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Meeting the challenge of providing flexible learning opportunities: Considerations for technology adoption amongst academic staff

Relever le défi de fournir des occasions d'apprentissage flexibles : considérations pour l'adoption de la technologie par le personnel universitaire

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Abstract

This paper reports on a subset of findings from a larger study investigating resistance from academic staff to the integration of technology with on-campus foreign language teaching at one North American higher education institution. The study revealed that the factors influencing technology adoption paralleled Davis' Technology Acceptance Model's tenets of perceived usefulness and ease of use. Further, this study supports Lai and Savage's (2013) assertion of a lack of attention to the pedagogical affordances of technology when adoption decisions are made by instructors, thus we highlight the need for higher education leaders to determine strategies promoting awareness of the benefits technology-enabled teaching and learning can bring to advance educationally-rich flexible learning opportunities.

Résumé

Cet article traite d'un sous-ensemble de résultats provenant d'une étude plus vaste ayant enquêté sur la résistance des universitaires envers l'intégration de la technologie à l'enseignement en langue étrangère sur le campus dans un établissement nord-américain d'études supérieures. L'étude a révélé que les facteurs ayant une influence sur l'adoption de la technologie coïncident avec les principes du modèle d'acceptation de la technologie de Davis sur l'utilité perçue et la facilité d'utilisation. De plus, cette étude appuie l'assertion de Lai et Savage (2013) d'un manque d'attention envers les affordances pédagogiques de la technologie lorsque les décisions d'adoption sont prises par les formateurs. Nous soulignons donc le besoin, pour les meneurs de l'éducation supérieure, de déterminer les stratégies qui favorisent la connaissance des avantages

de l'enseignement et de l'apprentissage que permet la technologie pour faire progresser les occasions d'apprentissage flexibles et riches sur le plan éducatif.

Introduction

A growing number of higher education leaders are integrating educational technology in their strategic planning. This is in part due to the recent global interest in open and online education manifested by the Massive Open and Online Course (MOOC) movement, coupled with the many challenges faced by higher education institutions to provide flexible learning opportunities offered beyond the traditional brick and mortar classroom (Hagel, Brown, & Davidson, 2010). For decades, technology has been shown to effectively enhance teaching and learning practice particularly in the foreign language discipline (Salaberry, 2001) and the affordances it brings to flexible learning delivery is immense, allowing education to be freed from time and place (Garrison & Kanuka, 2004). For instance, learning management systems (LMS) provide a customizable suite of tools and container to house other technologies that instructors and students can readily use to provide a blend of online and face-to-face course delivery that supplement class time (Siekmann, 1998; Torrisi-Steele & Drew, 2013). The tools and technologies housed within the LMS, such as synchronous video conferencing (Roseth, Akcaoglu & Zellner, 2013) and asynchronous discussion boards allow language learners to collaborate and interact with one another outside of the class meeting time (Cho & Carey, 2001; Godwin-Jones, 2003), freeing up class time for lecture delivery or other activities. Alternatively, class time can be shifted from the dissemination of course content through lectures (McKenzie et al., 2013) and instead focused on student engagement in collaborative activities or discussion.

While there is no shortage of technologies that can help provide a blend of online and face-to-face learning opportunities, higher education leaders are faced with the further challenge of ensuring this technology is diffused and accepted across their campuses (Abrahams, 2010). Higher education leaders therefore need to be aware of the factors that influence technology acceptance in order to achieve their strategic plans of offering more flexible learning opportunities at their institutions.

Literature on Technology Adoption

Numerous case studies that have investigated the use of technology in higher education have yielded a variety of factors that influence the adoption of technology by instructors. Del Favero and Hinson's (2007) study on instructors' adoption of a LMS indicated that adequate training sessions increased confidence levels and the subsequent adoption of the LMS. Similarly, Kessler and Plakans' (2008) study showed that training, practice time, and a collaborative environment improved technology adoption amongst English as a Second Language (ESL) instructors. Collaboration amongst teaching staff was a common factor for technology adoption that emerged in several studies (Davis, 2005; Mwaura, 2003; Oncu, Delialioglu, & Brown, 2008), while mentorship (Kopcha, 2010) and the professional social networks of academic staff (Mirriahi, Dawson, & Hoven, 2012) further helped explain how the sharing of information about technology has led to greater technology adoption. Other studies have discovered that foreign

language instructors chose to use certain technologies because they are convenient for their students (Arnold, 2007) or help to engage and to motivate the class (Lam, 2000).

While the previously noted case studies highlight that there are a vast variety of factors influencing the technology adoption decisions of academic staff, technology adoption process models help to methodologically explain the patterns that emerge when individuals in a variety of contexts are faced with the acceptance or rejection of particular technologies. Davis' (1989) Technology Acceptance Model (TAM) is one such process model that was developed to explain individuals' general use of computers. TAM posits that, "two particular beliefs, *perceived usefulness* and *perceived ease of use*, are of primary relevance for computer acceptance behaviours" (Davis, Baggozi, & Warshaw, 1989, p. 985). Perceived usefulness refers to how useful an individual feels that a computer will be for them to enhance and complete their task, while perceived ease of use refers to the amount of effort required to use the computer effectively. This means that for TAM an individual's primary interest is in how useful a computer can be in the completion of a task, while a secondary interest is the amount of effort required to utilize the computer (Davis, 1989). As Davis (1989) posits, "although difficulty of use can discourage adoption of an otherwise useful system, no amount of ease of use can compensate for a system that does not perform a useful function" (p. 333). Therefore, perceived usefulness is considered to be more critical than perceived ease of use when individuals are selecting whether to use the computer or not.

Although TAM was initially developed to explain computer use, it has been used as a theoretical process model to explain the acceptance of various technologies and information systems in a variety of contexts (Gao, 2005; Legris, Ingham, Collerette, 2003; Venkatesh & Davis, 2000). Higher education is one such context in which TAM has been used to describe a variety of technology acceptance. For example, Landry, Griffeth, and Hartman (2006) utilized TAM to investigate students' perceptions of various tools available within their institution's LMS, and concluded that students preferred to use tools that were useful and easy to use. Their study therefore argued that TAM is appropriate for exploring technology adoption within an academic setting. Similarly, Edmunds, Thorpe and Conole's (2012) study of students' perceptions of ICT use in work, social, and course settings, utilized the TAM model to show that perceived usefulness and ease of use are critical aspects of students' attitudes towards technology use. Together, Landry et al.'s (2006) and Edmunds et al.'s (2012) studies serve as important examples of the TAM model's robustness and appropriateness for understanding technology acceptance in an academic setting.

While both Landry et al.'s (2006) and Edmunds et al.'s (2012) studies utilized TAM to better understand students' perceptions of technology use, Park, Lee, and Cheong (2008) utilized TAM to study instructors' adoption of electronic courseware (eClass). Park et al. used a survey instrument specifically designed to discover the reasons for the adoption of eClass by academic staff. Following the tenets of TAM, their study showed that the choice by academic staff of whether to use eClass depended on whether they perceived it to improve students' learning experiences while concurrently offering ease of use by not requiring much additional effort. However, while Park et al.'s study focused specifically on the acceptance of one particular technology, eClass, few studies have explored how TAM may be applicable to understanding instructors' technology adoption decisions in general. Therefore this paper discusses the findings

from a case study on the overall factors influencing technology adoption amongst foreign language instructors in one higher education institution and how they relate to TAM.

Research Setting and Participation

This paper reports on a subset of data from a larger investigation of factors influencing foreign language instructors' technology adoption decisions. This qualitative case study took place in a large research-intensive North American higher education institution with an enrolment of over 47,000 students and approximately 4000 academic staff. Reflecting the trends throughout higher education, academic staff were comprised of sessional and contract instructors, early career academics, and tenured professors. A case study approach was appropriate for this study since the research design did not have any control over the behaviours of the participants (Yin, 2009) and had a sample population from a single setting (Eisenhardt, 1989). This particular higher education institution was an appropriate research setting for this study because senior administration had, since the late 1990s, provided a LMS as an optional technology for instructors to use to supplement their classroom instruction. Although the LMS is not a novel tool for foreign language instructors at this institution, there continues to be a range of acceptance levels. The foreign language disciplinary area was specifically selected due to its history of computer-assisted language learning supplementing classroom pedagogy (Salaberry, 2001). Hence, purposive sampling was used to identify and invite all instructors who taught in the foreign language discipline at this particular higher education institution in the 2011-2012 academic year (N = 75). With a response rate of 31%, 23 instructors from across three foreign language academic departments representing a range of technology adoption and teaching experience volunteered to participate in the study.

Data Collection and Analysis

In order to conduct an intensive investigation into the factors influencing the technology adoption decisions of the participating instructors, a qualitative data collection approach was taken. According to Creswell (2009), qualitative research allows for an in-depth discovery of individuals' behaviours helping to reveal emerging patterns. Data was collected through semi-structured interviews providing an opportunity for the participants to elaborate and explain their reasons for selecting a particular technology (Cohen, Manion, & Morrison, 2007; Rapley, 2001). In order to allow participants the opportunity to elaborate upon their responses, the interviews were conducted in person (Cohen et al., 2007). Participants were specifically asked to share which educational technologies they currently or previously had used and to explain the reasons for their adoption. In order to ensure accuracy of content, prior to any analysis the interviews were audio recorded, transcribed and then these transcripts were sent to instructors for their review (Carlson, 2010). To maintain participants' privacy, their names and the names of the colleagues they mentioned during their interview were replaced with non-identifying codes after they had completed the review of their transcripts and prior to any analysis.

These 23 interview transcripts resulted in copious amounts of textual data that were coded and categorized in Atlas.ti, a qualitative content analysis software that allowed the data to be analyzed in manageable and comprehensible groupings. The codes were derived from the data responsively rather than being created pre-ordinately (Cohen et al., 2007). This meant that the factors that the participants mentioned influencing their technology adoption decisions were

coded post hoc and similar codes were clustered into code families. Each code was used only once per transcript to help determine commonalities between participants' responses. Hence, after the coding and categorizing process, the frequency of each code was calculated in order to determine how many participants shared a similar response. This was the primary process through which we discerned patterns in the data. Emerging patterns were revealed in Atlas.ti by utilizing its visual displays, which showed codes within a code family alongside their frequency of use.

Findings

The primary intent of this study was to discover the factors influencing the technology adoption decisions of academic staff in the foreign language discipline. Figure 1 illustrates the code family "Factors Influencing Technology Adoption" that presents 13 distinct codes mentioned by the participants as influencing factors. The total number of participants who shared in their interviews that their technology adoption decisions were based on a particular factor is indicated at the end of each code.

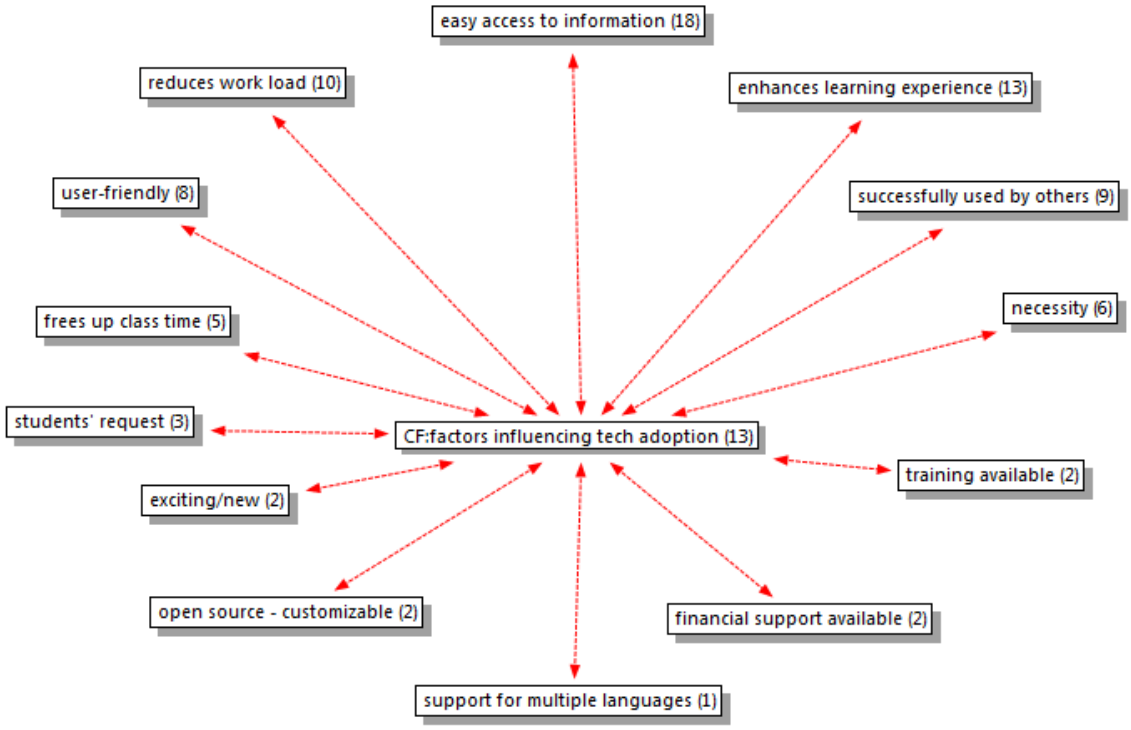

Figure 1. Network diagram of all factors influencing technology adoption.

As can be seen in Figure 1, several factors were commonly expressed by participants while others were only mentioned by one or two participants. We will focus on these five most commonly shared factors in this case study:

- easy access to information (18)
- enhances learning experience (13)
- reduces work load (10)
- successfully used by others (9)
- user-friendliness (8)

The majority of participants (18 in total) revealed that a key factor that contributed towards their decision to use a given technology was its capability to assist them in distributing information to their students in a readily accessible manner. As one participant shared:

> 'I put homework there [the LMS] so the students can check whenever. If I send them by email, some students just maybe, you know, delete it by accident, so I just put it in the LMS so they can find it anytime.' [12C]

Another participant, 13B, echoed this sentiment: "It [the LMS] gives all students, even those who miss classes, easy access to important class material." Likewise, a second participant expressed using the LMS for disseminating information:

> 'So that was the main use I had - simply distributing. You know, I do a correction sheet for a quiz, I have to distribute that, I don't want to put it up on the web because I don't want everybody to see this so I put it through the LMS.' [2A]

Similarly, a third participant, 11C, indicated using the LMS for providing formative assessments for students to do on their own time: 'Some exercises they do it at home and are supposed to check their answers.' A fourth participant, 1C, noted the use of the LMS for sharing answer keys and files: 'I just upload answer keys and students can check it by themselves. And also sometimes I ask them to download a file and then bring it to the class.' Another participant also indicated that the LMS allowed students to easily access their grades:

> 'For example, the grade book, the students can monitor their achievement, they don't have to ask me or they don't have to record their own result themselves.' [8C]

These examples illustrate the importance of the technology having the capability to allow easy access to information.

The second most frequently mentioned influencing factor was the technology assisting with enhancing students' learning experience. Thirteen participants expressed that they carefully considered whether a technology would improve the learning experience by either helping students meet the learning outcomes or by engaging them with the course material. As one participant explained:

> 'I included a forum, because there are some cases that the students could discuss in that forum. In that way, I could see the interaction of a group of students and that was very useful for that course.' [3A]

Similarly, another participant who had recently begun to include blog activities described:

> 'I went and looked at what other possibilities I have to make the class more interesting in the sense that, you know, to make it more creative and I think we have to keep up with all this because students are using all these things and if you want to talk the same language as them and make your classes interesting, you have to go and look at the these things.' [5B]

A third participant shared that the main factor for technology adoption is whether it can help students achieve the intended learning outcome or goal:

> 'The main one is to see the technology as a means to an end and not the end itself. So, I ask myself, *what's my goal here and what's the best way to achieve the goal?* Sometimes, just because there's a new technology it isn't the best means to my end, the goal.' [3B]

However, a participant indicated that technology integration into a course is based on finding strategies for engaging students to help them stay on task:

> 'I do think that it is one of our biggest challenges to make your teaching interesting…. It is difficult to get them [students] to focus and to stay focused and by that I don't mean the 50 minutes in class. I mean also going home or going wherever and with all those distractions available not to forget to do their homework. So, that's what I think is the criteria.' [6B]

These responses indicate that approximately half of the participants assessed whether it may help to enhance their students' learning experience before adopting a technology. This assessment took the form of considering the technologies utilized by the students for non-educational purposes and then integrating these technologies with the course material and outcomes in order to promote a richer learning experience.

The third most common factor was the capability of a technology to reduce an instructor's workload. Ten participants explained in their interviews that they selected to use a technology based on whether it would lessen their administrative duties. For instance, some participants noted that they had chosen to use the LMS for course material distribution because it eliminated the need to print handouts or make photocopies and, instead, transferred this task to students. As one participant explained:

> 'It makes your life a little easier, for the teacher, you know? You don't have to take a lot of print outs with you. Right now, I do not make any copies for students. I ask them to please go online and print out everything.' [2B]

Participant 13B also noted this same benefit: 'Prior to the LMS, I had to print every handout and bring it to class for every student. Now, they could always check the LMS or print the handouts themselves.' Others discussed that they had decided to use the LMS because of its functionality to have automated grading of online quizzes, thereby minimizing their marking time. One participant, 6B, shared: 'I thought it was very beneficial, those LMS tests, in terms of taking the marking load away from the instructors.' Another participant had the same sentiment:

> ‘We do have a lot of language learners and very limited T.A. time. So, this will really help the teachers to save time in marking all those objective answers, which could be done by the system [the LMS].’ [7C]

The lessening of these administrative duties and the resulting sense of a decreased workload thereby served as an important factor in the participants’ decisions to adopt a technology in their teaching.

The fourth most influential factor recounted by nine participants was the knowledge that others had successfully used a particular technology in their courses. For example, one participant, 2A, shared: ‘I gained an appreciation for blogging through co-teaching a course. I would never have really understood why it’s an effective tool without doing this course with 8A.’ Likewise, another participant, 4A, explained: ‘I do know that 8A uses Wiki’s and I’ve been playing with the idea for my own course for the last few weeks.’ Both of these examples illustrate that some of the participants considered using a technology after hearing about its successful usage by their colleagues.

The fifth most influential factor related to the technology’s user-interface and ease of use. Eight participants revealed that they chose to adopt a technology if they felt it was user-friendly and did not require much effort. As one participant commented: ‘Well, you know, obviously if it’s user friendly or not and if you get the impression that it can deal with your problems quickly without too much fuss.’ [2A]. The ease of using a technology without much effort was also noted by another participant, 5C: ‘Ease of putting things up. How easily can you put the documents up. How easily can you put up a link.’ Another participant indicated not relying on technology too extensively in class due to previous technical problems:

> ‘Knowing that it [technology] is going to be there when I want it to turn on. Fifty-minute classes are short. You have to pack in so much. To spend five or ten minutes attempting to get the technology to work is not good.’ [3B]

This sense of the usability of the technology to quickly address pedagogical or administrative issues thereby represents an important factor in the participants’ decisions to adopt a technology in their teaching, whether online or in the classroom. In addition to the above five most highly mentioned factors, Figure 1 presents eight other factors influencing the participants’ technology adoption decisions. While these factors were considered to be important for fewer than seven participants, they do illustrate the wide variety of factors that influence the technology selection decisions of academic staff.

Discussion

The findings from this study report that through an analysis of the participants’ interviews and the frequency of specific codes, the following three factors are most critical for selecting to use a technology:

- The technology should facilitate easy access to information.
- The technology should enhance the learning experience by allowing instructors to design activities that increase student engagement or help to meet the learning outcomes of the course.
- The technology should lessen the workload of the instructors by reducing administrative tasks.

These three factors parallel TAM's primary criterion of perceived usefulness. According to Davis (1989), perceived usefulness refers to individuals feeling that technology is able to enhance their job performance or allowing them to do their job more easily. Being able to easily provide information to their students, enhance their learning, or having fewer administrative tasks such as marking or photocopying, encourages instructors to adopt a particular technology because they find it useful. These three most commonly mentioned factors reveal that participants will select the use of a technology if they consider it to be useful for teaching and learning purposes, with the dissemination of information and the decrease of administration being understood as potentially resulting in enhanced learning experiences for students. Furthermore, just as TAM emphasizes that the second most important criterion for technology acceptance is its perceived ease of use (Davis, 1989), the results from this study illustrate that fewer participants felt that it was critical for their technology to be user-friendly than to be useful. Participants felt that while a technology could be user-friendly and thereby decrease the effort or thinking required to complete a task, it was much more critical that the technology actually enhance the task. Therefore, these results are consistent with TAM and further reinforce the value of this model in understanding foreign language instructors' technology adoption decisions.

Perhaps what is more interesting is the way in which the results reveal a particular division between pedagogy and course administration amongst instructors that is worth further attention. If "pedagogy" is here understood to denote direct teaching activities, and "course administration" is understood to denote necessary activities secondary to teaching, there is a clear indication in the data of an emphasis on the latter in the making of technology adoption decisions. It can thereby be observed that instructors appear to view the secondary course administration outcomes of instructional technology as most salient. It is clear from the frequency of results in Figure 1 that pedagogically focused responses were quite limited in number. Only one code can be claimed to directly and clearly invoke teaching: "enhances learning experiences." This code could only be applied to 13 respondents while 18 respondents cite the administrative task, "dissemination of information". It is therefore plain to observe that nearly half of the respondents failed to note that pedagogical concerns were central to their decisions about instructional technology adoption. This observation in the findings is startling as one might reasonably expect that all of the respondents would cite pedagogy as a critical factor motivating instructional technology adoption. However, the administrative task of "dissemination of information" which perceives a LMS as primarily an information-transfer system (Lane, 2009), was cited with greatest frequency. This observation can partially be explained by Lai and Savage's (2013) assertion that many LMS tools may dictate the rationalization for usage rather than promote creative pedagogy or pedagogical considerations. In those rare instances when pedagogy is a consideration, it seems prudent to require that the resulting pedagogy code be further subdivided in order to capture the variation of concerns being considered.

The findings from this study do not support this reasonable assumption that pedagogical concerns would be the most critical motivating factor. Instead, the respondents were disproportionately concerned with administrative efficiency gains as has come to be expected in traditional scholarship about LMS adoption amongst instructors (Coates, James, & Baldwin, 2005; Siemens, 2006; Lane, 2009; Lai and Savage, 2013). Why might this be so? Several possibilities exist for this emphasis upon administrative tasks. First, it might be the case that the instructors who participated in this case study are sufficiently comfortable with their own teaching methods that substantive pedagogical changes through the introduction of an instructional technology do not figure prominently within their consideration. Second, it might be the case that these instructors are already aware of the pedagogical benefit of these new technologies, or more problematically, these instructors have some measure of blind faith in the pedagogical benefits of these new technologies, resulting in either case as they not deeming it necessary to gauge these benefits in advance of adoption. Third, the instructors may not fully realize the non-administrative contribution such technologies can make, or alternatively the instructors are all too aware of the limitations of a generic institutional LMS as more of a container for course materials than as a suitable tool for promoting the necessary interactions required in language learning, thus making them more likely to consider the most obvious information dissemination impact of the technology. These three possibilities could be referred to as the pedagogical status quo benefit, the pedagogical accepted benefit, and the pedagogical most obvious benefit. Which of these is most prominent in the minds of the given instructors is unclear from the data. In addition to the tenets of the TAM model, perceived usefulness and perceived ease of use, we thus conclude that there should also be significant attention given to the division between administrative benefits and pedagogical benefits for instructional technology adoption. In order to ensure this attention is paid to the division between these types of benefits, the instructors may be required to take on the role of educational designer in as much as that of academic (Torrisi-Steele & Drew, 2013) and hence the need arises for higher education leaders to ensure robust professional development services are accessible to academic staff that clearly demonstrate the pedagogical affordances of available instructional technologies.

By identifying the key factors that influence foreign language instructors' technology adoption decisions, this study draws much needed attention to the specifically pedagogical dimensions of technology adoption. Utilizing TAM can be a cost-effective way for higher education institutions to short-list potential technologies (Gao, 2005) as decisions would be made based on whether academic staff might perceive a technology to be useful and therefore more likely for successful adoption. These short-listed potential technologies could then be further assessed on their pedagogical benefits once academic staff better recognize the distinction between the types of benefits available. This would thereby allow strategic plans for flexible learning opportunities for language learners to account for the complexities of successful instructional technology adoption.

Limitations and Future Directions

The major limitation of this study is that the findings cannot be readily applied to a wide population of language instructors since only the perceptions of foreign language instructors toward a LMS at one higher education institution was explored. To be able to better generalize TAM as a sound framework for understanding language instructors' technology adoption decisions and making technology selections that would result in greater acceptance, a

comparison of adoption decisions for multiple instructional technologies at one higher education institution followed closely by cross-institutional studies are required. This would allow for cross-comparison and may support or refute the findings in this study.

A second limitation refers to the qualitative case study design and the limited sample population. Future studies with a greater sample population will provide opportunities for using survey instruments to determine whether instructors' technology adoption decisions are statistically consistent with TAM's criteria of perceived usefulness and ease of use, or if other factors better explain and predict this technology adoption. The third and final limitation refers to the accuracy of the self-reported data collected during the interviews. Participants may have felt inclined to respond in a way that was most flattering to their own teaching, resulting in the data being affected by social desirability bias (Beretvas, Meyers, & Leite, 2002). Future studies that involve collecting self-reported data through either surveys or interviews should also include a social desirability scale such as the one developed by Crowne & Marlowe (1960) to determine the possible extent of biased information the participants provide.

Despite the limitations encountered, this study adds to the scholarship of teaching and learning by revealing some of the general factors perceived by foreign language instructors to be critical for influencing their technology adoption decisions. In particular, the findings having similar themes as the tenets of Davis' (1989) TAM model further emphasizing its potential for being a framework for higher education leaders to utilize in selecting technologies that will be successfully adopted. This in turn will allow higher education leaders to be one step closer to attaining their strategic goal of offering flexible learning opportunities. While future studies with consistent findings are required to further support TAM as a model for understanding foreign language instructors' technology acceptance, the study reveals three extremely influential factors:

1. the capability for a technology to facilitate easy access to course information,
2. the capability for a technology to enhance the learning experience of students, and
3. the capability for a technology to lessen the administrative workload of academic staff.

Most poignant in these three factors influencing technology adoption is the consideration, or lack thereof, of pedagogical benefits. It could very well be that academic staff focus so little on the benefits to pedagogy because they are comfortable with their teaching, because they are confident of the added benefit to that teaching provided by technology, or perhaps most alarming because they are not being given adequate professional development with respect to the specific pedagogical benefits of the instructional technology (Bair & Bair, 2011). This study therefore begins to reveal the need for strategies to better inform foreign language instructors of the pedagogical affordances of technology to aid in supporting educationally rewarding flexible learning opportunities.

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