

The influence of technology in the classroom: An analysis of an iPad and video intervention on JHS students' confidence, anxiety, and FL WTC

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This small-scale, longitudinal study tested for the influence of video recording with a camcorder, and recording and self-viewing with an iPad. The study tested for changes in confidence, anxiety and foreign language (FL) willingness to communicate (WTC; McCroskey & Baer, 1985) using self-report measures before and after the intervention (N = 91 & 71, respectively). For the second administration, a second instrument was administered which asked about the influence of the camcorder / iPad intervention on confidence, anxiety, and WTC. The class that received the iPad intervention shows statistically significant increases in confidence and WTC, and a statistically significant decrease in anxiety. Furthermore, the WarpPLS structural equation modeling (SEM) software results show that the iPad use had a strong positive influence on confidence and WTC and may also have lowered the level of anxiety of the students video-recorded directly (n = 9) with the iPad. The results indicate that video recording and self-viewing in the classroom with an iPad may promote confidence and WTC, and lower anxiety.

Keywords: WTC, CALL, iPad, young learners, intervention

Introduction

Research papers in CALL on digital video use have mainly focused on the pedagogical implications from the perspective of the positive influence on student motivation as a result of involving students in the creative and production process (Kearney & Schuck, 2004, 2005, 2006; Schuck & Kearney, 2004, 2005, 2006). Furthermore, research in Japanese English as a foreign language

(JEFL) classrooms has focused on the use of digital video to promote communication (Foss, 2008; Rawson, 2008), increase student motivation (Shrosbee, 2008), and confidence while speaking (Wyers, 1999, in Shrosbee, 2008). However, Dorwick (1977, in Markus & Nurius, 1986, pp. 961–962) used video recording as an ‘intervention’ in which students with severe psychomotor impairments were asked to perform a task that was beyond their ability level. Their ‘errors’ were edited out and the viewing of the successful completion of the tasks was shown to enhance future performance.

Several papers report research conducted in the JEFL learning situation on the relationships amongst affective variables influencing foreign language (FL) willingness to communicate (Hashimoto, 2002; Nakahira, Yashima, & Maekawa, 2010; Neff, 2007; Ockert, 2013b, 2013c; Yashima, 2002; Yashima, Zenuk-Nishide, & Shimizu, 2004). Other researchers have tested for the effect of interventions on affective variables (see Hiromori, 2006). This paper is amongst the first to report on the use of an iPad to record Japanese junior high school (JHS) students and allow them to view themselves speaking English as an intervening stimulus to influence the affective variables of confidence, anxiety, and willingness to communicate (WTC; McCroskey & Baer, 1985), with the hope of increasing their English as a foreign language (EFL) WTC.

The influence of digital video on student affective variables

In the JEFL learning environment, the results of research studying changes of student affect by Takiguchi (2002) show that real-time communication with students in foreign countries using a video conferencing telephone system (e.g. Skype or Gizmo) through the Internet improved student interest, concern, and desire to use English (WTC). Shrosbee (2008) has reported on three means of incorporating digital video into the classroom: a) for assessment purposes; b) teacher-made video; and c) student-made video. Further uses of digital media in the classroom include video reviews as a high interest method to develop essay skills and promote discussion (Foss, 2008) and promote English communication to allow students to explore their creativity and work as a team (Rawson, 2008). Fee and Fee, (2003) discuss the pedagogical approaches for the use of digital video, including “as an interactive activity that can *engage* learners [italics added]” (p. 1). However, these approaches did not test for what influence the video recording of students and self-viewing of them speaking English has on student affective variables. Will recording students with a camcorder or iPad engage students enough to influence their confidence, anxiety, or WTC?

For the present study, an iPad was used to record students on task. Later they viewed themselves on task speaking English using the iPad. Doing so allowed them to view their successful performance. The previous study by Dorwick (1977) mentioned above has shown that this type of intervention created and fortified “specific positive possible selves for children that functioned as powerful incentives and standards for future successful task performance” (Markus & Nurius, 1986, p. 962). The research presented in this paper explores specifically what, if any, influence the use of digital video in the classroom has on student confidence, anxiety, and FL WTC.

Confidence, anxiety, and willingness to communicate

50 The construct WTC was first reported on by McCroskey and his associates in a first language (L1; McCroskey, 1992; McCroskey & Baer, 1985; McCroskey & Richmond, 1991). According to

their research, WTC captures the major implications that affective variables such as anxiety, communication apprehension, introversion, reticence, self-esteem and shyness have in regards to their influence on communicative behavior (McCroskey & Richmond, 1991). In addition, MacIntyre and Charos (1996) showed that motivation influenced WTC in the L2, which, in turn, resulted in increased frequency of L2 communication. Also, WTC was a predictor of frequency of communication in the L2, while motivation was a predictor of WTC and frequency of communication (MacIntyre & Charos, 1996).

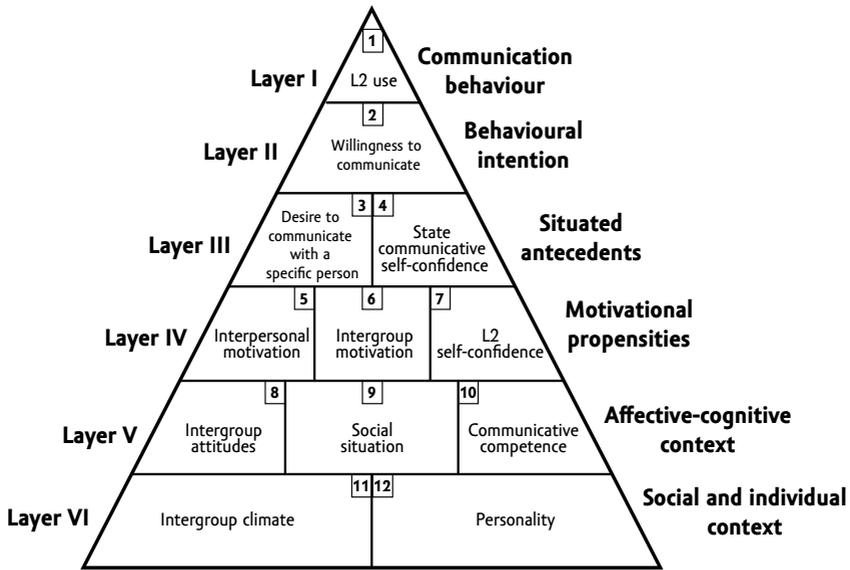


Figure 1. Heuristic model of variables influencing WTC (MacIntyre et al., 1998, p. 547)

Research on JEFL confidence, anxiety, and WTC

Yashima and her associates (Yashima, 2002; Yashima et al., 2004) have conducted research in the JEFL context on affective variables and FL WTC. Yashima (2002) has reported on the influence of attitudes and affect on WTC and second language communication (Yashima et al., 2004). Furthermore, several studies have looked to the learner's WTC in the L2 by trying to identify the underlying influences of the variables that precede the act of L2 communication, specifically perceived competence, self-confidence, and anxiety (Hashimoto, 2002; MacIntyre et al., 1998; Yashima, 2002; Yashima et al., 2004). Furthermore, in her research on motivation, Hashimoto (2002) has stated that "perceived competence or self-confidence" (p. 57) in an L2 are positive indicators of motivation, and can in fact be considered the same construct.

Additional research on WTC in the JEFL environment by Matsuoka (2005) using structural equation modeling (SEM) showed that introversion, motivational intensity, communication apprehension (anxiety) were "significant predictors of L2 WTC" (p. 157). It was shown

“that perceived competence (or self-confidence) and L2 WTC were significant predictors of L2 proficiency” (p. 157). In addition, using a regression analysis on data collected from JHS students, Ockert (2012) found that “confidence was the strongest predictor of WTC” (p. 174). Therefore, since WTC has been consistently shown to be a predictor of L2 proficiency and use, the present study will test to see to what extent a video intervention has an influence on WTC and its precursor’s anxiety and confidence.

Watanabe (2013) has recently reported the results of a longitudinal study of high school students’ WTC in Japan. He found that there were no significant changes over the three year period of the study. However, using the Rasch measurement model (Rasch, 1960) he was able to identify two uni-dimensional constructs in each of the three waves of data: Willingness to communicate with friends and acquaintances (WTCFA) and willingness to communicate with strangers (WTCS).

Gender and age differences in WTC studies

According to a study by Donovan and MacIntyre (2004) on age and gender differences in WTC amongst JHS, high school and university students, JHS girls are higher in WTC than JHS boys. Women at the university level are higher in communication apprehension and lower in self-perceived competence than are male university students. In their study, communication apprehension (i.e., anxiety) and self-perceived competence show a consistent negative relationship that did not vary with age or gender. However, the degree to which anxiety and self-perceived competence predicted WTC varied with age and gender. In the three age groups, anxiety was a significant predictor of WTC among women. Among men, self-perceived competence emerges as a “significant predictor of WTC in the three age groups” (Donovan & MacIntyre, 2004, pp. 425–426).

In the JEFLE setting, Yashima *et al.* (2009) conducted research on university students and the results reveal that female students possess a higher level of motivation and anxiety about not understanding everything taught in class. Male students, on the other hand, showed an equal level of amotivation. In other words, male and female students appear to be equally ‘ambivalent’ but female students are more motivated to learn an L2 in general.

In addition, Kobayashi (2002) reported that female high school students have more interest and positive attitudes toward learning English. Also, recent research with JHS students by Ockert (2012, 2013a) confirms that gender differences in L2 learning motives occur in the early teen years. The results presented herein indicate that there may also be gender differences in L2 confidence, anxiety, and FL WTC. For example, the boys in this study show an increase in confidence and WTC, and a decline in anxiety, as a result of the iPad intervention.

WTC and computer-based interventions

In a study of Thai students involved in an online video-game requiring English, Reinders and Wattana (2011) found that the “participants were generally willing to communicate in English (mean 4.52 on a 1 to 5 scale) and generally showed positive changes in their willingness to engage in communication situations between the two sessions using a second language” (p. 19). Of particular importance to their study is that the amount of participants’ WTC in the third session was higher than the amount of participants’ WTC in the first session (by means score comparisons). In other words, the participants became more willing

to interact in the second language over time. The actual difference revealed that “computer game playing had very practical importance in WTC improvement among second language learners” (Reinders & Wattana, 2011, p. 20). This was especially surprising since, according to Kamprasertwong (2010), students in Thailand are ‘notoriously’ shy and hesitant to speak in English. This is particularly relevant to the present study since teachers in Japan frequently express the difficulty of getting students to communicate in English in front of their peers (Dwyer & Heller-Murphy, 1996; Jones, 1999; Sato, 1990; Tsui, 1996).

Reinders and Wattana’s (2011) results also show that the students’ WTC improved significantly from the first game session to the third session. Specifically, students who were normally shy in face-to-face classes tended to become less reluctant, showing an increase in participation, and expressed themselves more freely while playing the game.

In the JEFL learning situation, the results of research studying changes of student affect by Takiguchi (2002) shows that real-time communication with students in foreign countries using a video conferencing telephone system (e.g. Skype or Gizmo) via the Internet improved student interest, concern, and desire (WTC). In addition, Hiromori’s (2006) research has shown that interventions which stimulate autonomy, competence and need for relatedness improve student SDT motives. More recently, Fukada, Fukuda, Falout and Murphey (2011) demonstrated that *possible selves* (Markus & Nurius, 1986) can be used to increase motivation in university students.

Furthermore, Freiermuth and Jarrell’s (2006) research on WTC and online chat has shown that a computer-mediated environment “provided a more comfortable environment” which “enhanced students’ willingness to communicate” (p. 189). Research results presented by Ockert (2013a) have shown that an iPad intervention positively influenced student SDT-based motives, confidence, and WTC, while also lowering anxiety. These research results are presented in this paper to explore the influence of the use of an iPad in the classroom and self-viewing of Japanese JHS students speaking English has on their anxiety, confidence, and WTC.

Objectives of the present study

The purposes of the present study are to examine the relationships between confidence, anxiety, and FL WTC. We had initially hoped to play the video back for the students so that they could see themselves on task using English. As this was not possible, we were able to record nine students in class B with an iPad, and allow five of them to view themselves speaking English via the iPad. SEM analysis will determine what, if any, causal relationships exist between these three variables and the video-related survey question results. Two research questions motivate the present study:

Research questions:

1. Will the use of the camcorder to record students in the classroom influence the affective variables of confidence, anxiety or WTC?
2. Will the impact of recording students with an iPad speaking English have a positive influence on student confidence and WTC, and lower their anxiety?

Methods

Project outline

The fifteen-month schedule of the project can be seen in Table 1. The original plan was to use a video camcorder to record the students and edit the tape to show the students using English successfully, similar to Dorwick (1977). However, during the months of July and August, 2011, it became evident that the use of a digital video camera and the iMac iMovie software for editing was simply too time consuming to allow us to produce video for all of the classes which were recorded with the camcorder. Therefore, we decided to use an iPad for the simple convenience of using it in class for recording students and ease of playback. Due to scheduling, only nine students in class B were recorded directly with the iPad on January 18th. The second administration of the surveys was on February 29th and March 1st 2012.

Table 1: The twelve month video and iPad-intervention research project schedule

Dates	Activity	Classes
Jan – Mar 2011	1. Students fill in the WTC survey instrument	Class 2A, 2B, 2C, 2F
Apr – Jun 2011	1. Video filming in class with a camcorder	Class 3B, 3C, 3F
July – Aug 2011	1. Video filming in class with a camcorder	Class 3B, 3F
Sept – Dec 2011	1. Show video to the students in class	(was not possible)
Jan – Feb 2012	1. Video filming in class and viewing with an iPad	Class 3B
Feb – Mar 2012	2. Students complete the WTC & video surveys	Class 3A, 3B, 3C, 3F

Participants

The survey instruments for this study were filled out by JHS students in six classes at a single school in Nagano City, Japan (For the first iteration, $N = 120$). The students were divided into six groups for English classes with the goal of producing six classes of equal ability on average; there was no discernible difference in ability between the boys and the girls in any class before or after forming the new classes (C. Kitamura, pers. comm.). However, for the post-intervention administration, only four of the classes' homeroom teachers had enough class time to do so. Therefore, the data of these four classes are presented herein for pre- and post- intervention comparisons ($N = 91$ & 71 , respectively). The two administrations of the surveys were during the final semester of the students' second and third years. Each class had a different Japanese teacher but the same assistant language teacher (ALT). Course lessons covered the same text material.

Materials

Previous research using self-report measures used "communication contexts involving speaking to friends, acquaintances, and strangers in four settings: dyads, small groups, formal meetings, and public speaking situations" (MacIntyre & Charos, 1996, pp. 13–14). The WTC survey instrument consists of three sub-sections (scales) of thirty items each, similar in receiver and context to those used by MacIntyre and Charos (1996). However, this instrument was designed specifically for JEF L learners by Sick and Nagasaka (2002, English

version) and Matsuoka (2004, Japanese version). For this study, the Matsuoka (2004) version was simplified for comprehensibility for Japanese JHSs.

For this project, the instruments were checked by bilingual native Japanese speakers for clarity to ensure comprehensibility for JHS students. All surveys in this research project used a six-point numerical data collection system (1 - 6) since Japanese respondents tend to select the middle or 'neutral' option when an odd number system is used (Reid, 1990).

The instrument asks the respondents to rank the items from 1 to 6. The first, a confidence scale, asks the students to rank from 1 (I absolutely don't think I could do that) to 6 (I think I could do that easily). The second scale, for anxiety, asks the students to rank from 1 (I would definitely not be nervous) to 6 (I'd be extremely nervous). The third scale, for desire (to communicate), asks the respondents to rank the items from 1 (If I could, I'd run away!) to 6 (I would absolutely want to try that!).

The SPSS software package was used to ascertain the reliability and validity of the WTC instrument for the results of the first administration ($N = 120$). All three scales on the WTC instrument show a very high Cronbach's α , which indicates each is a uni-dimensional scale. The α s are as follows: Confidence (0.94), anxiety (0.96), and WTC (0.93). Furthermore, two of the items on the confidence scale, question two, *Complaining to a Japanese teacher that the speed of the listening test was too quick to catch* ($M = 2.85$, $SD = 1.67$) and three, *Complaining to a native teacher that the speed of the listening test was too quick to catch* ($M = 2.36$, $SD = 1.36$) showed a low corrected item-total (point-biserial) relationship (B. Calfee, pers. corr.). However, if these two items were removed from the confidence scale, the α would increase less than 0.004 and 0.001, respectively. As these items showed no variation on either the anxiety or WTC scale, they were included in further analysis for a total of 30 variables per scale.

SPSS tests of factorability include the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity. For the KMO, "values between 0.5 and 0.7 are mediocre, values between 0.7 and 0.8 are good, values between 0.8 and 0.9 are great and values above 0.9 are superb" (Hutcheson & Sofroniou, 1999, in Field 2009, p. 647). The results for Bartlett's test of sphericity should be significant at the $p < 0.05$ level. The KMO measure of sampling adequacy and Bartlett's test for sphericity for the confidence and the desire (WTC) scales are in Tables 2 and 3, respectively. As can be seen, the results for these WTC instrument sub-scales are excellent.

Table 2: The KMO and Bartlett's Test of Sphericity for the confidence scale ($N = 120$)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.901
	Approx. chi-square	2380.306
Bartlett's Test of Sphericity	df	435
	Sig.	.000

The scales for confidence and WTC are organized from 1 to 6, with the option of 6 being the highest and ideal response for each scenario. Therefore, confidence and WTC are expected to move in tandem with high confidence being optimal for high WTC. On the other hand, the anxiety scale works in the opposite manner. The 1 option indicates a low level of anxiety and the 6 a high level of anxiety. As a result, a low score on the anxiety scale is ideal, and low anxiety should correspond to a high level of confidence, which should result in a high level of WTC.

Table 3: The KMO and Bartlett’s Test of Sphericity for the desire (WTC) scale (N = 120)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.879
Bartlett’s Test of Sphericity	Approx. chi-square	2102.382
	df	435
	Sig.	.000

In order to test the internal validity of the confidence scale, a principal component analysis (PCA) was carried out. It was hypothesized that the items would cluster into components, hypothetically by the context or receiver (MacIntyre & Charos, 1996; Watanabe, 2013). However, the results for the scree plot indicated that two components could be extracted; three components accounted for more than 60% of the variance; and seven components had eigenvalues greater than one. Furthermore, the rotated component matrix attempts failed to converge in 25 iterations, indicating that the internal validity attempts for this sub-section confirm that it operates as a uni-dimensional scale. Similar results were found for the anxiety and desire (WTC) scales.

All of the students in the four classes received the same WTC survey before and after the intervention. All three WTC survey instrument sections’ Cronbach’s *alpha*, mean, and standard deviations for the pre-intervention data are provided in Appendix A.

In addition, a second survey instrument was given to all of the students in each of the classes in March 2012. This instrument asked if the students were video-recorded (with a camcorder or iPad) during English class and if yes, *Did viewing yourself speaking English increase your confidence and desire (WTC) to speak in English and reduce your nervousness (anxiety) to speak in English?* Answer choices were from 1 (No influence) to 6 (A lot of influence). See Appendix B.

Procedures

The surveys were both filled out in pencil during regular class time. The WTC survey instrument was filled out for the first time in March, 2011. This survey and a second survey consisting of questions regarding the use of in-class video were administered again in March, 2012 to students in four classes (Classes A, B, C, & F). During their third year, each class received similar teaching methods, lesson plans, and classroom activities. The results presented in this research study are of the four classes that participated in both survey administrations, with a particular focus on the nine students in class B who responded to the video-related questions (Note: All students received the same surveys. However, only the nine students in class B who were recorded with the iPad responded – and positively – to the video questions, indicating that the impact of the iPad intervention was quite substantial).

In each of the four classes it was decided to put the students in small groups of four students each. Each class had six groups. In their groups, the students made four quiz questions as follows: each student must produce three hint questions with one using ‘as ~ as’; a second question using a relative clause such as ‘that’ or ‘which’, and a third question was the student’s choice. (For example, one student in class B described a cow and used the following three sentences: It is as big as a horse. It is something that makes meat. It is a thing that is the color(s) black and white.)

The students could receive help from their classmates to create their three statements. However, each student would have to stand in front of the class and read their three

sentences. Each of the other groups that correctly guessed the answer received a point, and the group whose member was giving the quiz received a point for each group that correctly guessed the answer. This was done to encourage good quiz statements. Each group chose the order of the members to stand in front of the class and present. The students in class B who presented were recorded with an iPad. Approximately one and a half 'rotations' were completed for a total of nine students in one class period. Due to the order selection of the members of the groups in class B, only male students presented and were recorded with the iPad. This was completely random as a result of the students' choice in the groups. Naturally, we intended to film all students in class B with the iPad, but time did not permit.

As a result, class B serves as the experimental group and classes A, C, and F serve as control groups for the purpose of comparison. The video was taken on January 18th. Students had an opportunity to view themselves speaking English using the iPad on February 28th. For comparative purposes, it should be noted that class A had no in-class video taken at all; classes B, C and F were filmed with a camcorder; nine students in class B were filmed with an iPad and five of these nine students had the opportunity to view themselves speaking English using the iPad.

Analysis

The SEM analysis used the WarpPLS non-linear structural equation modeling software program. The user's manual (Kock, 2012) states that the software program uses algorithms that are fairly computing intensive, in some cases employing multiple checks and optimizing sub-algorithms in each sub-step. Consequently, the results generated by this software are more complete than other publicly available software, and often more reliable. For example, this software calculates model fit indices and P values for most of its parameter estimates. In addition, the WarpPLS software provides three model fit indices: average path coefficient (APC), the average R-squared (ARS), and the average variance inflation factor (AVIF). For the APC and ARS indices, the P values are provided.

When assessing the model fit with the data, it is recommended that the P values for the APC and ARS be significant at the 0.05 level (Kock, 2012). Second, it is recommended that the AVIF measure be lower than 5. It is noted that the AVIF index will increase as new latent variables are added to the model which add multi-collinearity. This occurs when the inclusion of new latent variables overlap in meaning with existing latent variables. As a result, "the AVIF brings in a new dimension that adds to a comprehensive assessment of a model's overall predictive and explanatory quality" (Kock, 2012, p. 30).

According to Kock (2012), the P values are calculated through a complex process that involves resampling estimations coupled with Bonferroni-like corrections (see Rosenthal & Rosnow, 1991). This is necessary since the fit indices are calculated as averages of other parameters. Furthermore, WarpPLS includes three re-sampling methods: blindfolding, bootstrapping, and jackknifing. The results presented herein used jackknifing as it tends to generate more stable resample path coefficients, and therefore more reliable P values, with sample sizes less than 100 (see Chiquoine & Hjalmarsson, 2009).

Results and discussion

The results for the pre- and post-intervention instrument administrations are shown in Table 4. Interestingly, there are statistically significant ($p < .01$) differences in the results

for most of the scales in classes A, B, and F. Both classes A and F show a decrease in both confidence and WTC, and an increase in anxiety. However, only class B shows statistically significant and positive results for both confidence and WTC, and a statistically significant decrease in anxiety. In addition, all three scale results for class B show a statistically significant result at the $p < .01$ level. Therefore, given the very small number of participants involved in the analysis, these results can be confidently interpreted to not be chance alone.

Table 4: Differences in the WTC scale results before and after the video intervention

	Confidence	Anxiety ⁽¹⁾	WTC
Class A			
Before (n = 23)	3.21 (1.62)	3.50 (1.77)	2.89 (1.50)
After (n = 21)	2.96 (1.65)	4.08 (1.66)	2.64 (1.66)
Difference	-0.25*	0.58**	-0.25*
Class B			
Before (n = 18)	2.55 (1.46)	3.84 (1.79)	2.24 (1.31)
After (n = 20)	2.96 (1.87)	3.50 (1.78)	2.49 (1.77)
Difference	0.41**	-0.34**	0.25*
Class C			
Before (n = 21)	2.65 (1.61)	3.96 (1.63)	2.44 (1.46)
After (n = 15)	2.57 (1.44)	4.00 (2.07)	2.23 (1.32)
Difference	-0.08	-0.04	-0.21*
Class F			
Before (n = 29)	2.87 (1.50)	3.51 (1.67)	2.64 (1.35)
After (n = 15)	2.49 (1.62)	4.18 (1.82)	2.31 (1.52)
Difference	-0.38**	0.67**	-0.33**

Note: Mean (Standard Deviation); * $p < .05$, ** $p < .01$ (2-tailed); (1) For anxiety, a low score is ideal.

The results by class and aggregated by gender for the second iteration of the survey instruments after the intervention are shown in Table 5. For class B, the nine boys outperform the girls on all three scales. For the confidence and WTC scale data, they are the only group above a '3' and, similarly, below a '3' for anxiety.

The differences between class B boys and girls on all three sub-section scales are all above 1-point – none of the other classes show so great a difference between the boys and the girls. Also, class B boys' confidence and wtc are the highest of any group. Furthermore, anxiety for the class B boys is the lowest of any group of either girls or boys. By looking at the rather small differences between the results for the boys and girls in class A, it appears that gender does not come into play as an important variable. Yet, there are some rather large differences between the boys and girls in class F. While the differences between the boys and girls in class B are much greater, it appears that gender differences can be supported with this data, and that the use of the iPad can account for the much greater gender difference outcome between the class B boys and girls. In other words, these results indicate that the iPad video intervention is quite likely the cause of the obvious increase in confidence and wtc and decrease in anxiety for the class B boys in comparison to the girls in the same class and all of the students in the other classes.

Table 5: Differences in the WTC scale results by gender after the video intervention

	Confidence	Anxiety ₍₁₎	WTC
Class A			
Boys (<i>n</i> = 10)	2.94 (1.86)	4.16 (1.77)	2.56 (1.72)
Girls (<i>n</i> = 11)	2.95 (1.43)	4.01 (1.54)	2.62 (1.59)
Difference	-0.01	0.15	-0.06
Class B			
Boys (<i>n</i> = 9)	3.81 (1.98)	2.65 (1.86)	3.39 (2.07)
Girls (<i>n</i> = 11)	2.11 (1.31)	4.07 (1.37)	1.67 (0.91)
Difference	1.70*	-1.42*	1.72*
Class C			
Boys (<i>n</i> = 7)	2.60 (1.48)	3.68 (1.73)	2.03 (1.41)
Girls (<i>n</i> = 8)	2.54 (1.40)	4.28 (2.29)	2.41 (1.22)
Difference	0.06	-0.60*	-0.38
Class F			
Boys (<i>n</i> = 6)	2.79 (1.67)	3.82 (1.79)	2.66 (1.66)
Girls (<i>n</i> = 9)	2.29 (1.55)	4.42 (1.80)	2.08 (1.37)
Difference	0.50	-0.60*	0.56*

Note: Mean (Standard Deviation); * $p < .01$ (2-tailed); (1) For anxiety, a low score is ideal.

All of the students in each of the classes received the same surveys and *only* the nine boys in class B who were recorded with the iPad responded to the three questions regarding the influence of having been video-recorded. Therefore, a correlational analysis was performed for the three scales of the WTC survey and the three video-related question responses using WarpPLS for these respondents. The results are shown in Table 6. There are very strong correlations between the influence of video responses and confidence and WTC, and a strong negative correlation with anxiety. These results are similar to those found by previous researchers mentioned above.

Table 6: The correlation coefficient matrix for video, confidence, anxiety, and WTC (*n* = 9)

	Video	Confidence	WTC
Video			
Confidence	0.872*		
WTC	0.651*	0.797*	
Anxiety	-0.768*	-0.885*	-0.708*

Note: *correlation is significant at $p < .01$

As mentioned above, only nine students were filmed and only nine students (*n* = 9) replied to the survey question on the influence of video on confidence, anxiety, and WTC. The authors' notes show that five students were shown the video of themselves speaking English. The second survey asked: *Were you video-recorded (with a camera or iPad) during English class?* If the students responded 'yes' they were asked to answer the following three questions: *How much did being video recorded increase your confidence to speak in English?* ($M = 4 .22$,

SD = 1.56), *How much did being video recorded increase your desire to speak in English?* (M = 5.00, SD = 1.32), and *How much did being video recorded reduce your nervousness (anxiety) to speak in English?* (M = 4.11, SD = 1.36). The ‘positiveness’ of these responses must not go unmentioned. The mean scores are higher than any of the responses on either the confidence or desire scales (please see Appendices A & B).

It may be argued that the question format is biased in favor of the hypothesis that video will positively influence confidence and WTC and have a negative influence on anxiety. However, given that the answer choices range from 1 (Not at all) to 6 (Quite a lot), this critique is not valid. The respondents could have easily chosen the ‘1’ option or even a more neutral option, as is common with Japanese survey respondents (see Reid, 1990).

Furthermore, all of the students in the four classes received the same surveys, indicating that the students in classes A and F who were recorded with the video-camcorder could have replied ‘Yes’ on the second survey, but did not. This indicates that they did not recall having been filmed with the camcorder.

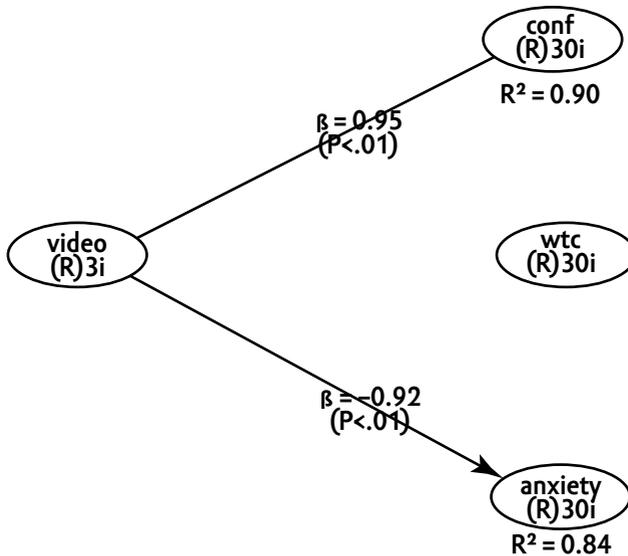


Figure 2. The influence of video recording on confidence and anxiety (n = 9)

The positive influence of the iPad (the variable ‘video’) on confidence and the negative influence on anxiety can be seen in Figure 2. Not only are the standardized beta coefficients quite high, they are both significant at the P = <.01 level using the jackknifing resampling method for a sample of less than 100 (Kock, 2012, p. 12–13). These results show a very strong and statistically significant influence of video on confidence, and a negative influence on anxiety.

Figure 3 shows the positive influence of video on confidence and the negative influence on anxiety when they serve as mediators for WTC. As mentioned above, previous research by Hashimoto (2002) has shown this relationship.

In addition, the model has excellent fit indices: APC = 0.897, P = <0.001; ARS = 0.807, P = <.001; AVIF = 1.000, Good if <5.0. Also, and of most importance, the impact of video not only appears to increase the influence of confidence on WTC, but also lowers the level of anxiety.

Previous research findings showed that the standardized beta coefficient from confidence to WTC was 0.66 ($P = 0.37$) without the influence of video (Ockert, 2013b). Furthermore, the beta for anxiety to WTC was -0.22 ($P = 0.46$) without the influence of the iPad recording and self-viewing. As can be seen in Figure 3, the beta for confidence not only goes up, but is statistically significant. In addition, the negative beta for anxiety goes down, indicating that anxiety decreases. It should be noted, however, that a negative influence – or decrease – in anxiety as a result of the influence of the iPad intervention is good (Ockert, 2013c). This phenomenon is excellent news if it can be replicated and demonstrated to be predictably consistent with larger sample groups in a controlled experiment.

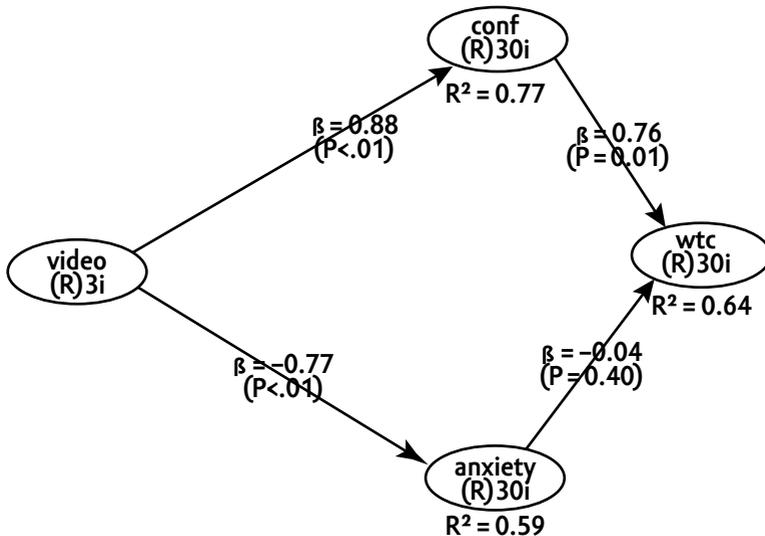


Figure 3. The SEM analysis of video on WTC via confidence and anxiety ($n = 9$)

Of note is the rather high P value from anxiety to WTC. This appears to be odd, especially given the excellent statistical significance of the paths from video to anxiety and confidence, and from confidence to WTC. However, one point that should be noted here is that statistical significance does not necessarily mean that the relationship is ‘meaningful’ (For a full discussion on this topic, see Brown, 2012). In the author’s opinion, the fact that the nine boys in class B appear to have been very positively influenced by the iPad intervention is great news.

The research questions and answers are as follows:

1. Will the use of the camcorder to record students in the classroom influence the affective variables of confidence, anxiety or WTC?
2. Will the impact of recording students with an iPad speaking English have a positive influence on student confidence and WTC, and lower their anxiety?

The class B boys’ results show an increase in confidence and WTC, and a decrease in anxiety in comparison to not only the three other classes but more significantly as compared with

the girls in the very same class. The research results show that only the class B boys showed an increase in confidence and WTC, and a lower level of anxiety. It can be argued that the use of the iPad was the causal variable in this outcome.

Another purpose of this research project is to check for any data-driven paths in the SEM analysis not outlined in the theory-driven questions above. One very strong path exists from video => confidence => WTC, indicating that having the students' view themselves speaking English increases their confidence, which leads to a greater willingness to actually use English in the hypothetical scenarios.

Hypothesis 1 stated: *The use of video to record students will influence student confidence, WTC, and anxiety.* The students in class B report a higher increase in the level of confidence and WTC, and a lower level of anxiety after the intervention compared with the three other classes. Therefore, it can be concluded that the use of the iPad influenced these affective variables.

Hypothesis 2 stated: *Recording students with an iPad and allowing these same students to view themselves speaking English will increase their confidence and WTC, and lower their anxiety.* This hypothesis appears to be correct for class B overall and the boys in particular, especially with regard to anxiety. The SEM results indicate that a beta weight for a given predictor variable (video) is the predicted difference in the outcome variable (on WTC via confidence) in standard units for a one standard deviation increase on the given predictor variable when all of the other predictor variables are held constant. In other words, using the iPad increased confidence, which in turn appears to increase WTC, and also appears to lower anxiety.

There are several limitations within the present study. First, the low number of students ($n = 9$) makes the statistical analysis difficult to generalize beyond the group of students involved in the project. Second, there were no follow up qualitative questions on the influence of video with the students who were recorded and/or able to view themselves speaking English using the iPad as to *exactly* what the influence was that caused them to feel less anxious, more confident and more willing to use English. Finally, the original group of surveys for class B did not indicate specifically which survey instruments were filled out by male or female students – we only know how many boys and girls in total for the first iteration of gathered data. Unfortunately, this fact does not allow for a direct before and after comparison in the differences among the affective variables.

However, we can speculate on why the results are what they are based on the data that is available. As we have seen, the nine male students' responses to the three questions on the influence of video on confidence, anxiety, and WTC were, on average, quite high. This tells us that, without a doubt, both being recorded with the iPad and the self-viewing had a positive impact on these three affective variables.

Conclusions

The students in class B who presented their quiz questions in class were recorded with an iPad. These students show an increase in confidence and WTC, and a decrease in anxiety. Ironically, even though students in classes C and F were recorded with a camcorder, none of the students recalled being recorded. Due to the order selection for presentation of the members of the groups in class B, only male students made presentations and were recorded with the iPad. This was completely by chance and occurred as a result of

the students' choice in the groups of who should present first, second, etc. Naturally, we intended to film all students in class B with the iPad, but time did not permit.

It is regrettable that since the homeroom teacher in class B only reported the number of male and female students in class for the first iteration of the surveys, rather than a case-by-base basis. This makes a direct before and after intervention of the boys in class B impossible. However, the results indicate that *something* positively influenced the affective variables of the students in class B. Given their positive responses to the three questions on the influence of being recorded with the iPad, the author believes that the nine male students in class B – including the five who were able to see themselves speaking English – were positively influenced and this not only alleviated their anxiety, but also boosted their confidence and WTC. However, additional studies in a more controlled experiment need to be carried out that take into account teacher influence, gender, and extraneous variables such as family situation, what type of high school the student(s) wish to enter and the entrance exam(s) associated with each school, sports and club membership, etc.

This study has several implications for teachers. One is that by increasing perceived competence or self-confidence and reducing language anxiety, student WTC may increase. Creating a low-pressure, non-threatening classroom atmosphere to reduce anxiety and working to increase student confidence may be effective in increasing WTC and therefore, frequency of L2 use in general with Japanese JHS EFL students. The use of video had a direct and strong influence on confidence, which in turn had a powerful influence on FL WTC. Therefore, when using video to record students it may be especially effective with Japanese EFL students to increase their confidence and lower their anxiety in order for them to use English. The author believes that future, longitudinal studies which track student progress based on gender, orientations, and their effort/desire to learn English would be beneficial.

Since this study was a preliminary look into the influence of an iPad video intervention on student affective variables, it has several limitations which will need to be addressed in future research of a similar nature. In particular, the small sample size ($n = 9$) stands out since in the past this has proven to be problematic when complex statistical procedures such as regression analysis and SEM are performed. In addition, the only students who were video-recorded with the iPad were male students in a single class. Therefore, this makes any attempt to generalize the results difficult. However, the analysis results and SEM model fit indices are excellent, particularly for the SEM model of video => confidence => WTC.

There are several future directions which would be excellent choices for research projects. For example, replicating the same study and aggregating for gender would be a great start. Second, having different types of media used – sound, video, video no sound – and differing numbers of interventions over a specified period of time would also be great research options.

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Author biodata

David Michael Ockert has worked in Japan from kindergarten to University and graduate-level business courses at multi-national corporations. His research interests are in CLT (TBLT) in a socio-cultural context, and the effects of technology in the classroom on motivation, motives, confidence, anxiety, and WTC. He has a MEd from Temple University and a JLPT Level 2 certificate.

Appendix A

The WTC survey sub-section Cronbach's alpha, mean, and standard deviations

	Sub-section affective variable tested (Whole sub-section Cronbach's alpha)	Confidence* (.94)	Anxiety** (.96)	WTC* (.93)
1)	Asking a Japanese teacher for a copy of an audio recording.	3.24 (1.36)	2.93 (1.39)	2.96 (1.29)
2)	Complaining to a Japanese teacher that the speed of the listening test was too quick to catch.	2.85 (1.67)	3.18 (1.58)	2.58 (1.49)
3)	Complaining to a native teacher that the speed of the listening test was too quick to catch.	2.36 (1.36)	3.68 (1.67)	2.17 (1.16)
4)	Giving a reply for an American television program covering student life in Japan.	2.31 (1.37)	4.57 (1.59)	2.38 (1.64)
5)	Making a telephone call in order to make a reservation at a hotel in English speaking country.	2.34 (1.36)	4.21 (1.58)	2.17 (1.22)
6)	Interviewing a native English speaker for an article in the school paper.	3.17 (1.36)	3.62 (1.44)	2.71 (1.34)
7)	Asking a pair work partner for the time now.	3.85 (1.70)	2.68 (1.43)	3.17 (1.44)
8)	Speaking to a foreigner sitting next to you on the train.	2.16 (1.52)	4.24 (1.67)	2.09 (1.36)
9)	Asking a native English speaking teacher the meaning of a word.	3.55 (1.47)	3.17 (1.44)	3.08 (1.34)
10)	Making a phone call to invite a friend who can speak only English to a party.	2.44 (1.40)	3.69 (1.66)	2.34 (1.27)
11)	Asking a native teacher for a handout given when you were absent from class.	3.05 (1.45)	3.16 (1.52)	2.70 (1.17)
12)	Talking to your pair work partner about a TV program which you watched.	3.09 (1.66)	3.07 (1.55)	2.68 (1.43)
13)	Stand in front of the entire class and talk about a TV program which you watched.	2.24 (1.33)	4.19 (1.73)	1.99 (1.31)
14)	Helping a foreigner that looks troubled because he cannot read a restaurant menu.	2.66 (1.45)	4.06 (1.58)	2.54 (1.39)
15)	Asking a foreigner for the time when you do not know it.	3.06 (1.60)	3.62 (1.57)	2.76 (1.36)
16)	Help a troubled foreigner because he cannot understand what the salesclerk says at the supermarket.	2.61 (1.35)	3.96 (1.49)	2.58 (1.38)
17)	Greet a group of medical professionals who came from the United States to visit your school.	2.00 (1.40)	4.78 (1.61)	1.77 (1.33)
18)	In front of your class, answer a native teacher's questions about your trip during summer vacation.	2.34 (1.37)	4.19 (1.63)	2.08 (1.26)
19)	Stand in front of your class and talk about your memories of your summer vacation for two minutes.	2.21 (1.28)	4.27 (1.71)	1.94 (1.15)

20)	To buy a rare CD sold only overseas, call a CD store in the United States by telephone to order one.	2.39 (1.40)	4.19 (1.67)	2.21 (1.30)
21)	Take a small number of English speaking people sightseeing in Tokyo for one day.	1.96 (1.34)	4.48 (1.65)	1.98 (1.38)
22)	Call your host family and thank them for letting you stay with them.	2.55 (1.36)	4.09 (1.51)	2.54 (1.39)
23)	Tell your pair work partner in English the way to a place using a map.	2.59 (1.45)	3.63 (1.53)	2.45 (1.28)
24)	Say five English words which start with S to your pair work partner.	3.80 (1.68)	2.66 (1.52)	3.23 (1.54)
25)	Ask a native English speaking teacher to copy a CD.	2.64 (1.37)	3.54 (1.58)	2.38 (1.13)
26)	Ask the meaning of a word to a Japanese teacher using classroom English.	2.91 (1.35)	3.21 (1.49)	2.61 (1.15)
27)	Stand and tell your entire class five words using classroom English.	2.61 (1.49)	3.81 (1.67)	2.11 (1.25)
28)	Talk to your pair work partner about your memories of summer vacation for two minutes.	2.49 (1.40)	3.60 (1.68)	2.21 (1.32)
29)	Help a foreigner who looks troubled at the station.	2.43 (1.35)	4.25 (1.61)	2.24 (1.34)
30)	Participate in an English language speech contest for Japanese students. Judges are native speakers.	1.80 (1.24)	4.64 (1.81)	1.64 (1.16)

Adapted from Matsuoka (2004), which was adapted from Sick and Nagasaka (2000).

*A high score on the confidence and WTC scales is ideal. **A low score on the anxiety scale is ideal.

Appendix B

Additional questions on confidence, WTC, and anxiety

Were you video-recorded (with a camera or iPad) during English class?

If yes, please circle from 1 (no influence) to 6 (a lot of influence) for the three questions below.

- Did being video recorded increase your confidence to speak in English?
- Did being video recorded increase your desire to speak in English?
- Did being video recorded reduce your nervousness to speak in English?