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DETERMINANTS OF E-LEARNING ACCEPTANCE AMONG AGRICULTURAL EXTENSION AGENTS IN MALAYSIA: A CONCEPTUAL FRAMEWORK

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Abstract: *The objective of this paper is to develop a framework on e-learning acceptance among agricultural extension agents in Malaysian agricultural sector. E-learning is viewed as a solution in response to the increasing need for learning and training. This paper will review past literatures for the relevant factors that influence behavioral intention for e-learning acceptance as well as the relevant behavioral theories that provide the foundation for developing research framework to illustrate the relationship between the factors and behavioral intention for e-learning acceptance. The outcome of this research is the proposed framework that demonstrates the relationship between the factors and behavioral intention for e-learning acceptance. Understanding the determinants of e-learning acceptance will lead to the development of more effective and meaningful e-learning services. The research outcome will help to increase the interest to use e-learning, improve the policies and infrastructure, widen the availability and increase user engagement. Investigating the ability of the behavioral theory in predicting e-learning acceptance in agricultural setting will be useful for comparison in the future studies in different settings.*

Keywords: acceptance, agriculture, e-learning, extension agent.

Introduction

One of the initiatives in the Economic Transformation Program (ETP) which will drive Malaysia towards high-income status and global competitiveness to achieving sustainable economic growth is 'Establishing e-Learning for Students and Workers' which is projected to achieve gross national income (GNI) of RM1,487 and 800 job creations by 2020. E-learning which refers to learning process to acquire knowledge using electronic application through the computer and network, is an important approach to enhance and support conventional teaching and provide the ability to render learning to a large population without physical boundaries (Daud, Sahari@Ashaari, & Muda, 2013). Characteristically easy to deliver, flexible, economical and agnostic to distance and time (Carey & Blatnik, 2005), e-learning has various advantages and is superior over the traditional techniques of learning (Agarwal & Kumar, 2013) and becoming a desirable education, learning and teaching alternative for developing countries (Maldonado, Khan, Moon, & Rho, 2011) such as Malaysia. E-learning is seen as a solution to meet the growing demand for learning and training that facilitates more users to learn and train at fraction of the cost, offers opportunity for life-long learning, enables self-regulated learning irrespective of time and location and makes education accessible to all, including people living in remote areas or who have work or family constraints. As with the other innovations accessible out there, the rise of e-learning environment should not be overlooked. The use of e-learning which is traditionally known for its utilization in educational institutions has extended to numerous corporate enterprises and organizations hence along these lines, it is always imperative to study the elements that affect and factors that influence the e-learning environment (Hashim & Tasir, 2014).

In relation to learning and training, the agricultural extension agents (AEA) are among the most important actors in agriculture industry, as they are one of the important determinants of success for agriculture industry in Malaysia and form a special role as a change agent that is crucial to transform the attitude, competencies and knowledge of the farmers in order to support the achievement of national mission (Shah, Asmuni, & Ismail, 2013). The AEAs being the important actor in the agriculture value-chain must first be equipped with all the required knowledge and technology skills to ensure the program planned for the community is effectively and successfully delivered (Abdullah & Samah, 2013). Annor-Frempong, Kwarteng, Agunga, and Zinnah (2006) argue that ICTs are more and more seen as practical and cost-effective tools to facilitate knowledge sharing and information delivery stakeholders including extension agents and farmers. According to Hafkin and Odame (2002) and Richardson (2005) the benefits of ICT utilization such as e-learning for purposes of agricultural extension and training are well documented. Public sector programs have attempted to overcome information-related barriers to technological adoption by providing agricultural extension services however such programs have been widely criticized for their limited scale, sustainability and impact (Aker, 2011). Richardson (2005) remarked that the e-learning technologies can be utilized to expand access to training and education and enhance learning in the agricultural sector. The author further stated that the ICT development has popularized e-learning systems in the field of agricultural extension. Understanding that traditional education is no longer effective, the Iranian Ministry of Agriculture has considered the necessity of e-learning in agricultural extension for training extension agents (Ahmadpour & Mirdamadi, 2010). E-learning is seen as a solution to meet the rising demand for training and learning. Through e-learning, there is possible opportunity for self-pace learning and life-long learning anywhere and anytime and more participants can be trained at more affordable cost (Yunus & Salim, 2013).

The agriculture sector remains a significant development factor and continues to make important contribution to the national economy in Malaysia despite profound reduction of its contribution to the Gross Domestic Product (GDP) i.e. from some 30% in the 1970s to only 7% in 2013 (Othman & Jafari, 2014; Shah, Asmuni, & Ismail, 2013). The significance of agriculture can be seen in terms of its contribution to the total economy, via its functional role in social and environmental development and linkages within the agriculture ministries and departments and other government agencies such as rural development, natural resources and environment, plantation and commodities (Othman & Jafari, 2014). According to the ETP, agriculture sector in Malaysia is vitally important as it provides rural employment, uplift rural incomes and ensure national food security hence it represents one of the key economic sectors that has become the focus of productivity growth and targeted to contribute to the annual productivity growth of 3.7% by year 2020. In the context of this research, the focus remains on the factors that influence e-learning acceptance by AEAs in Malaysia.

Government extension agencies play the central role of intermediaries which are integral to agricultural research and development primarily to disseminate important agricultural information that are all part of an overall agricultural knowledge system linked by information and communication technology (ICT) to farmers (Abdon & Raab, 2005). In many developing countries, training and education for government extension agencies is clearly top priority however the efforts currently taken are less than desired and there are increasing evidence that indicates the issue with extension services is the result of crisis in agricultural training and education (Gasperini, 2000). Despite various extension strategies such as Decentralization, Farmer Field Schools, Training and Visit and Transfer of Technology to improve the productivity of farmers and to facilitate the role that extension plays in national development in many developing countries, these extension efforts have not achieved high degree of success and extension systems are left facing many constraints and challenges such high cost of travel to remote areas, delay or loss of information delivery due to insufficient infrastructure and difficult access (Annor-Frempong & Kwarteng, 2006). The typical face-to-face classroom-type methods of training the extension agents are often unsatisfactory due to several reasons such as high number of extension agents scattered throughout the country causing it to be costly and very challenging to implement and manage thus rendering e-learning to be the proper resolution to resolve the issue (Ahmadpour, Mirdamadi, Hosseini, & Chizari, 2010).

The agricultural extension service in Malaysia has not sufficiently been effective in developing agriculture since the service is only focusing on the role of technology transfer and efforts on development of human resources have been minimal (Shah et al., 2013). ICT practice in agricultural area in Malaysia is still at the average level (Hassan, Hassan, Samah, Ismail, & Shaffril, 2008). Hassan, Shaffril, and Azril (2009) reported that the level of ICT usage such as internet application among Malaysia agro-based entrepreneurs is at moderate level. Moreover according to (M. A. Hassan, Hassan, Shaffril, and D'Silva (2009) and Irfan, Muhammad, Khan, and Asif (2006), instead of using ICT in their agro-business, agriculture community prefer to use traditional ways such as asking other entrepreneurs or their neighbor and by relying on traditional mass media such as newspaper, radio and television. Contributing to this problem are factors such as language problem (Deraman & Shamsul Bahar, 2000), elderly community and low level of education and self-esteem (Tamam et al., 2008). Hassan, Hassan, Samah, Ismail, and Shaffril (2008) further contend that ICT has been used moderately in Malaysian agriculture but it has the potential to help develop and commercialize agriculture sector and make it more

competitive among other industries. The issue related to extension service in Malaysia provides an opportunity for AEAs to adopt e-learning to fill the gaps.

Despite many organizations in public and private sectors investing considerable amounts of time and money in developing online alternatives to traditional types of education and training systems, the rate of e-learning systems user acceptance is not increasing correspondingly as high as expected (Ahmadpour, Mirdamadi, Hosseini, & Chizari, 2010; Wu & Chen, 2012). Although e-learning increasingly finds its place in a range of educational institutions and organizations, past researches still showed obvious shortcomings in e-learning including the inability to attract the learners' or trainees' interest which adversely affected the e-learning implementation. In addition, the learners' attitude towards e-learning also influences their desire to take part in e-learning courses in agricultural extension (Ahmadpour & Soltani, 2012; Yunus & Salim, 2013). There have been some emerging concerns that e-learning has not been able to achieve its full potential, partly due to high attrition and low rate of utilization (Bell, Martin, & Clarke, 2004; Tyler-Smith, 2006; Wang, 2010) hence the e-learning resource availability does not guarantee its use, nor its effectiveness as a tool to change employee behavior. In spite of the growth of adult learners who participate in online learning, the high dropout rate in online learning has been of concern to many higher education institutions and organizations (Park & Choi, 2009).

Yunus and Salim (2013) highlighted that existing studies on e-learning in Malaysia are more focused on certain private organizations and institutions of higher learning. The authors further argued that there was no comprehensive study to evaluate e-learning in the Malaysian public sector. This finding is further confirmed by (Agarwal & Kumar, 2013) and (Ahmadpour et al., 2010) who argue that despite the exciting benefits of e-learning, the adoption of e-learning for agricultural development and related fields particularly in or for developing countries is still in the early phases of adoption and has been slow to take off. Abdon, Raab, and Ninomiya (2008) contend that e-learning is a potentially cost-effective and viable way to facilitate knowledge development among farmers and agricultural professionals but is still not employed widely. The findings of the past research have pointed out that varying factors influence e-learning acceptance therefore, it is necessary to have an in-depth study of those factors that influence e-learning acceptance by AEAs in the Malaysian agricultural industry.

The overall objective of this research is to develop a model on e-learning acceptance and investigate the influence of psychological, social, management and training factors on the AEAs' acceptance of e-learning in agricultural sector in Malaysia. The relationship between the proposed factors and the AEAs' behavioral intention to use e-learning will be examined. Thus, in the context of e-learning acceptance by AEAs in Malaysian agricultural sector, this study will attempt to achieve the following objectives:

1. To develop a framework on e-learning acceptance.
2. To investigate the impact of attitude beliefs on AEAs' intention for e-learning acceptance.
3. To investigate the impact of subjective norms on AEAs' intention for e-learning acceptance.
4. To investigate the impact of perceived behavioral controls on AEAs' intention for e-learning acceptance.
5. To investigate the impact of management support on AEAs' intention for e-learning acceptance.
6. To investigate the impact of training on AEAs' intention for e-learning acceptance.

Literature review

E-learning refers to self-study or instructor-led training delivered on a digital device of which the contents and delivery techniques are designed to support individual learning or organizational performance improvement (Clark & Mayer, 2011). Sangrà et al. (2012) further describe e-learning as "an approach to teaching and learning, representing all or part of the educational model applied, that is based on the use of electronic media and devices as tools for improving access to training, communication and interaction and that facilitates the adoption of new ways of understanding and developing learning."

Advances in technology and the interrelation of ICT with teaching and learning settings have accelerated the growth of distance learning and fundamentally changed the way of education and learning. Learning on demand is becoming a type of lifestyle in modern society (McLoughlin & Lee, 2007) and such phenomenon is made possible mostly due to ICT facilitation. Information is constantly sought and shared by learners at home, school or work to solve problem, get help or just to obtain more knowledge to satisfy a curiosity by taking advantage of ICT advancement that besides being consumer of information, learners can also become content producers (McLoughlin & Lee, 2007; Smith & Caruso, 2010; Solomon & Schrum, 2007). The rapid growth of ICT and increasing computer knowledge of the population have led to the usage of many learning and teaching innovative technologies such as mobile-learning and e-learning (Vyas & Nirban, 2014).

Technology convergence has enabled employees to demand all types of learning materials via various types of tools such as smart devices besides typical laptops and desktop computer platforms and digital transmission of contents for the purpose of learning and knowledge-seeking known as e-learning is increasingly becoming common workplace learning (Brown & Charlier, 2013). In order to enhance employee and organizational effectiveness, organizational training requires a systematic approach that is geared towards learning and human resource development (Goldstein & Ford, 2001) and organizational training nowadays is supported by e-learning which rides on the power of technology infrastructures and web networking in order to achieve the particular objectives and deliver instruction (Rosenberg, 2001).

Workplace learning for continuous improvement is crucial to sustain competitiveness of organizations (Ho, Tsai, & Day, 2011). Organizations across the industries time and again have exploited e-learning system to facilitate employee development as e-learning has the capability to deliver knowledge and information to individuals (Yoo & Huang, 2015). Several areas including government and corporate training for employees and distance learning for primary, secondary and tertiary education have found e-learning applications being extended to support their learning and training needs (Pereira, Ramos, Gouvêa, & da Costa, 2015). Public organizations have utilized e-learning to facilitate training and employee development and enable training management, skill adequacy planning and training budgeting (Saha, Nath, & Sangari, 2010) and help to foster organizational learning culture based on knowledge sharing (Chen & Hsiang, 2007).

Infrastructure-wise Malaysia is ready to support e-learning. The Malaysian Performance Management & Delivery Unit (PEMANDU) reported that household broadband penetration in Malaysia has reached close to 70% in 2014, and coupled with internet and multimedia technology emergence in recent years, Malaysia is in a good position to harness the power of online learning to lower the delivery cost, enhance the quality of teaching and learning, widen access to good quality content and bring Malaysian expertise to the global community

(Malaysian Education Blueprint, 2015-2025). In Malaysian agriculture, the AEAs which is target group for e-learning implementation are potential adopters as more than fifty percent of them are in the age group of less than thirty-five years old (Tiraieyari, Hamzah, Abu Samah, & Uli, 2013) and according to Kamarul Zaman, Ali, and Othman (2015), younger generation has greater potential to adopt technology innovation. There will be plenty of opportunity that e-learning may contribute to dissemination and awareness of sustainable development which is part of National Green Technology Policy and sustainable practices being one of the six strategic thrusts of the Eleventh Malaysia Plan 2016-2020. Not implementing e-learning may impair the capability of the agriculture sector to stay on course with the national agenda.

Theoretical background

Chu and Chen (2015) noted that researches related to behavioral intention for technology acceptance have been developed around the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), Technology Acceptance Model (TAM) (Davis, 1989) and Theory of Planned Behavior (TPB) (Ajzen, 1991). In TRA, Fishbein and Ajzen (1975) explained that an individual performs a specific behavior based on behavioral intention, which can be determined by subjective norms and the attitude toward the behavior. So TRA is generally comprised of three main constructs i.e. behavioral intention, subjective norms and attitude toward behavior. Thus, a person's intention toward a specific behavior is affected by the person's attitude toward that behavioral outcome and the attitude a person perceives other people would have towards the performance of that behavior. A person's attitude, combined with subjective norms, forms the person's behavioral intention.

TRA however is a relatively poor at predicting those types of behaviors where internal and external factors might control or affect the motivation of the outcome of behavior hence Ajzen (1991) further extended TRA to include perceived behavioral control in addition to subjective norms and attitude as antecedents to behavioral intention. This extension to TRA is called TPB and it extends the incomplete concept of TRA in predicting an actual behavior under the influence of certain motivation that intended behaviors are also controlled by some uncertainty. Hence, a behavior performance depends on intention as well as internal or external factors that may affect the motivational behavior (Shareef, Kumar, Kumar, & Hasin, 2009). TAM is another widely referenced theoretical model for predicting the intention to use and the acceptance of information system by individuals. It proposes that only perceived ease of use and perceived usefulness determine the attitude toward adoption of ICT and ignores the factors of subjective norms and perceived behavioral control, thus making the model more parsimonious. The attitude, in turn, leads to the intention to use ICT and the eventual acceptance (Bhattacherjee, 2001; Davis, Bagozzi, & Warshaw, 1989). Many studies in the literature have used different technology acceptance and adoption models.

The Diffusion of Innovations (DOI) Theory popularized by Rogers (1983) is one of the well-established frameworks that examine how technological innovations are adopted between individuals within a social system. According to the author, the rate of innovations adoption is determined by five factors: relative advantage, compatibility, trialability, observability and complexity. Then there is also Taylor and Todd's (1995) Decomposed Theory of Planned Behavior (DTPB), which integrates the TPB model and the DOI theory.

TAM and TPB are two of the most prevalent theories that are associated with studies on information technology acceptance and both theories explain well the intentions to accept information technologies based on numerous empirical tests in variety of technologies in various

settings (Shiue, 2007; Teo, 2012). TPB however, offers more specific information related to subjective norms and the user's perceived behavioral control which is not considered in TAM, hence the TPB model extends more information about the factors to be considered for the intention to accept the technology (Mathieson, 1991). Mathieson (1991) and Taylor and Todd (1995) argue that TPB has been proven to have similar predictive powers as TAM for technology adoption. TAM puts greater emphasis on technology features rather than social influences for examining technology adoption intention. In this study about e-learning acceptance by AEAs, e-learning unlike an individual application, usually involves interaction with instructors and students. Thus, social influences should not be ignored as e-learning includes interpersonal interactions (Chu & Chen, 2015).

The TPB is applied quite comprehensively across several settings that include adoption/acceptance of new technology, technology-based learning such as e-learning and m-learning, organizational improvement and agriculture. Venkatesh and Speier (1999) adapted measures used in the TRA and TPB to investigate how the effects of emotion during new technology training influenced employees' motivation, intentions and usage of the new technology by employees of an accounting firm. George (2004) utilized the TPB to investigate Internet purchasing by extending the attitude toward behavior and perceived behavioral control components to include Internet trustworthiness beliefs and unauthorized use beliefs to determine online purchasing behavior among college students. Herrero, Crespo and del Bosque (2008) adapted TPB and add personal innovativeness construct as moderator on the adoption of electronic commerce by web users. Bosnjak, Tuten, and Wittmann (2005) in their study involving college business students adapted the TPB and add moral obligation component to predict and explain the number of participants in web-based panel study to study internalization of moral values. Engle et al. (2010) applied TPB to evaluate entrepreneurial intent by business students across twelve countries. Siragusa and Dixon (2009) adapted TPB to predict higher education students' behavior and attitudes towards technology-based learning. Chu and Chen (2015) adapted TPB that include social identity and social bonds on e-learning adoption intention among students who enrolled in courses using e-learning technology in Taiwan. Cheon, Lee, Crooks, and Song (2012) conducted a study to investigate mobile learning readiness in higher education based on the theory of planned behavior. Wiethoff (2004) adapted TPB to study effectiveness of training for organizational diversity. Yazdanpanah, Hayati, Hochrainer-Stigler, and Zamani (2014) adapted TPB and extended additional constructs i.e. perceived risk, self-identity and moral norm in their study on water conservation among farmers in Iran. In USA, Lynne, Franklin, Hodges, and Rahmani (1995) investigated the farmers' conservation technology adoption decision using TPB. Sparks and Shepherd (1992) extended TPB with self-identity and past consumption constructs to study the antecedents of intention to consume organic products. Colémont and Van den Broucke (2008) used TPB to understand the factors that contribute to unsafe and health damaging behavior among the farmers. Artikov, Hoffman, and Lynne (2006) utilized TPB to study the causes that drive farmer intentions of using climate and weather information and forecasts in farming decisions among farmers in mid-western USA.

Beside attitude, subjective norms and perceived behavioral control being the main constructs of TPB, the literatures related to TPB highlighted several other constructs such as emotion, trust, security, innovativeness, moral obligation, social bonds, social identity, training, perceived risk, self-identity and past experience as antecedents to behavioral intention. However there was limited research on management support and training as additional constructs to the TPB. Previous studies indicated that training is a significant factor that influences online learning

acceptance and have positive impact on users' acceptance and their intention to use a particular system (Igbaria, Zinatelli, Cragg, & Cavaye, 1997; Wolski & Jackson, 1999). Cerveny and Sanders (1986) and Igbaria (1994) contend that management support has been identified as one of the main recurrent factors affecting system success. In view of the above, two additional construct involving management support and training are proposed to be investigated besides the original TPB constructs i.e. behavior intention, attitude, subjective norms and perceived behavioral control.

The TPB has been widely used to predict behavioral intention hence the research framework in this study will adapt the TPB and apply behavioral intention, which has been considered as the important basis for examining the behavior of AEAs to accept e-learning system. The key components of TPB are behavioral intention as dependent variable and attitude, subjective norm and perceived behavioral control as independent variables. For the purpose of this study, another two variables are included as independent variable i.e. management support and training which reflects the setting that involves extension agents in Malaysia Department of Agriculture.

Behavioral intention

Behavioral intention refers to a person's subjective probability in performing certain behavior (Fishbein & Ajzen, 1975). It decides if the AEAs want to reject or accept the use the technologies in their learning and training duty. Behavioral intention is applied as a dependent variable for three reasons. First, a number of studies have reported a significant and strong relationship between behavioral intention and targeted behavior (Sheppard, Hartwick, & Warshaw, 1988; Venkatesh & Morris, 2000). Mathieson (1991) highlighted that over time there will be changes either in the environment, user's expectations or the system itself therefore measuring user acceptance based on the "intention to use" before the system implementation is ready will be required especially when the system does not yet exist. Secondly, according to Agarwal and Prasad (1998), usage intentions are more applicable than actual behavior because they are measured concurrently with beliefs. Thirdly, because e-learning system is not yet implemented, choosing intention to use over actual acceptance is more desirable; thus, examining the intention to accept e-learning facilitates a timely investigation of agricultural AEAs' acceptance to help prepare the actual implementation.

The literature reviews have shown several factors which influence the adoption and acceptance of information technologies such as e-learning. Among the factors that are extensively being studied are attitude towards technology, subjective norms and perceived behavioral control (Karaali, Gumussoy, & Calisir, 2011; Macharia & Nyakwende, 2010; N. Park, Lee, & Cheong, 2007; S. Y. Park, 2009; Qudais, Al-Adhaileh, & Al-Omari, 2010; Siragusa & Dixon, 2009). In relation to these factors, behavioral intention is the ultimate destination that brings about the adoption or acceptance of technology.

Attitude

Attitudes reflect the individual's positive or negative evaluations of performing a particular target behavior (Fishbein & Ajzen, 1975). According to Rogers (1983) attitude refers to individual's general feeling or perception of favorableness or un-favorableness towards using innovation or technologies. Ajzen (1991) further expands that the sum of accessible behavioral beliefs determines attitude towards the behavior. The author contends that accessible behavioral beliefs refer to the subjective probability that the behavior will achieve expected outcomes positively or negatively. Attitude is linked to behavioral intention as individual forms

psychological intentions to perform behaviors toward which they have positive feeling (Ndubisi, 2004).

Subjective norm

Also referred as social influence, subjective norm is described as "the person's perception that most people who are important to him think he should or should not perform the behavior in question" (Fishbein & Ajzen, 1975). Ajzen (1991) further adds that the determinant of subjective norm is the sum of normative beliefs which reflects the perceived behavioral views or expectations of important referents individuals or groups. Subjective norm implies that behavior is initiated by individual's wish to act according to what the thought or action of the important referent others (Pavlou & Fygenson, 2006). Pantano and Di Pietro (2012) suggest that referent people such as friends and family represent the expectations of other people to perform a particular behavior, thus they can potentially influence the behavior. Subjective norms have been observed to be more important prior to, or in the early stages of implementation when users have limited direct experience from which to develop the attitudes towards the innovation (Hartwick & Barki, 1994; Taylor and Todd, 1995).

Borotis and Poulymenakou (2009) contend that subjective norm refers to the individual's perceptions of broad social pressure to (or not to) perform the expected behavior. The social pressure exerted by the significant "referent" others whose beliefs may be important to the individual whom the individual perceives to support (or not) the behavior, conceives more (or less) likelihood for the individual to perform it. Subjective norm is considered as one of the factors that influences the adoption and the acceptance of technologies and appears in many adoption theories such as TRA and TPB.

Perceived behavioral control

To a certain extent the available opportunities and resources to a person determine the chances of achieving the target behavior and of greater psychological interest, is the perception and its impact of behavioral control on intentions and actions (Ajzen, 1991). The author refers perceived behavioral control as "people's perception of the ease or difficulty of performing the behavior of interest" and it can change across actions and circumstances. The author adds that perceived behavioral control is determined by the sum of accessible control beliefs which refers to the perceived presence of the necessary opportunities and resources to the performance of the intended behavior.

According to Tan and Teo (2000) perceived behavioral control refers to the factors that may hinder or encourage the performance of the behavior. Cheng and Huang (2013) identified the determinant factors for perceived behavioral control as ability, resource and opportunity and the authors contend that a person's behavioral intention will increase when he perceives himself as more in control which is supported by the perception that he has the ability, resources and opportunities to perform a certain behavior.

Management support

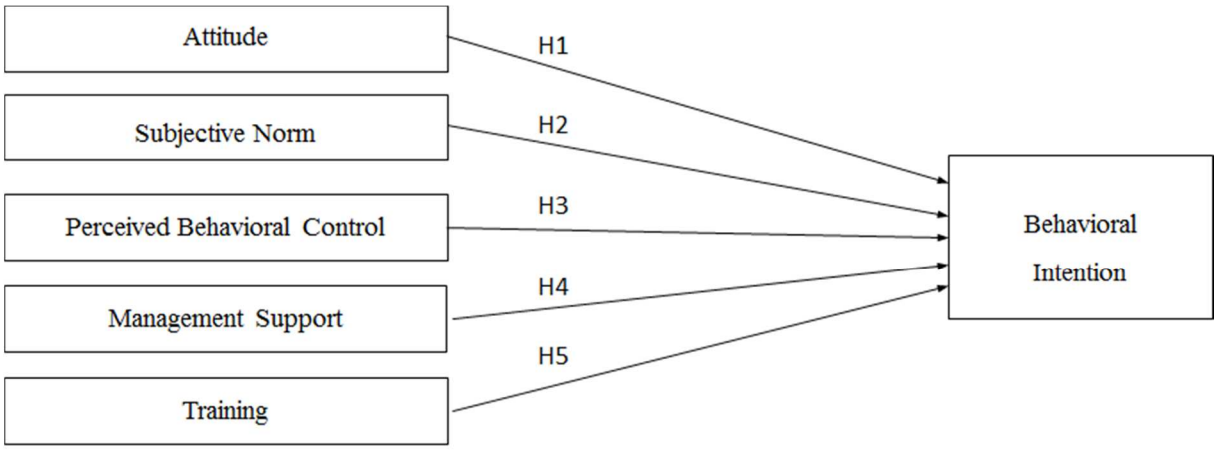
Management support refers to the perceived level of general support offered by the organization's top management (Igbaria et al., 1997). Management support functions as a change agent to create a more encouraging environment and ensure sufficient resource allocation for the success of IS implementation. Therefore, management support is always related to greater system success and lack of it may render a critical barrier to the effective IT utilization.

As with other information systems, management support is critical to e-learning implementation (Morrison, 2003) and top management's vocal support and consistency are important factors for success (Macpherson, Elliot, Harris, & Homan, 2004). As e-learning requires organization-wide change, the top management support is viewed as important to influence employees of the organization due to its position and ranking hierarchy in the organization. In addition, direct managers may also extend their support and guidance and direction as they are closer and more familiar with employees. They can assist employee in finding the right time to learn and subsequently buying the support from employees for acceptance of the new technology and the process. Management support should be relevant and clear to internal as well as external conditions (Sela & Sivan, 2009). Management support has been identified by the past literatures as one of the main recurrent factors affecting system success (Cerveny & Sanders, 1986; Igbaria, 1994). Sivakumar, Parasar, Das and Anantharaman (2014) conducted research in extension organizations in India and revealed that management support influenced computer utility positively among the extension professionals.

Training

Training in this study is defined as institution's effort to teach and train their employees to acquire e-learning skills. Previous studies have included training as a significant factor that influence the students' acceptance of using online learning and concluded that training had a positive impact on users' acceptance and their intention to use a particular system (Igbaria et al., 1997; Wolski & Jackson, 1999). Thus, the training provided by the institutions will be considered a key factor for the successful implementation of e-learning hence its relationship with the AEA's intention to use e-learning will be investigated.

Raymond (1988) in his study reported that training promotes more diverse and frequent use, favorable attitudes and greater understanding on the application use. Similarly, training was found to have a positive impact on technology acceptance (Igbaria, Guimaraes, & Davis, 1995; Nelson & Cheney, 1987). Ali and Magalhaes (2008) discovered that generally, the majority of the organizations were providing training to their employees under different models covering both traditional methods (on-the-job training and instructor-led training) as well as new methods (e-learning) and aware of the importance and effectiveness of training to implementation of e-learning. Research in extension organizations in India discovered that training influenced computer usage positively among extension officials (Sivakumar et al., 2014). The organizational effort of providing training and support for technology (i.e. Internet stock trading system) would enhance their capability in utilizing the technology among individual stock traders in Malaysia (Ramayah, Soto-Acosta, Colomo-Palacios, Gopi, & Popa, 2014).



Adapted from Theory of Planned Behavior (Ajzen, 1991)

Figure 1: Research framework of behavioral intention to e-learning acceptance

In the context of e-learning acceptance by AEAs and adapting the TPB, the research framework as depicted in Figure 1 is proposed to investigate the relationship between behavioral intention for e-learning acceptance as dependent variable and each of the independent variables i.e. attitude, subjective norms, perceived behavioral control, management support and training. The framework is expected to provide better understanding on the factors that contribute to the acceptance of e-learning by the target population i.e. AEAs and can be useful for those who are responsible to implementing ICT initiatives such as e-learning in public or private organization within the agriculture sector. The framework will help in terms of preparing for pre-implementation actions to increase the acceptance level, gain the necessary support and lift the potential barriers of the ICT initiatives.

Based on the research framework as illustrated in Figure 1 above, the hypotheses are postulated as follow:

H1: Attitude has a positive relationship with behavioral intention to e-learning acceptance.
H2: Subjective norm has a positive relationship with behavioral intention to e-learning acceptance.
H3: Perceived behavioral control has a positive relationship with behavioral intention to e-learning acceptance.
H4: Management support has a positive relationship with behavioral intention to e-learning acceptance.
H5: Training has a positive relationship with behavioral intention to e-learning acceptance.

Conclusion

This study is an attempt to provide a comprehensive review of the relationship between attitude, social influence and perceived behavioral control to the behavioral intention for e-learning acceptance by AEAs in Malaysia. From practical perspective, the study will offer an insight into one of the most important issues in Malaysian agricultural sector, which is learning and training for AEAs. In addition the research findings will help determine the barriers to e-learning, curtail the potential resistance and identify the factors that promote e-learning acceptance in Malaysia agricultural sector. The research findings would be beneficial to the

governmental departments to improve the relevant infrastructure to widen the availability of e-learning and increase the engagement among the users.

From the theoretical point of view and in relation to the body of knowledge, this research will contribute significantly through the process of investigating the impact of influencing factors on the e-learning acceptance through the framework of the social and behavioral theory. The study also attempts to prove the significant role of the proposed factors (social, psychological, management support and training) and e-learning acceptance and the respective relationships will be tested directly hence the findings will be useful for comparison in the future studies in different country and/or industry.

References

Abdon, B. R., & Raab, R. T. (2005). Knowledge sharing and distance learning for sustainable agriculture in the Asia-Pacific region: The role of the internet. *Plant Production Science*, *8*(3), 298–307. Retrieved from http://www.scopus.com/inward/record.url?eid=2-s2.0-25844438733&partnerID=40&md5=6b793037963740a0d3cc684a19399ac8

Abdon, B., Raab, R., & Ninomiya, S. (2008). E-learning for international agriculture development: Dealing with challenges. *International Journal of Education and Development Using Information and Communication Technology*, *4*(1), 80–94. Retrieved from http://search.proquest.com.library.capella.edu/docview/873571330?accountid=27965

Abdullah, F. A., & Samah, B. A. (2013). Factors impinging farmers' use of agriculture technology. *Asian Social Science*, *9*(3), 120–124. http://doi.org/10.5539/ass.v9n3p120

Agarwal, H., & Kumar, A. (2013). E-learning for agriculture education in India. *International Journal of Research in Engineering and Technology*, 101–104. Retrieved from http://ijrset.org/Volumes/V02/I12/IJRET_110212017.pdf

Agarwal, R., & Prasad, J. (1998). A conceptual and operational definition of personal innovativeness in the domain of information technology. *Information Systems Research*, *9*(2), 204–215.

Ahmadpour, A., & Mirdamadi, M. (2010). Determining challenges in the application of e-learning in agricultural extension services in Iran. *American-Eurasian Journal of Agricultural & Environmental Science*, *9*(3), 292–296.

Ahmadpour, A., Mirdamadi, M., Hosseini, J. F., & Chizari, M. (2010). Factors affecting the development of electronic learning in agricultural extension network in Iran. *Middle-East Journal of Scientific Research*, *5*(4), 261–267.

Ahmadpour, A., & Soltani, S. (2012). Agricultural extension workers' attitude to and experience of e-learning. *African Journal of Agricultural Reseearch*, *7*(24), 3534–3540. http://doi.org/10.5897/AJAR11.1992

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*, 179–211. http://doi.org/10.1016/0749-5978(91)90020-T

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour*. Englewood Cliffs, New Jersey: Prentice-Hall.

Aker, J. C. (2011). Dial "A" for agriculture: A review of information and communication technologies for agricultural extension in developing countries. *Agricultural Economics*, *42*(6), 631–647. http://doi.org/10.1111/j.1574-0862.2011.00545.x

Ali, G. E., & Magalhaes, R. (2008). Barriers to implementing e-learning: A Kuwaiti case study. *International Journal of Training and Development*, *12*(1), 36–53. http://doi.org/10.1111/j.1468-2419.2007.00294.x

Annor-Frempong, F., & Kwarteng, J. (2006). Challenges and prospects of infusing information communication technologies (ICTs) in extension for agricultural and rural development in Ghana. In *Proceedings of the Annual Conference of The International Association of Agricultural and Extension Education* (Vol. 22, pp. 36–46).

Artikov, I., Hoffman, S. J., & Lynne, G. D. (2006). Understanding the influence of climate forecasts on farmer decisions as planned behavior. *Journal Of Applied Meteorology And Climatology*, *45*(9), 1202–1214. http://doi.org/10.1175/jam2415.1

Bell, M., Martin, G., & Clarke, T. (2004). Engaging in the future of e-learning: A scenarios-based approach. *Education + Training*, *46*(6/7), 296–307. http://doi.org/10.1108/00400910410555204

Bhattacherjee, A. (2001). An empirical analysis of the antecedents of electronic commerce service continuance. *Decision Support Systems*, *32*, 201–214. http://doi.org/10.1016/S0167-9236(01)00111-7

Borotis, S., & Poulymenakou, A. (2009). E-learning acceptance in workplace training: The case of a Greek bank. In *17th European Conference on Information Systems (ECIS2009)* (pp. 1–14). http://doi.org/ECIS2009-0398.R1

Bosnjak, M., Tuten, T. L., & Wittmann, W. W. (2005). Unit (non)response in Web-based access panel surveys: An extended planned-behavior approach. *Psychology and Marketing*, *22*(6), 489–505. http://doi.org/10.1002/mar.20070

Brown, K. G., & Charlier, S. D. (2013). An integrative model of e-learning use: Leveraging theory to understand and increase usage. *Human Resource Management Review*, *23*(1), 37–49. http://doi.org/10.1016/j.hrmr.2012.06.004

Carey, K., & Blatnik, S. (2005). E-learning and economic development. *Turkish Online Journal of Distance Education*, *6*(1), 22–33.

Cerveny, R., & Sanders, L. (1986). Implementation and structural variables. *Information & Management*, *11*(4), 191–198. http://doi.org/10.1016/0378-7206(86)90004-2

Chen, R.-S., & Hsiang, C.-H. (2007). A study on the critical success factors for corporations embarking on knowledge community-based e-learning. *Information Sciences*, *177*(2), 570–586. http://doi.org/10.1016/j.ins.2006.06.005

Cheng, H. H., & Huang, S. W. (2013). Exploring antecedents and consequence of online group-buying intention: An extended perspective on theory of planned behavior. *International Journal of Information Management*, *33*(1), 185–198. http://doi.org/10.1016/j.ijinfomgt.2012.09.003

Cheon, J., Lee, S., Crooks, S. M., & Song, J. (2012). An investigation of mobile learning readiness in higher education based on the theory of planned behavior. *Computers & Education*, *59*(3), 1054–1064. http://doi.org/10.1016/j.compedu.2012.04.015

Chu, T.-H., & Chen, Y.-Y. (2015). With good we become good: Understanding e-learning adoption by theory of planned behavior and group influences. *Computers & Education*, *92–93*, 37–52. http://doi.org/10.1016/j.compedu.2015.09.013

Clark, R. C., & Mayer, R. E. (2011). *E-learning and the science of Instruction: Proven guidelines for consumers and designers of multimedia learning*. Hoboken, NJ: Pfeiffer.

Colémont, A., & Van den Broucke, S. (2008). Measuring determinants of occupational health related behavior in Flemish farmers: An application of the theory of planned behavior. *Journal of Safety Research*, *39*(1), 55–64. http://doi.org/10.1016/j.jsr.2007.12.001

Daud, N. A., Sahari@Ashaari, N., & Muda, Z. (2013). An initial model of persuasive design in web based learning environment. *Procedia Technology*, *11*, 895–902. http://doi.org/10.1016/j.protcy.2013.12.273

Davis, F. D. (1989). Perceived usefulness , perceived ease of use , and user acceptance. *MIS Quarterly*, *13*(3), 319–339. http://doi.org/10.2307/249008

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, *35*(8), 982–1003. http://doi.org/10.1287/mnsc.35.8.982

Deraman, A. B., & Shamsul Bahar, A. . (2000). Bringing the farming community into the internet age: A case study. *Informing Science*, *3*(4), 1–8.

Engle, R. L., Dimitriadi, N., Gavidia, J. V., Schlaegel, C., Delanoe, S., Alvarado, I., … Wolff, B. (2010). Entrepreneurial intent: A twelve-country evaluation of Ajzen's model of planned behavior. *International Journal of Entrepreneurial Behavior & Research*, *16*(1), 35–57. http://doi.org/10.1108/13552551011020063

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intentions and behaviour: An introduction to theory and research*.

Gasperini, L. (2000). From agricultural education to education for rural development and food security: All for education and food for all. *Food And Agriculture Organization Of The United Nations*.

George F. Joey. (2004). The theory of planned behavior and Internet purchasing. *Internet Research*, *14*(3), 198–212. http://doi.org/10.1108/10662240410542634

Goldstein, I., & Ford, J. (2001). *Training in organizations (4th Ed.)*.

Hafkin, N. J., & Odame, H. . (2002). Gender, ICTs and agriculture: A situation analysis. *The 5th Consultative Expert Meeting of CTA's ICTs Observatory Meeting on Gender and Agriculture in the Information Society*.

Hartwick, J., & Barki, H. (1994). Explaining the role of user participation in information system use. *Management Science*, *40*(4), 440–465. http://doi.org/10.1287/mnsc.40.4.440

Hashim, H., & Tasir, Z. (2014). E-learning readiness: A literature review. *Proceedings - 2014 International Conference on Teaching and Learning in Computing and Engineering, LATICE 2014*, (April 2014), 267–271. http://doi.org/10.1109/LaTiCE.2014.58

Hassan, M. A., Hassan, M. S., Shaffril, H. A. M., & D'Silva, J. L. (2009). Problems and obstacles in using information and communication technology (ICT) among Malaysian agro-based entrepreneurs. *European Journal of Scientific Research*, *36*(1), 93–101. Retrieved from

http://www.scopus.com/inward/record.url?eid=2-s2.0-70349826866&partnerID=40&md5=28f897baa8609ef7bcd577e574dd55ac

Hassan, M., Shaffril, H., & Azril, H. (2009). Internet usage among agro-based entrepreneurs: Can it affect productivity. *Journal of Agriculture & Social Sciences*, (2008), 61–66. Retrieved from http://www.fspublishers.org/jass/past-issues/JASSVOL_5_NO_3/2.pdf

Hassan, S., Hassan, M. A., Samah, B. A., Ismail, N., & Shaffril, H. A. M. (2008). Use of information and communication technology (ICT) among agri–based entrepreneurs in Malaysia. *World Conference on Agricultural Information and IT*, 753–762.

Herrero Crespo, Á., & Rodríguez del Bosque, I. (2008). The effect of innovativeness on the adoption of B2C e-commerce: A model based on the theory of planned behaviour. *Computers in Human Behavior*, *24*(6), 2830–2847. http://doi.org/10.1016/j.chb.2008.04.008

Ho, Y. Y., Tsai, H. T., & Day, J. (2011). Using the theory of planned behaviour to predict public sector training participation. *The Service Industries Journal*, *31*(5), 771–790. http://doi.org/10.1080/02642060902960776

Igbaria, M. (1994). An examination of the factors contributing to microcomputer technology acceptance. *Accounting, Management & Information Technology*, *4*(4), 205–224.

Igbaria, M., Guimaraes, T., & Davis, G. B. (1995). Testing the determinants of microcomputer usage via a structural equation model. *Journal of Management Information Systems*, *11*(4), 87–114. http://doi.org/Article

Igbaria, M., Zinatelli, N., Cragg, P., & Cavaye, A. L. M. (1997). Personal computing acceptance factors in small firms: A structural equation model. *MIS Quarterly*, *21*(3), 279–305. http://doi.org/10.2307/249498

Irfan, M., Muhammad, S., Khan, G. A., & Asif, M. (2006). Role of mass media in the dissemination of agricultural technologies among farmers. *International Journal of Agriculture & Biology*, *8*(3), 417–419. Retrieved from http://www.fspublishers.org

Kamarul Zaman, N. B., Ali, J., & Othman, Z. (2015). Perbandingan ciri-ciri sosioekonomi penerima inovasi sistem intensifikasi padi dan projek estet padi. *Jurnal Teknologi*, *4*, 163–171.

Karaali, D., Gumussoy, C. A., & Calisir, F. (2011). Factors affecting the intention to use a Web-based learning system among blue-collar workers in the automotive industry. *Computers in Human Behavior*, *27*(1), 343–354. http://doi.org/10.1016/j.chb.2010.08.012

Lynne, G. D., Franklin Casey, C., Hodges, A., & Rahmani, M. (1995). Conservation technology adoption decisions and the theory of planned behavior. *Journal of Economic Psychology*, *16*(4), 581–598. http://doi.org/10.1016/0167-4870(95)00031-6

Macharia, J., & Nyakwende, E. (2010). Vice-chancellors influence on academic staff intentions to use learning management systems (LMS) for teaching and learning. *The Journal of Language, Technology & Entrepreneurship in Africa*, *2*(1), 220–230. http://doi.org/10.4314/jolte.v2i1.52000

Macpherson, A., Elliot, M., Harris, I., & Homan, G. (2004). E-learning: Reflections and evaluation of corporate programmes. *Human Resource Development International*, *7*(3), 295–313. http://doi.org/10.1080/13678860310001630638

Maldonado, U. P. T., Khan, G. F., Moon, J., & Rho, J. J. (2011). E-learning motivation and educational portal acceptance in developing countries. *Online Information Review*, *35*(1), 66–85. http://doi.org/10.1108/14684521111113597

Mathieson, K. (1991). Predicting user intentions: Comparing the technology acceptance model with the theory of planned behavior. *Information Systems Research*, *2*(3), 173–191. http://doi.org/10.1287/isre.2.3.173

McLoughlin, C., & Lee, M. J. W. (2007). Listen and learn : A systematic review of the evidence that podcasting supports learning in higher education. *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2007*, 1669–1677. Retrieved from http://www.editlib.org.ezproxy.library.ubc.ca/p/25596

Morrison, D. (2003). *E-learning strategies: How to get implementation and delivery right first time*. West Sussex, England: John Wiley & Sons Ltd. Retrieved from http://www.raypub.com

Ndubisi, N. O. (2004). Factors influencing e-learning adoption intention : Examining the determinant structure of the decomposed theory of planned behaviour constructs. *HERDSA 2004 Conference Proceedings*, 252–262.

Nelson, R., & Cheney, P. (1987). Training end users: An exploratory study. *MIS Quarterly*, *11*(4), 549–559.

Othman, J., & Jafari, Y. (2014). Selected issues in the Malaysian agricultural sector. *Jurnal Ekonomi Malaysia*, *48*(2), 127–136.

Pantano, E., & Di Pietro, L. (2012). Understanding consumer's acceptance of technology-based innovations in retailing. *Journal of Technology Management and Innovation*, *7*(4), 1–19. http://doi.org/10.4067/S0718-27242012000400001

Park, J. H., & Choi, H. J. (2009). Factors influencing adult learners' decision to drop out or persist in online learning. *Educational Technology & Society*, *12*(4), 207–217.

Park, N., Lee, K. M., & Cheong, P. H. (2007). University instructors' acceptance of electronic courseware: An

application of the technology acceptance model. *Journal of Computer-Mediated Communication*, *13*(1), 163–186. http://doi.org/10.1111/j.1083-6101.2007.00391.x

Park, S. Y. (2009). An analysis of the technology acceptance model in understanding university students' behavioral intention to use e-learning. *Educational Technology & Society*, *12*, 150–162. http://doi.org/10.1007/s00340-009-3513-0

Pavlou, P. A., & Fygenson, M. (2006). Understanding and predicting electronic commerce adoption : An extension of the theory of planned behavior. *MIS Quarterly*, *30*(1), 115–143.

Pereira, F. A. de M., Ramos, A. S. M., Gouvêa, M. A., & da Costa, M. F. (2015). Satisfaction and continuous use intention of e-learning service in Brazilian public organizations. *Computers in Human Behavior*, *46*, 139–148. http://doi.org/10.1016/j.chb.2015.01.016

Qudais, M. A., Al-Adhaileh, M., & Al-Omari, A. (2010). Senior faculty members ' attitudes in Jordanian universities towards using information and communication technology. *International Arab Journal of E-Technology*, *1*(4), 135–141.

Ramayah, T., Soto-Acosta, P., Colomo-Palacios, R., Gopi, M., & Popa, S. (2014). Explaining the adoption of Internet stock trading in Malaysia: comparing models. *Asian Journal of Technology Innovation*, *22*(1), 131–151. http://doi.org/10.1080/19761597.2013.873110

Richardson, D. (2005). How can agricultural extension best harness ICTs to improve rural livelihoods in developing countries? *In ICT in Agriculture: Perspectives of Technological Innovation*.

Rogers, E. M. (1983). *Diffusion of innovations: Third edition*. *New York Free Press*. London: The Free Press. http://doi.org/citeulike-article-id:126680

Rosenberg, M. J. (2001). *E-learning : Strategies for delivering knowledge in the digital age*. McGraw-Hill Professional.

Saha, P., Nath, A., & Sangari, E. (2010). Success of government e-service delivery: Does satisfaction matter? Lectures Notes in Computer Science. http://doi.org/10.1007/BF03251472

Sangrà, A., Vlachopoulos, D., & Cabrera, N. (2012). Building an inclusive definition of e-learning: An approach to the conceptual framework. *International Review of Research in Open and Distance Learning*, *13*(2), 145–159.

Sela, E., & Sivan, Y. Y. (2009). Enterprise e-learning success factors: An analysis of practitioners' perspective(with a downturn addendum). *Interdisciplinary Journal of Knowledge and Learning Objects*, *5*, 335–343. Retrieved from http://ijklo.org/Volume5/IJELLOv5p335-343Sela674.pdf

Shah, J. A., Asmuni, A., & Ismail, A. (2013). Roles of extension agents towards agricultural practice in Malaysia. *International Journal on Advanced Science Engineering Information Technology*, *3*(1), 59–63. Retrieved from http://www.insightsociety.org/ojaseit/index.php/ijaseit/article/view/278

Shareef, M. A., Kumar, V., Kumar, U., & Hasin, A. A. (2009). Theory of planned behavior and reasoned action in predicting technology adoption behavior. *Handbook of Research on Contemporary Theoretical Models in Information Systems*, 544–562. http://doi.org/10.4018/978-1-60566-659-4.ch031

Sheppard, B. H., Hartwick, J., & Warshaw, P. R. (1988). The theory of reasoned action: A meta-analysis of past research with recommendations for modifications and future research. *Journal of Consumer Research*, *15*(3), 325–343. http://doi.org/10.2307/2489467

Shiue, Y.-M. (2007). Investigating the sources of teachers' instructional technology use through the decomposed theory of planned behavior. *Journal of Educational Computing Research*, *36*(4), 425–453. http://doi.org/10.2190/A407-22RR-50X6-2830

Siragusa, L., & Dixon, K. C. (2009). Theory of planned behaviour : Higher education students' attitudes towards ICT-based learning interactions. *Proceedings Ascilite Auckland 2009*, 969–980.

Sivakumar, P. S., Parasar, B., Das, R. N., & Anantharaman, M. (2014). Determinants of computer utilization by extension personnel: A structural equations approach. *The Journal of Agricultural Education and Extension*, *20*(2), 191–212. http://doi.org/10.1080/1389224X.2013.803986

Smith, S. D., & Caruso, J. (2010). The ECAR study of undergraduate students and information technology. *EDUCAUSE - Center for Applied Research*, (October), 1–13.

Solomon, G., & Schrum, L. (2007). *web 2.0 new tools, new schools*. Washington DC: International Society for Technology in Education. http://doi.org/10.1073/pnas.0703993104

Sparks, P., & Shepherd, R. (1992). Self-identity and the theory of planned behavior: Assesing the role of identification with "Green Consumerism." *Social Psychology Quarterly*, *55*(4), 388. http://doi.org/10.2307/2786955

Tamam, E., Md Sail, R., Mohamed, Z. A., Abdullah, A. M., Hamzah, M. R., & Yaakob, Z. (2008). Teaching efficacy of Universiti Putra Malaysia trainee teachers in teaching Malay language as a first language. *Pertanika Journal of Social Sciences and Humanities*, *16*(1), 31–44.

Tan, M., & Teo, T. S. H. (2000). Factors influencing the adoption of Internet banking. *Journal of the Association for Information Systems*, *1*(1), 1–44. http://doi.org/10.1016/j.elerap.2008.11.006

Taylor, S. and Todd, P. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research*, *6*(2), 144–176.

Teo, T. (2012). Examining the intention to use technology among pre-service teachers: An integration of the technology acceptance model and theory of planned behavior. *Interactive Learning Environments*, *20*(1), 3–18. http://doi.org/10.1080/10494821003714632

Tiraieyari, N., Hamzah, A., Abu Samah, B., & Uli, J. (2013). Knowledge and perceptions of extension workers on sustainable agricultural practices. *American Journal of Environmental Sciences*, *9*(1), 45–50. http://doi.org/10.3844/ajessp.2013.45.50

Tyler-Smith, K. (2006). Early attrition among first time e-learners: A review of factors that contribute to drop-out, withdrawal and non-completion rates of adult learners undertaking e-learning programmes. *Journal of Online Learning and Teaching*.

Venkatesh, V., & Morris, G. M. (2000). Why don't men ever stop to ask for directions? Fender, social influence, and their role in technology acceptance and usage behavior. *MIS Quarterly*, *24*(1), 115–139. http://doi.org/10.2307/3250981

Venkatesh, V., & Speier, C. (1999). Computer technology training in the workplace: A longitudinal investigation of the effect of mood. *Organizational Behavior and Human Decision Processes*, *79*(1), 1–28. http://doi.org/10.1006/obhd.1999.2837

Vyas, N., & Nirban, V. S. (2014). Students' perception on the effectiveness of mobile learning in an institutional context. *ELT Research Journal*, 26–36.

Wang, G. G. (2010). Theorizing e-learning participation: A study of the HRD online communities in the USA. *Journal of European Industrial Training*, *34*(4), 344–364. http://doi.org/10.1108/03090591011039081

Wiethoff, C. (2004). Motivation to learn and diversity training: Application of the theory of planned behavior. *Human Resource Development Quarterly*, *15*(3), 263–278. http://doi.org/10.1002/hrdq.1103

Wolski, S., & Jackson, S. (1999). Technological diffusion within educational institutions: Applying the technology acceptance model. *Proceedings of Society for Information Technology & Teacher Education International Conference 1999*, 1718–1723. Retrieved from http://www.editlib.org/p/8182

Wu, C.-H., & Chen, T.-C. (2012). Understanding e-learning system usage behavior: An evolutionary psychology perspective. *Procedia - Social and Behavioral Sciences*, *64*, 362–371. http://doi.org/10.1016/j.sbspro.2012.11.043

Yazdanpanah, M., Hayati, D., Hochrainer-Stigler, S., & Zamani, G. H. (2014). Understanding farmers' intention and behavior regarding water conservation in the Middle-East and North Africa: A case study in Iran. *Journal of Environmental Management*, *135*, 63–72. http://doi.org/10.1016/j.jenvman.2014.01.016

Yoo, S. J., & Huang, W. D. (2015). Can e-learning system enhance learning culture in the workplace? A comparison among companies in South Korea. *British Journal of Educational Technology*, n/a-n/a. http://doi.org/10.1111/bjet.12240

Yunus, Y., & Salim, J. (2013). E-learning evaluation in Malaysian public sector from the pedagogical perspective: Towards e-learning effectiveness. *Journal of Theoretical and Applied Information Technology*, *51*(2), 201–210.