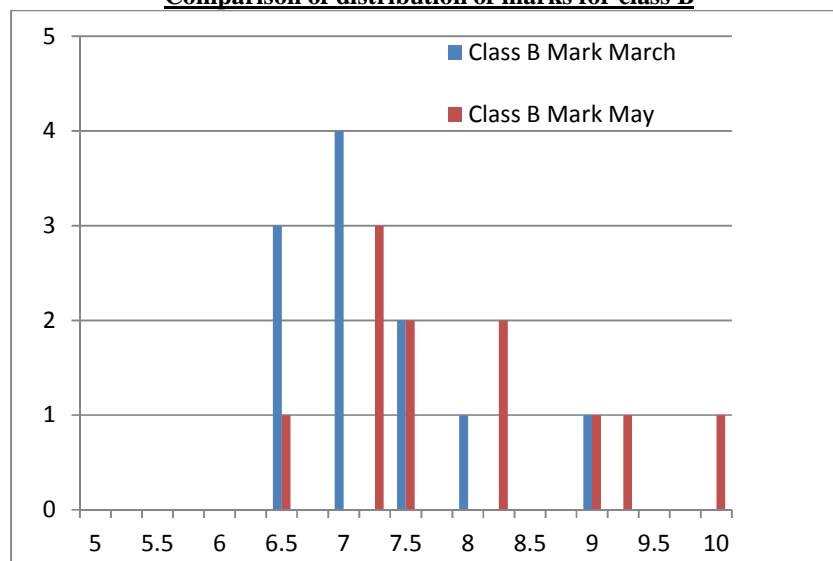
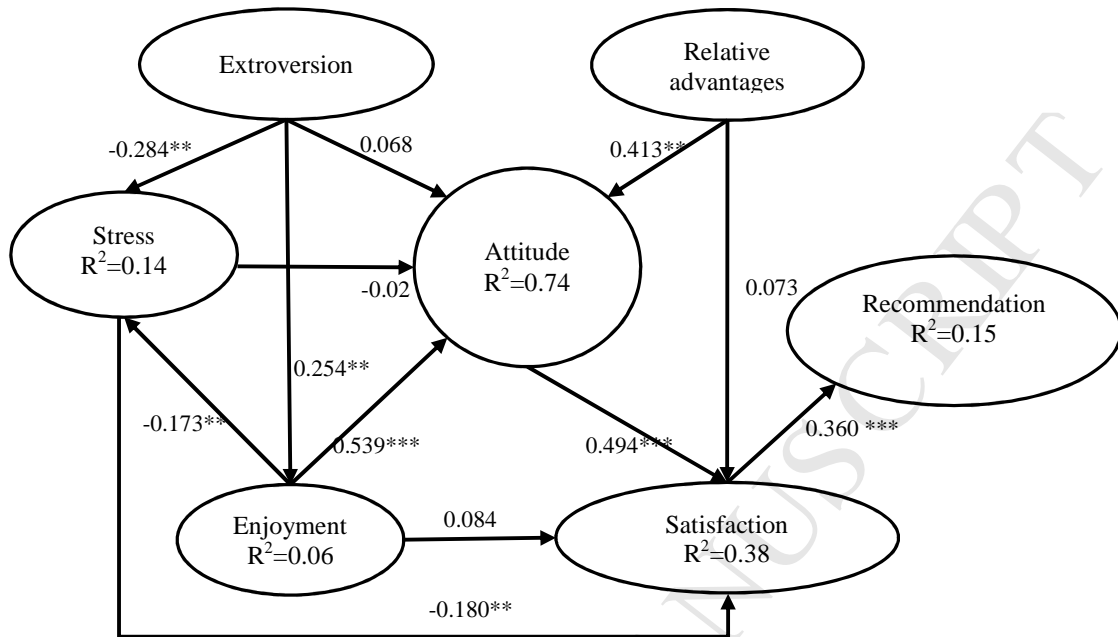


FIGURE 4  
Results of the structural model



\*\*\*significant at 1%, \*\* significant at 5%

**Highlights**

- Extrovert individuals perceive lower stress and a greater enjoyment.
- A total mediation effect of enjoyment between extroversion and attitude is found.
- Stress acts as a barrier for satisfaction, but has no negative effect on attitude.
- Attitude partially mediates the relationship between enjoyment and satisfaction.