THE EVOLUTION OF TECHNOLOGY ACCEPTANCE MODEL (TAM) AND RECENT PROGRESS ON TECHNOLOGY ACCEPTANCE RESEARCH IN ELT: STATE OF THE ART ARTICLE

by:
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Abstract:
The vast development of Information and Communication Technology (ICT) improves the integration of technology for the academic purpose. This phenomenon then raises an issue of technology acceptance, which becomes an interesting field of investigation for many scholars. In this respect, Technology Acceptance Model (TAM) has proven to be a robust, powerful, and parsimonious framework for predicting user acceptance of technology integration in various fields (Lai, 2017; Rondan-Cataluna et al., 2015). Although there is a lot of research studies reported the use of TAM and its developed versions in investigating the technology acceptance in the educational field, there is no publication that trying to map current studies which focus on educational technology acceptance research especially in ELT. Based on the needs of providing such information, this article would present the state of the art of the current research trends on the application of TAM framework in investigating ICT integration acceptance in ELT. The main part of this article would describe the evolution of TAM framework, followed by the discussion of recent research results concerning the technology acceptance, and the future trends of technology acceptance research in ELT. This state of the art article is expected to inspire other researchers to conduct further studies on technology acceptance in ELT and also suggest the ELT practitioners about the current and future trends in technology integration for academic purpose.

Keywords: English Language Teaching (ELT), Technology Acceptance Model (TAM).

INTRODUCTION
Technology acceptance research has long been practiced in various fields, such as economy, business, health, and also education that had been reported by various research reviews synthesis (Rondan-Cataluña et al., 2015; Venkatesh et al., 2016; Lai, 2017). Most of the studies reported are the result on the investigation of the users’ acceptance of a new system to be implemented in a working environment and also the factors that might contribute to the users’ intention to use the system introduced. Most of those studies use the Technology Acceptance Model (TAM) and its developed versions including TAM1, TAM2, TAM3, Unified Theory of Acceptance and Use of Technology (UTAUT1) and UTAUT2 as a research framework to explore the users’ acceptance behavior. TAM itself was initially introduced by Fred D. Davis in 1986 and continuously developed until the introduction of UTAUT2 in 2012. However, although there are a lot of research reports on the use of TAM in the educational field, there are limited number of studies reported which are...
done in ELT context. Therefore, this state of the art article sought to fulfill this information gap by providing the evolution of TAM, recent progress of TAM application in ELT context and also the research gap in the field of investigation. The implication for ELT practitioners and other researchers in ELT also is provided at the end of this article.

THE EVOLUTION OF TAM
Technology Acceptance Model (TAM)

The main issue that initiated the development of TAM is the lack of measurement scale that can be used to predict user acceptance of technology e.g. computer, at that time. Therefore, Davis (1986) proposed Technology Acceptance Model (TAM) which was adapted from the Theory of Reasoned Action (TRA) by Martin Fishbein and Icek Ajzen in 1975. TAM is specifically developed for modeling the user acceptance of information systems (Davis et al., 1989). TAM can be used to predict the technology usage and expected to be beneficial for vendors who would need to know the users’ requirement and the information system manager within the user organization who need to evaluate the new technology or system design offered by vendors (Davis, 1989: 320).

There are two specific variables that were developed and validated in constructing TAM, namely ‘perceived usefulness’ (PU) and ‘perceived ease of use’ (PEOU). PU is defined as “the degree to which a person believes that using a particular system would enhance his or her job performance.” This definition was generated from the word ‘useful’: “capable of being used advantageously” (Davis, 1989: 320). Besides, PEOU is defined as “the degree to which a person believes that using a particularly system would be free of effort.” This definition was rooted from the word ‘ease’: “freedom from difficulty or great effort” (Davis, 1989: 320). These two variables were hypothesized to be the fundamental determinants of user acceptance.

PU and PEOU have three dimensions each. The dimensions of PU variable are job effectiveness, productivity & time saving and the importance of the system to one’s job. The final proposed scale items to assess perceived usefulness are related to work more quickly, job performance, increase productivity, effectiveness, makes job easier, and useful (Davis, 1989: 325). Besides, the dimensions of PEOU are physical effort, mental effort and perception on how easy the system can be learned. Then final proposed scale items to assess perceived ease of use are relate to easy to learn, controllable, clear and understandable, flexible, easy to become skillful and easy to use.

Technology Acceptance Model 1 (TAM1)

TAM1 was introduced by Venkatesh and Davis (1996) in an article that investigates the antecedent of perceived ease of use. TAM1 in figure 2
shows the omission of ‘Attitude’ (A) which mediate the relationship between PU and PEOU on ‘Behavior’ (B) in the previous model. The A variable was omitted because it does not fully mediate the effect of PU and PEOU on B (Davis, 1989:335).

Figure 2. Technology Acceptance Model 1 (TAM1) (Venkatesh & Davis, 1996:453)

Technology Acceptance Model 2 (TAM2)

Venkatesh & Davis (2000) develop and tests a theoretical extension of TAM which is called TAM 2. TAM 2 explains PU in terms of two external variables, namely ‘social influence processes’ and ‘cognitive instrumental processes’ which has proven to be significantly influenced user acceptance (Venkatesh & Davis, 2000:186). The social influence processes include subjective norms (as in TRA), voluntariness, social influence, images, and experience, while the cognitive instrumental process includes job relevance, output quality, result demonstrability, and PEOU.

The operational definitions of the variables constructing ‘social influence processes’ are; (1) ‘Subjective norms’ is defined as “person’s perception that most people who are important to him think he should or should not perform the behavior in question” (Fishbein and Ajzen 1975: 302 in Venkatesh & Davis, 2000:187), (2) ‘Voluntariness’ is defined as “the extent to which potential adopters perceive the adoption decision to be non-mandatory” (Agarwal & Prasad, 1997; Hartwick & Barki 1994; Moore & Benbasat 1991 in Venkatesh & Davis, 2000:188), (3) ‘Social influence’ is defined as “influence to accept information from another as evidence about reality” (Deutsch & Gerard, 1955: 629 in Venkatesh & Davis, 2000:189), and (4) ‘Images’ is defined as “the degree to which use of an innovation is perceived to enhance one’s . . . status in one’s social system” (Moore & Benbasat, 1991:195 in Venkatesh & Davis, 2000:189).

The operational definitions of the variables constructing ‘social influence processes’ are; (1) ‘Job relevance’ is defined as “an individual’s perception regarding the degree to which the target system is applicable to his or her job” (Venkatesh & Davis, 2000:191), (2) ‘Output quality’ is defined as “how well does a system could perform a task and the degree to which those tasks match the job goal” (Venkatesh & Davis, 2000:191), (3) ‘Result demonstrability’ is defined as “tangibility of the results of using the innovation” (Moore & Benbasat, 1991: 203 in Venkatesh & Davis, 2000:192) and (4) PEOU is still consistent with previous definition. Figure 3 illustrates the relationship among variables in TAM2.
After the introduction of TAM2 by Venkatesh & Davis (2000), in the same year, Venkatesh also publish an article concerning the determinants of PEOU which was actually already introduced in Venkatesh and Davis (1996). The determinants of PEOU include two frames, namely ‘anchoring’ and ‘adjustment’. ‘Anchoring frame’ is defined as “user’s initial or general belief about computer and computer usage,” which including the constructs of ‘control’, ‘intrinsic motivation’, and ‘emotion.’ The construct of ‘control’ are perceptions of internal control or computer self-efficacy and perceptions of external control or facilitating conditions. The construct of ‘intrinsic motivation’ is computer playfulness. The construct of ‘emotion’ is computer anxiety. Besides, ‘adjusting frame’ is defined as “belief that is shaped based on direct experience with the target system” which includes ‘perceived enjoyment’ and ‘objective usability’ (Venkatesh, 2000:346). Figure 4 illustrates the relationship among the anchoring frame, adjusting frame and PEOU. Then, in TAM3 as illustrated in Figure 5, Venkatesh and Bala (2008: 280) combine the whole determinants of PU and PEOU in a single model which also shows new tested moderating effects on the relationship between ‘computer anxiety’ and PEOU, PEOU and PU, PEOU and BI.
Unified Theory of Acceptance and Use of Technology (UTAUT)

Unified Theory of Acceptance and Use of Technology (UTAUT) was formulated by Venkatesh, Morris, Davis, & Davis (2003). UTAUT is the fusion of eight prominent models that are used to predict the user acceptance behavior. Those models are; (1) Theory of Reasoned Action (TRA), (2) Technology Acceptance Model (TAM), (3) Motivational Model (MM), (4) Theory of Planned Behavior (TBP), (5) Combined of TAM and TBP (CTAM-TBP), (6) Model of PC Utilization (MPCU), (7) Innovation Diffusion Theory (IDT), and Social Cognitive Theory (SCT).

Venkatesh, Morris, Davis, & Davis (2003) conducted several steps in formulating UTAUT, those are; (1) reviewing user acceptance literature and research and discuss the eight prominent models, (2) comparing the eight models and their extensions empirically, (3) formulating a unified model that integrated elements across the eight models, and then (4) validate the unified model. The final validated unified model comprises four main determinants of intention and usage behavior and four moderators of the main relationships (Venkatesh, Morris, Davis, & Davis, 2003:425). Figure 6 shows the relationships among the construct and variables in UTAUT.

Based on the illustration above, the four unified determinants of intention and usage are ‘performance expectancy’, ‘effort expectancy’, ‘social influence’, and ‘facilitating conditions.’ The root construct of ‘performance expectancy’ are perceived usefulness, extrinsic motivation, job-fit, relative advantage and outcome expectation. The root construct of ‘effort expectancy’ are perceived ease of use, complexity, and ease of use. The root construct of ‘social influence’ are subjective norms, social factors, and image. The root construct of ‘facilitating conditions’ are perceived behavioral control, facilitating condition, and compatibility. While the four main relationship moderators are ‘gender’, ‘age’, ‘experience’, and ‘voluntariness of use’ (Venkatesh, Morris, Davis, & Davis, 2003).

Unified Theory of Acceptance and Use of Technology 2 (UTAUT2)

UTAUT2 is the extension of UTAUT in a sense that there are three additional constructs that are incorporated into the previous Unified Theory of Acceptance and Use of Technology. Those three additional constructs are ‘hedonic motivation’, ‘price value’, and ‘habit’. ‘Hedonic motivation’ is defined as “the fun or pleasure derived from using a technology.” ‘Price value’ is defined as “consumers’ cognitive tradeoff between the perceived benefits of the applications and the monetary cost for using them” (Dodds et al. 1991 in Venkatesh, Thong, Xu, 2012: 161). ‘Habit’ is defined as “the extent to which people tend to perform behaviors automatically because of learning” (Limayem et al. 2007 in Venkatesh, Thong, Xu, 2012: 161).
In the development of UTAUT2, the investigation also focused on the role of ‘gender’, ‘age’, and ‘experience’ in moderating the relationship performed by ‘hedonic motivation’, ‘price value’, ‘habit’, and also facilitating condition toward ‘behavioral intention’ and ‘use behavior’. There are several statements hypothesized based on these investigated moderating relationship, those are: (1) the effect of facilitating conditions on behavioral intention will be stronger among older women in early stages of experience with a technology, (2) the effect of hedonic motivation on behavioral intention will be stronger among younger men in early stages of experience with a technology, (3) the effect of price value on behavioral intention will be stronger among women, particularly older women, (4) the effect of habit on behavioral intention will be stronger for older men with high levels of experience with the technology, (5) the effect of habit on technology use will be stronger for older men with high levels of experience with the technology, and (6) the effect of behavioral intention on use will be stronger for consumers with less experience. Figure 7 illustrates the relationships among variables in UTAUT2.

Figure 7. Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) (Venkatesh, Thong, Xu, 2012: 160)

If we focused on the specified technology acceptance investigated along the evolution of technology acceptance model, there is a gradual shift from investigating the user acceptance of computer-based technology toward the behavioral usage of mobile-based technology. In developing the original TAM, the technologies investigated are file (text) processing and editing software and electronic mail system (Davis, Bagozzi, & Warshaw, 1989; Davis, 1989; Davis, 1993). TAM1 which is introduced in 1996 also investigates the college students’ acceptance of word processing and spreadsheet software (Venkatesh, & Davis, 1996). TAM2 which is introduced in 2000, investigated the employee acceptance of proprietary software, company or operational business system, customer account management system, financial system, online-help desk system, multimedia system for property management, company payroll application, etc. (Venkatesh & Davis, 2000; Venkatesh, 2000). TAM3 still deals with the acceptance of IT systems applied in the development of TAM2, it is more directed for business use of technology (Venkatesh, Bala, 2008). The fusion of eight mainframes of user acceptance framework to develop UTAUT in 2003 was also gone through a validation based on an investigation of two computer-based system software; financial system and user account system (Venkatesh, Morris, Davis, & Davis, 2003).

A shift of technology focus could be seen in the development of UTAUT2 in 2012. UTAUT2 gives emphasis on the acceptance and use of mobile internet technology in the customer context. The mobile internet technology investigated
was e-government services system, which provides such services including filing tax returns, booking public facilities, checking traffic information, appointment booking for various government services, and renewal of driving licenses (Venkatesh, Thong, Xu, 2012). It shows that, in the previous development, starting from TAM until UTAUT, the investigation focus was in computer-based technology, while in the development of UTAUT 2 the focus is shifted to mobile-based technology. Figure 8 illustrates the evolution of technology acceptance framework and focus of technology investigated in its initial development and testing.

RECENT PROGRESS ON TECHNOLOGY ACCEPTANCE RESEARCH IN ELT

The evolution of technology acceptance framework influences the current trend of technology acceptance research in various fields, especially education. Based on the recent development of UTAUT2, research on technology acceptance in general education field all around the world are mostly focused on the acceptance of mobile-based learning technology (Ahmed & Kabir, 2018; Lebzar & Jahidi, 2017; Chaka & Govender, 2017, Alharbi, et.al. 2017; Alzaidiyeen, 2017; Ali & Arshad, 2016). Besides, there are also studies that investigate the technology acceptance in a bigger educational scope, such as classroom and school management system (Wei, et.al, 2016; Zyad, 2016).

The applications of UTAUT and UTAUT2 framework in predicting user acceptance of mobile technology in general education field raise various findings which support the premises offered by those frameworks. Chaka & Govender (2017) states that ‘performance expectancy’, ‘effort expectancy’, ‘social influence’, and ‘mobile learning conditions’ are positively correlated and significantly predict Nigerian college students’ intention towards m-learning. These findings are also confirmed by Ahmed & Kabir (2018) who states that that UTAUT2 model constructs are significant predictors for the acceptance of smartphone as m-learning tools among university students in Bangladesh, where there is an equal acceptance showed by man and woman users. He also found that younger age group students (18-20) are potential users of mobile technology, so it is suggested m-learning would be more effective if it is applied to the students in those ages.

While there are many reports on the application of UTAUT and UTAUT2 in the education field, research that investigated technology acceptance in the field of ELT is relatively rare. A synthesis article made by Venkatesh, Thong, Xu (2016), which present a summary of the application of UTAUT from 2007 to 2014, does not mention any studies conducted in ELT context. There are 4 out of 11 total application of UTAUT model recorded in
the synthesis which is done in educational context, but none of them are especially done in English Language Teaching context (Venkatesh, Thong, Xu, 2016: 333). Therefore, to fulfill this information gap, I have collected several published studies on the application of either TAM or its other developed versions including UTAUT to investigate the technology acceptance in ELT. The collected research studies are ranging from the publications of 2014 to 2017. Table 1 below provides information about the authors, acceptance model used, users, technology investigated, language skills, research location, and research result.

Table 1 Summary of TAM & UTAUT Application in ELT Research

<table>
<thead>
<tr>
<th>Source</th>
<th>Model Used</th>
<th>Users</th>
<th>Tech.</th>
<th>Skills</th>
<th>Location</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chung et al, 2014</td>
<td>TAM</td>
<td>College Students</td>
<td>Vocabulary Learning Resources</td>
<td>Vocabulary</td>
<td>Taiwan</td>
<td>Learners’ behavioral intention to use mobile English vocabulary learning resources was significantly determined by ‘compatibility’ of the technology.</td>
</tr>
<tr>
<td>Zyad, 2016</td>
<td>TAM2</td>
<td>College Students</td>
<td>Online Moodle Course</td>
<td>Writing</td>
<td>Morocco</td>
<td>Almost all the students across different degree of engagement perceived Moodle as a useful tool for sharing, collaboration and learning.</td>
</tr>
<tr>
<td>Hashim et al., 2016</td>
<td>UTAUT</td>
<td>College Students</td>
<td>Mobile Learning</td>
<td>All skills</td>
<td>Malaysia</td>
<td>ESL students show a positive attitude towards mobile learning.</td>
</tr>
<tr>
<td>Dizon, 2016</td>
<td>TAM</td>
<td>College Students</td>
<td>Quizlet</td>
<td>Vocabulary</td>
<td>Japan</td>
<td>Quizlet was found to be a useful approach to studying L2 vocabulary. Students would like to continue using it in the future.</td>
</tr>
<tr>
<td>Al-Seghayer, 2016</td>
<td>TAM</td>
<td>College Level English Instructor</td>
<td>Online Reading Text</td>
<td>Reading</td>
<td>Worldwide</td>
<td>Participants held strong beliefs about the usefulness of online reading in improving the quality of L2 reading instruction and developing learners’ reading skills.</td>
</tr>
</tbody>
</table>
Using flash-cards on mobile phones was a more useful tool in enhancing learners’ vocabulary acquisition than using flashcards on paper.

Although there are very limited publications could be presented on the table, yet the information provided still shows the recent progress of technology acceptance research in ELT. Most of the studies still used TAM framework to explain students’ technology acceptance in ELT, although there are already renewed model including TAM2 and TAM3. It means that the findings would be not as comprehensive as what is suggested by the last developed TAM. Therefore, based on this issue, the first gap of technology acceptance research in ELT is; there are a limited number of studies on technology acceptance in ELT which applied the recent updated TAM3 framework. Besides, it was rarely found a research that utilizes UTAUT2 framework in predicting technology acceptance in ELT. So, the second gap is; there are a limited number of studies on technology acceptance in ELT which applied the recent updated UTAUT2 framework.

The second information that we can get from the table above is regarding the target user of technology in ELT context. The table shows that most of the studies that had been conducted recently investigate the technology acceptance of college-level users, both students and lecturers. However, the high school level smartphone users are also potential target investigation of technology acceptance. American demographic data shows that there is 90% of less than high school graduates are smartphone users (Pew Research Center, 2018). Less than high school graduates are including the smartphone users in high school, lower secondary and might also be in primary school or lower. Therefore, the third gap is: Users’ technology acceptance from different ages and education levels is left unexplored.

The third information provided by Table 1 is the technology in a form of hardware or software/system/platform that is investigated for its acceptance in ELT context. However, the hardware and software listed on the table are only a small number of technologies which are developed for the academic purpose. There might be hundreds of software and applications especially for mobile devices, which are developed for the educational purpose and many of them, are created especially for English language teaching and learning e.g. Duo Lingo, Hello English, 50 Languages, all types of Dictionaries application, etc. This phenomenon suggests the fourth gap, that is: there are a limited number of studies which investigated English language learning mobile application acceptance in ELT context.

The target language component and skill investigated in technology acceptance research in ELT is only limited to vocabulary, reading and writing. ELT researchers need to investigate the acceptance of other technologies which
match the language component and skill other than vocabulary, reading and writing. Besides, English language learning technology investigated should also follow the development of the view of communicative competence which is not limited to language component and skill only. There are 6 latest developed communicative competencies that should be taken into account in developing and researching ELL technology acceptance, those are; linguistic competence, formulaic competence, sociocultural competence, interactional competence, discourse competence and strategic competence (Celce-Murcia, 2007:45). This raises the fifth gap, that is: user acceptance investigation of a technology which matches all of the communicative competence aspects is still rarely found.

Based on the five gaps elaborated based on the recent progress of technology acceptance research in ELT, there would be four main directions of future research trend in this particular field of investigation. First, more ELT researchers will explore the application of the latest developed TAM and UTAUT frameworks in ELT. There will also be more studies that investigate other external variables that might be added to the established TAM3 or UTAUT2 which are able to explain the technology acceptance in ELT better. Second, there will be more studies conducted in various demographic backgrounds of technology users, especially different education levels, ages, etc. Third, future research will move toward mobile technology acceptance in ELT context. The technology investigated would be including English language learning mobile application, newly developed devices that support mobile or distance learning, or any other developed technology that supports the 21st-century learning. Lastly, the technology acceptance research will also consider the aspects of communicative competence in ELT which probably would still growing and developing.

CONCLUSION

The development of technology acceptance research, which is indicated by the evolution of TAM and UTAUT frameworks, is expected to offer a robust and powerful tool in predicting the ELT practitioner acceptance of English language learning technology. Present progress in the field of technology acceptance research also suggests that the English language teaching and learning practices are moving toward the mobile internet learning environment. However, there are relatively rare studies that report the use of the latest TAM and UTAUT frameworks in ELT context. Therefore, more studies are expected to contribute to the development of both the technology acceptance research in ELT and the ELT practices itself. Theoretically, there are still a lot more external variables that could explain the technology acceptance behavior in ELT which are left unexplored. Practically, the integration of technology in ELT should be preceded by an acceptance research, in order to ensure the users’ intention to use at the following time.

This state of the art article which provides recent progress in the field of technology acceptance research in ELT and its research gaps is expected to inspire both ELT practitioner (lecturer, teachers, student teachers, students,
school/institution organizer, etc.) and researchers in their activities around ELT field. ELT practitioner should be able to take the information given in this article as an anchoring point of technology integration practices in their instructional process, classrooms organization or institution management. The research results provided could also give them a suggestion about the appropriate technology for a specific level of education and targeted language component or skill. Besides, ELT researchers should be able to fill in the gaps that are suggested by the previous researchers.

REFERENCES


http://www.jstor.org/stable/2490008


