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# How do we inspire children to learn with e-readers?

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## Abstract

**Purpose** – Mobile handheld e-readers, such as the iPad and Kindle, have gained increased attention in schools and are becoming useful as a tool to attract students to learn and read. Although the benefits of mobile learning are clear, few studies have delved into the specific factors impacting the adoption and use of e-readers among elementary students. Moreover, the question of whether learning with e-readers can enhance reading comprehension remains unanswered. Given these facts, the study has a dual purpose. In order to explore the above-mentioned factors, the authors base the proposed research model on the task-technology fit (TTF) and self-efficacy theories, along with the technology acceptance model. Second, the authors examine the relationship between reading with e-readers and reading comprehension. The paper aims to discuss these issues.

**Design/methodology/approach** – A sample of 60 third grade children participated in the study. The reading material used in this research was an e-book edition of the Chinese printed storybook Missing Grandmother. The causal model was validated using SmartPLS 2.0. In addition, this research used the SPSS statistical software package (SPSS for Windows, 17.0) to conduct a *t*-test and analysis of variance with a confidence level of 95 percent.

**Findings** – All eight study hypotheses were supported. The results indicate that TTF and mobile learning self-efficacy have the most significant influence on intention to learn with e-readers. The authors also found that children's reading comprehension is enhanced in an e-book reading group. The analysis revealed no gender differences in reading comprehension.

**Originality/value** – This study explored factors which increase children's intention to learn with e-readers. The proposed model helps the authors to understand the influence of mobile learning self-efficacy, perceived usefulness, perceived ease of use, and TTF on this intention. The authors also compared e-books and p-books in regards to usability and found that e-book reading can improve third grade children's reading comprehension. The authors found no gender differences in either the p-book reading group or the e-book reading group.

**Keywords** Self-efficacy, E-book, Technology acceptance model, E-reader, Task-technology fit
**Paper type** Research paper

## Introduction

As the technology for electronic books (e-books) has developed, the topic of e-books has become increasingly popular (Landoni and Hanlon, 2007; Wilson, 2014). E-books are portable and can effectively support learning missions. People can read e-books everywhere via various electronic devices. An e-book is officially defined as a book formed with digital presentations, including text, graphics, video, animation, and/or sound, and shows the content on the screen of desktop PC or mobile device (Merriam-Webster.com, 2013). Digital information which is stored and accessed via an e-book has certain advantages over paper books (p-books), including storage capacity, price, searchability, font adjustability, and easier readability at night (Jeong, 2012).

E-book readers (e-readers), including the Amazon Kindle, Noble Nook, iPad, and tablet PC, allow users to find and read specific content with greater ease and efficiency



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than is possible with a p-book (Shelburne, 2009). For example, e-readers enable individuals to quickly find any appropriate related information they need from within the contents of the book. Moreover, students like the storage capacity, navigation functionality, ease of use, and light weight of e-book devices (Gibson and Gibb, 2011). Although e-readers have existed for some time, they are only just now achieving a significant level of popularity. The usability and desirability of e-book readers remains somewhat problematic (Grenina, 2012; Richardson and Mahmood, 2012). E-readers present an exciting and controversial issue for users (Foasberg, 2011; Jeong, 2012). The electronic resources is affecting significant impacts on the children who are reluctant to read and do not react well to deal with the conventional print media. Research has shown that reading on an e-reader satisfies users the same as does reading a printed book, in spite of the fact that e-book reading speeds are generally slower (Nielsen, 2010). However, since evidence regarding the relationship between children's reading comprehension and e-reader usage has been inconclusive (Korat, 2010), this relationship merits further study.

In summary, our study has two purposes: to explore the factors affecting children's intention to read e-books using e-readers, and to examine how children's reading comprehension differs when they read e-books vs p-books. Since the technology acceptance model (TAM), task-technology fit (TTF), and self-efficacy theories are widely used in related studies (e.g. Bergström and Höglund, 2014; Kuo and Lee, 2011; Park *et al.*, 2012; Yen *et al.*, 2010), we integrated these theories into our framework.

## Literature review

### *E-books and e-readers*

Compared with p-books, e-books have greater potential as a solution for reducing the cost of reading material (Hilton and Wiley, 2010). Although some students do not prefer e-books over traditional paper textbooks, e-book collections in libraries have grown dramatically in recent years (Wu and Mitchell, 2010). E-books are becoming increasingly popular among not only college and university students, but also among public library users. This indicates that the e-book market has great growth potential (Shaw, 2010). Particularly, e-books have the potential to inspire children to read, even those who are lazy and lack good reading habits (Barlow and Skidmore, 2010; Maceviciute *et al.*, 2014).

E-book usage findings in the extant literature have been inconsistent (Kumbhar, 2012). According to Wu and Chen (2010), graduate students in the humanities rely more heavily on printed resources than on electronic materials. Shereff (2010) claimed that biomedical content is especially suitable for the electronic format. Herlihy and Yi (2010) indicated that, over the years, e-book usage has declined in areas such as science, technology, education, history, and social sciences. Nevertheless, when comparing the departments of pure and applied sciences, Bierman *et al.* (2010) found no marked differences in faculty e-book usage.

Since, at this writing, e-readers are a relatively new technology, issues regarding these devices are receiving increasing attention from researchers. For example, Herther (2009) found that students who use Amazon's Kindle DX liked its better screen resolution, its ability to play music, and having the option to take notes using hypertext. However, complaints were raised regarding the lack of a color display, and the unit's high cost, heavier weight, poorly designed keyboard, and inability to zoom or scroll when viewing PDF files. According to Kiriakova *et al.* (2010), 96 percent of university students consider e-book readers to be comfortable to use. Foasberg (2011) indicated price as the greatest

barrier to e-reader adoption, and reported that college students appear uninterested in checking out e-books from the library. These inconsistent findings show the need for further exploration into issues regarding the e-book and e-reader usage.

*Reading comprehension*

Differences in e-books' and p-books' impacts on reading behaviors are usually evaluated via measurements of reading comprehension, but the results have proven debatable. Macedo-Rouet *et al.* (2003) found that readers of e-books score lower in reading comprehension tests than do those who read p-books. However, Grimshaw and Dungworth's (2004) UK study found that children reading a printed book and children reading an e-book version of the same book scored essentially the same on reading comprehension tests. Kang *et al.* (2009) demonstrated that reading accuracy was similar when e-books and p-books were compared. Moreover, it is believed that e-books can support the knowledge young children acquire from printed sources (Korat, 2009, 2010). One study found that children between the ages of 4 and 6 showed significant improvement in their word-reading ability of after having read an e-book (Korat, 2009). From this we infer that reading e-books can improve children's reading performance. Since the number of recent studies on e-reader users is not large (Foasberg, 2011; Richardson and Mahmood, 2012), we chose to investigate differences in the reading comprehension of children using e-books vs p-books.

*Acceptance model*

The TAM, TTF, and self-efficacy models have been used in a variety of educational settings (Callum and Jeffrey, 2013; Park *et al.*, 2012). The TAM conceptualized the idea that individuals will intend to use an information system if they think it will be useful (perceived usefulness (PU)) and that using the system will not be difficult (perceived ease of use (PEOU)) (Davis, 1989; Venkatesh and Davis, 2000). Self-efficacy and TTF are two particular constructs often used to extend the TAM in an education context (Kuo and Lee, 2011; Park *et al.*, 2012; Yen *et al.*, 2010). The common idea of self-efficacy was established in Bandura's (1986) social cognitive theory. Individuals tend to behave in ways that they believe will have valuable results, and they will avoid behaviors they perceive as having unfavorable consequences. TTF is also useful when conducting research on predictions regarding technology usage. Goodhue and Thompson (1995, p. 216) defined TTF as "the degree to which a technology assists an individual in performing his or her portfolio of tasks." The concept of TTF has been applied to explaining how the match or mismatch between task characteristics and technology influence the outcome of the use of technology in many areas (Pagani, 2006), including e-commerce, mobile business applications, and software engineering (Gebauer and Shaw, 2004).

## Research model

Our research model (Figure 1, below) is based on an extension of the TAM. With e-reader technology as the focus, the proposed model explores how TTF and mobile learning self-efficacy influence users' beliefs and intentions. In the sections that follow, we define the constructs and describe the rationale behind each of our proposed hypotheses.

*TAM*

Davis *et al.* (1989) indicated that PU, PEOU (PEOU), and behavioral intention are three major factors which explain user behavior. Szajna (1996) indicated that PU and PEOU have proven to be consistently accurate predictors of acceptance intentions. In this study,

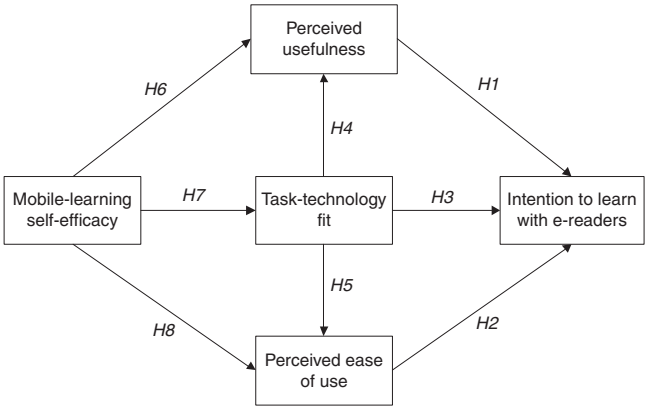



**Figure 1.**
Research model

we define PEOU as the level of a person's belief that reading e-books on an e-reader will be effortless, and PU as the level of a person trusts the reading e-books on an e-reader will increase his/her performance when accomplishing a learning activity. Recently, the TAM has been successfully adopted by several studies exploring users' acceptance of teaching or learning systems/technologies (Callum and Jeffrey, 2013; Park *et al.*, 2012). According to the TAM, people will have a greater willingness to adopt a particular information system or new technology when they think it can help them properly perform a task, and/or they have the sense that using the IS/IT will be effortless. Accordingly, the hypotheses can be assumed in the follows:

*H1.* PU will have a positive effect the intention to learn with e-readers.

*H2.* PEOU will have a positive effect the intention to learn with e-readers.

*TTF*

Goodhue and Thompson (1995) presented the concept of TTF as a means by which to illustrate the connection among an information system and each person's behavior. TTF implies a match between the technology's capabilities and the demands of the task. Thus, a person will adopt a certain technology only if its features match the characteristics of the task it is intended to facilitate. For example, Yen *et al.* (2010) found that the usage of a mobile device is affected by perceived match between task characteristics and the technology's functionality. The model suggested by Dishaw and Strong (1999) incorporates concepts from both the TAM and TTF. In their model, perceptions of the PU and PEOU will be influenced by TTF. Thus, we propose the following three hypotheses:

*H3.* TTF will have a positive effect on the intention to learn with e-readers.

*H4.* TTF will have a positive effect on PU.

*H5.* TTF will have a positive effect on PEOU.

*Mobile learning self-efficacy*

Mobile learning is a new aspect of e-learning style. With the mobile learning approach, learners can access the learning materials by using many popular mobile devices, like cellular phones, smart phones, and tablet PC (Kukulska-Humle and Traxler, 2005). Mobile

learning self-efficacy refers to an individual's belief about his/her capabilities to use mobile devices to accomplish learning tasks. A higher level of mobile learning self-efficacy indicates that user has sufficient ability to use mobile devices to accomplish difficult and sophisticated learning tasks. How self-efficacy affects PU, PEOU, and TTF have been examined in past studies. For example, Park *et al.* (2012) discovered that mobile learning self-efficacy has significant influence on PEOU. Lin and Huang (2008) demonstrated that self-efficacy regarding knowledge management systems directly affects TTF. Holden and Rada (2011) indicated that computer self-efficacy directly relates to PU and PEOU. Therefore, the hypotheses can be assumed in the follows:

*H6.* Mobile learning self-efficacy will have a positive effect on PU.

*H7.* Mobile learning self-efficacy will have a positive effect on TTF.

*H8.* Mobile learning self-efficacy will have a positive effect on PEOU.

## Methodology

### *Participants and setting*

The sample consisted of 60 children in two third grade classes in a school in Taiwan. Each class had 30 students. Before participating in our experiment, the students had to finish a Chinese reading comprehension test. We compared the means of the students' reading comprehension scores in each class to ensure that the reading comprehension abilities of the students in the two classes were not significantly different from the start. Our study used an e-book version of the Chinese printed storybook Missing Grandmother. This e-book includes music and animation. Two experts on children's literature examined the book and confirmed it to acceptable reading material for children. The structure of the story and the simplicity of its narrative elements – the setting, the characters, the goal and the initiating event, the problem and the final resolution and conclusion (Mandler and Johnson, 1977) – were deemed suitable for participants the age of those in our study. The e-reader used in this study has an eight-inch LCD screen (not a touch screen), speakers, USB host capability, and a memory card slot. Functionality that allows for text to be reread or listened to again is also available.

A reading comprehension test for the storybook was developed by the two experts. The test was comprised of ten questions, all of which were multiple choice questions. One point was to be awarded for every correct answer. In this research, a questionnaire was developed and used to evaluate users' perceptions regarding e-readers with 11 items. These measurement items were designed by using five-point Likert scale and modified briefly to match the e-reader context. The measure items for mobile learning self-efficacy were modified from Park *et al.* (2012). In addition, the measure items for TTF were revised from Dishaw and Strong (1999). Measures for PEOU and PU were adapted from Teo (2011). Besides, there are two measure items adopted from Hsiao *et al.* (2010) were used to assess intention. Table I shows the constructs and items.

The students of one class were assigned a printed storybook while the students of the other class were assigned an e-reader on which to read the electronic storybook. The students using the printed storybook spent the first 20 minutes reading the book. Following that, they completed the reading comprehension test and the questionnaire. The students in the class using the e-readers spent the first 15 minutes learning to use the e-reader's functions to read the e-book. Following this instruction,

| Constructs | Items |
|---|---|
| Task-technology fit | 1. I can get information quickly and easily through the e-reader when I need it |
| | 2. The functions in the e-reader are basically sufficient to help me do what I need to do |
| Perceived ease of use | 1. I believe that it's easy for me to learn to use an e-reader |
| | 2. I believe e-readers are easy to use |
| Perceived usefulness | 1. Using e-readers makes it more likely that I can do things that I believe are important |
| | 2. I can get things done faster using an e-reader |
| Mobile learning self-efficacy | 1. I am good at using mobile device menus or applications for mobile learning |
| | 2. I am confident that I can use both mobile devices and computers for mobile learning |
| | 3. I have the required technical abilities for mobile learning |
| Intention to learn with e-readers | 1. I intend to continue to use e-readers |
| | 2. I predict that I will use e-readers continuously in the future |

**Table I.**
Research constructs and items

they spent 20 minutes reading the e-book, after which they completed the reading comprehension test and the questionnaire. All of the students' data were recorded and used in the research analysis.

*Data analysis*

Partial least squares structural equation modeling (PLS-SEM) method was employed to analyze our research model and hypotheses. Compared to other structural equation modeling (SEM), PLS-SEM can accommodate a smaller sample size when validating a model (Chin *et al.*, 2003). In addition, the PLS-SEM method can measure and asses the parameters of the proposed model and structural path coefficients at the time. Besides being able to use a smaller sample, PLS-SEM also puts less strict requirements on the measurement items and statistical assumptions (Chin *et al.*, 2003). Based on the above reasons, this study has the effective sample size of 30 e-reader users will be satisfied the PLS-SEM requirements (Chin, 1998).

We used the SPSS statistical software package (SPSS for Windows, 17.0) to conduct a *t*-test and analysis of variance (ANOVA) with a confidence level of 95 percent. The *t*-test was used to examine whether or not students using e-readers have better reading comprehension test scores, and the ANOVA test was used to determine whether or not the test scores of male and female students differ significantly.

## Results

*Instrument validity*

We assessed convergent and discriminant validity by investigating composite reliability and average variance extracted (AVE) (Hair *et al.*, 1998). Though many researches employing PLS-SEM have considered 0.5 to be an acceptable threshold for measure reliability, a construct reliability is properly ensured with a value of 0.7 (Chin, 1998). In Table II, the factor loadings of all items were exceeded 0.7. In Table III, the values of composite reliability were from 0.805 to 0.933, well above the 0.7 threshold. AVE values from all constructs ranged between 0.649 and 0.874, exceeding Fornell and

**Table II.** Individual item reliability

| Construct | Item | Loading | Mean | Composite reliability | AVE |
|---|---|---|---|---|---|
| Intention (INT) | 1 | 0.929 | 3.60 | 0.872 | 0.718 |
| | 2 | 0.827 | | | |
| PU | 1 | 0.829 | 4.46 | 0.849 | 0.649 |
| | 2 | 0.889 | | | |
| PEOU | 1 | 0.923 | 3.95 | 0.933 | 0.874 |
| | 2 | 0.947 | | | |
| Mobile learning self-efficacy (MLS) | 1 | 0.857 | 4.10 | 0.856 | 0.669 |
| | 2 | 0.788 | | | |
| | 3 | 0.808 | | | |
| TTF | 1 | 0.745 | 4.48 | 0.805 | 0.676 |
| | 2 | 0.892 | | | |

**Note:** $n = 30$

**Table III.** Analysis of discriminant validity

| Construct | INT | PEOU | PU | MLS | TTF |
|---|---|---|---|---|---|
| INT | *0.847* | | | | |
| PEOU | 0.514 | *0.935* | | | |
| PU | 0.466 | 0.339 | *0.806* | | |
| MLS | 0.300 | 0.655 | 0.505 | *0.818* | |
| TTF | 0.579 | 0.493 | 0.620 | 0.460 | *0.824* |

**Note:** $n = 30$

Larcker's (1981) recommended value of 0.5 (see Table III). Thus, we conclude that our measurement items were adequate convergent and validity according to researchers' experiences and suggestions.

*t-Test and ANOVA*

Reading comprehension score means and standard deviations for each experimental condition are shown in Table IV. The students reading the e-book ($M = 7.1$, SD = 1.029) scored higher than did those reading the p-book ($M = 6.0$, SD = 1.203). An independent *t*-test was used to determine whether the participants who read the p-book and participants who read the e-book scored significantly differently on reading comprehension tests. Table IV shows an obviously distinction between p-book and e-book reading comprehension scores ($t = -3.805$, $p < 0.001$). From this we infer that reading an e-book appears to enable better reading comprehension than does reading a p-book.

Gender differences in this experiment are illustrated by the means and standard deviations of the students' reading comprehension scores for each condition in our study (Table V). We used two-way analysis to evaluate if gender differences had any

**Table IV.** Means and standard deviations of children's reading comprehension scores

| | P-book reading | | E-book reading | | Test results | |
|---|---|---|---|---|---|---|
| | *M* | SD | *M* | SD | *t*-Value | $p <$ |
| Reading comprehension score | 6.0 ($n = 30$) | 1.203 | 7.1 ($n = 30$) | 1.029 | −3.805 | 0.001* |

significant impact on the scores of students who read the p-book vs the e-book. The difference between the male and female groups was discovered to be insignificant ($F = 1.087$, $p = 0.302$) (Table VI). The interaction effect between gender and reading group was not significant either ($F = 0.903$, $p = 0.346$).

*Model testing results*

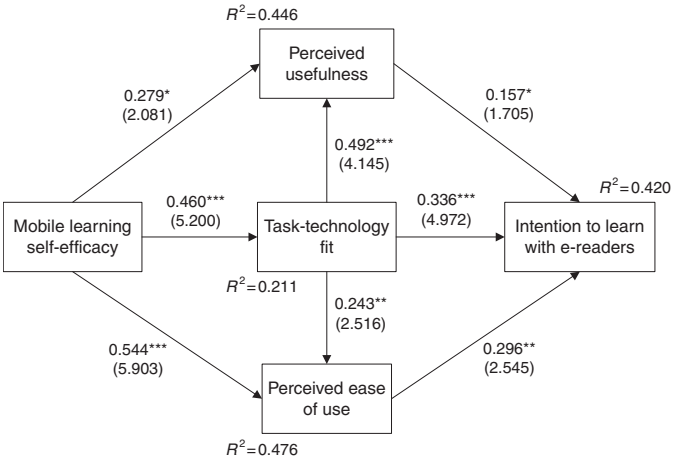
We assessed the structural model and hypotheses examining path coefficients (Figure 2). The data sample's test results indicate that PU and PEOU influence intention ($\beta = 0.157$, $p < 0.05$; $\beta = 0.296$, $p < 0.01$), supporting *H1* and *H2*. The effect of TTF on the intention, PU, and PEOU were all significant ($\beta = 0.336$, $p < 0.001$; $\beta = 0.492$, $p < 0.001$; $\beta = 0.243$, $p < 0.01$), supporting *H3*, *H4*, and *H5*. The same as mobile learning self-efficacy on PU,

| Group | Gender | *M* | SD | Number |
|---|---|---|---|---|
| P-book reading | Female | 5.60 | 1.430 | 10 |
| | Male | 6.20 | 1.056 | 20 |
| E-book reading | Female | 7.08 | 1.24 | 12 |
| | Male | 7.11 | 0.90 | 18 |

**Table V.** Means and standard deviations of male and female children's reading comprehension score

| Source | df | SS | MS | *F* | $p <$ |
|---|---|---|---|---|---|
| Intercept | 1 | 2,339 | 2,339 | 1,863.362 | 0.001* |
| Reading group | 1 | 19.846 | 19.846 | 15.811 | 0.001* |
| Gender | 1 | 1.364 | 1.364 | 1.087 | 0.302 |
| Reading group × gender | 1 | 1.113 | 1.113 | 0.903 | 0.346 |
| Error | 56 | 70.294 | 1.255 | | |
| Total | 60 | | | | |

**Table VI.** Results of two-way ANOVA for reading comprehension score




**Notes:** *$p<0.05$; **$p<0.01$; ***$p<0.001$ (one-tailed)

**Figure 2.** Analysis results

TTF, and PEOU were significant ($\beta = 0.279$, $p < 0.05$; $\beta = 0.460$, $p < 0.001$; $\beta = 0.544$, $p < 0.001$), supporting *H6*, *H7*, and *H8*. PU, TTF, and PEOU explained 42 percent of the variance in users' intention to learn with e-readers.

In Table VII, the direct, indirect, and total effects of PU, TTF, PEOU, and mobile learning self-efficacy on behavioral intention are listed. Finally, the empirical results demonstrate that TTF and mobile learning self-efficacy have a stronger impact on intention while the effects of PU and PEOU are less significant.

*Discussions*

The purposes of this paper were to investigate factors that impact children's intention to learn with e-readers, and to determine whether e-books or p-books better facilitate a child's reading comprehension. Our usage of the TAM and TTF was successful in this context, indicating that our model was robust. The findings suggest that, in general, students are confident in their mobile learning skills and intend to use e-readers going forward. The related statistical tests of our measurement model were confirmed to be adequate. The statistical significance of each of our structural model's path coefficients was confirmed.

We found that mobile learning self-efficacy and TTF are the key factors. In particular, we found that mobile learning self-efficacy is a critical antecedent of PU, TTF, and PEOU. Therefore, if students know how to learn via mobile devices and have a higher degree of mobile learning self-efficacy, their PU, TTF, and PEOU will be enhanced, increasing their intention to learn with e-readers. The results confirmed that mobile learning self-efficacy on the adoption of mobile learning is mediated by means of the PU and PEOU (Callum and Jeffrey, 2013). We recommend that elementary school teachers increase students' mobile learning self-efficacy to encourage them to learn with e-readers. Past research has also found that students who are competent users of information and communications technology are more likely to adopt mobile learning (Callum and Jeffrey, 2013). This suggests that the intention to use a novel e-learning technology is enhanced by a minimum skill level in a range of basic computing tasks. Surprisingly, the effect of PU and PEOU on the intention is relatively weak. That indicates that PU and PEOU are not the most important factors in a mobile learning context. TTF will be the main factor affecting students' choice regarding whether or not to learn with e-readers.

The results of two-way ANOVA confirm that reading e-books with e-readers can increase students' reading comprehension (Korat, 2010). Though previous research has revealed no obviously distinction between p-books and e-books groups (Kang *et al.*, 2009; Macedo-Rouet *et al.*, 2003), our study results suggest that reading performance was enhanced when students used e-books instead of p-books. This may be because the interactivity of e-readers and e-books can increase students' concentration while reading, and the animation and sound of e-books can help students "catch the point."

**Table VII.** Direct, indirect, and total effects

| Constructs | Intention | | |
|---|---|---|---|
| | Direct effects | Indirect effects | Total effect |
| PU | 0.157 | – | 0.157 |
| TTF | 0.336 | 0.149 | 0.485 |
| PEOU | 0.296 | – | 0.296 |
| Mobile learning self-efficacy | – | 0.428 | 0.428 |

The students reported that the e-reader was a useful reading device, and most of the students considered the e-reader to be easy to use. The findings partially provide assistance with previous researches in which students were shown to perceive e-readers in a positive light (Carlock and Perry, 2008; Jeong, 2012).

## Conclusion

As electronically published books are increasingly available, and the use of handheld devices such as e-readers becomes more common, children can gain significant benefits from time spent independently reading e-books (Korat, 2010). This study explored factors which increase children's intention to learn with e-readers. The proposed model improves our comprehension of the influence of mobile learning self-efficacy, PU, PEOU, and TTF on this intention. We also evaluated e-books vs that of p-books in terms of usability and found that reading e-books can improve third grade children's reading comprehension. We found no gender differences in either the e-book reading group or the p-book reading group.

Several limitations must be taken into consideration when generalizing the results of this study. First, our survey used self-report scales to estimate the research variables, and thus may be considered including more related variables in the future. Second, because of the limitation of teaching resources, including teacher manpower, the amount of e-readers, and the time cost, there were only 60 students selected and participated in this study. Future studies can further examine our analysis results by sampling a larger number and wider variety of students and by using different types of e-readers. Third, in order to increase the utility of the proposed model, future studies can reach out to colleagues in other countries and determine what role the culture in different countries might play. More research is necessary to confirm our model's validity. Finally, since this study belongs to a cross-sectional research, children's reactions could not be measured over time. Without the longitudinal evidence that allows us to predict behavior over time, we cannot fully understand the causality and interrelationships between these variables.

## References

Bandura, A. (1986), *Social Foundations of Thought and Action*, Prentice-Hall, Englewood Cliffs, NJ.

Barlow, S. and Skidmore, S. (2010), "To e or not to e? That and a lot of other questions", *The School Librarian*, Vol. 58 No. 2, p. 70.

Bergström, A. and Höglund, L. (2014), "A national survey of early adopters of e-book reading in Sweden", *Information Research*, Vol. 19 No. 2, p. 621, available at: http://InformationR.net/ir/19-2/paper621.html

Bierman, J., Ortega, L. and Rupp-Serrano, K. (2010), "E-book usage in pure and applied sciences", *Science & Technology Libraries*, Vol. 29 Nos 1/2, pp. 69-91.

Callum, K.M. and Jeffrey, L. (2013), "The influence of students' ICT skills and their adoption of mobile learning", *Australasian Journal of Educational Technology*, Vol. 29 No. 3, pp. 303-314.

Carlock, D. and Perry, A. (2008), "Exploring faculty experiences with ebooks: a focus group", *Library Hi Tech*, Vol. 26 No. 2, pp. 244-254.

Chin, W.W. (1998), "The partial least squares approach to structural equation modeling", in Marcoulides, G.A. (Ed.), *Modern Methods for Business Research*, Lawrence Erlbaum Associates, Mahwah, NJ, pp. 295-336.

Chin, W.W., Marcolin, B.L. and Newsted, P.R. (2003), "A partial least squares latent variable modeling approach for measuring interaction effects: results from a Monte Carlo simulation study and an electronic mail motion/adoption study", *Information Systems Research*, Vol. 14 No. 2, pp. 189-217.

Davis, F.D. (1989), "Perceived usefulness, perceived ease of use, and user acceptance of information technology", *MIS Quarterly*, Vol. 13 No. 3, pp. 319-340.

Dishaw, T. and Strong, M. (1999), "Extending the technology acceptance model with task-technology fit constructs", *Information & Management*, Vol. 36 No. 1, pp. 9-21.

Foasberg, N.M. (2011), "Adoption of e-book readers among college students: a survey", *Information Technology & Libraries*, Vol. 30 No. 3, pp. 108-128.

Fornell, C. and Larcker, D.F. (1981), "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, Vol. 18 No. 1, pp. 39-50.

Gebauer, J. and Shaw, M.J. (2004), "Success factors and impacts of mobile business applications: results from a mobile e-procurement study", *International Journal of Electronic Commerce*, Vol. 8 No. 3, pp. 19-41.

Gibson, C. and Gibb, F. (2011), "An evaluation of second generation e-book readers", *The Electronic Library*, Vol. 29 No. 3, pp. 303-319.

Goodhue, D. and Thompson, R.L. (1995), "Task-technology fit and individual performance", *MIS Quarterly*, Vol. 19 No. 2, pp. 213-236.

Grenina, A. (2012), "Electronic books: content provision and adoption possibilities among users in Latvia", *Information Research*, Vol. 17 No. 1, paper 512, available at: http://InformationR.net/ir/17-1/paper512.html

Grimshaw, S. and Dungworth, N. (2004), "Electronic books: children's reading practices and comprehension", *British Journal of Educational Technology*, Vol. 38 No. 4, pp. 583-599.

Hair, J.F., Anderson, R.E., Tatham, R.L. and Black, W.C. (1998), *Multivariate Data Analysis with Reading*, 5th ed., Prentice-Hall, Englewood Cliffs, NJ.

Herlihy, C.S. and Yi, H. (2010), "E-books in academic libraries: how does currency affect usage", *New Library World*, Vol. 111 Nos 9/10, pp. 371-380.

Herther, N.K. (2009), "Kindle DX: Amazon's latest eBook reader", *Information Today*, Vol. 26 No. 9, pp. 26-27.

Hilton, J.I. and Wiley, D. (2010), "The short-term influence of free digital versions of books on print sales", *The Journal of Electronic Publishing*, Vol. 13 No. 1, pp. 1-11.

Holden, H. and Rada, R. (2011), "Understanding the Influence of perceived usability and technology self-efficacy on teachers' technology acceptance", *Journal of Research on Technology in Education*, Vol. 43 No. 4, pp. 343-367.

Hsiao, K.L., Lin, J.C.C., Wang, X.Y., Lu, H.P. and Yu, H. (2010), "Antecedents and consequences of trust in online product recommendation: an empirical study in social shopping", *Online Information Review*, Vol. 34 No. 6, pp. 935-953.

Jeong, H. (2012), "A comparison of the influence of electronic books and paper books on reading comprehension, eye fatigue, and perception", *The Electronic Library*, Vol. 30 No. 3, pp. 390-408.

Kang, Y., Wang, M.J. and Lin, R. (2009), "Usability evaluation of e-books", *Displays*, Vol. 30 No. 2, pp. 49-52.

Kiriakova, M., Okamoto, K.S., Zubarev, M. and Gross, G. (2010), "Aiming at a moving target: pilot testing eBook readers in an urban academic library", *Computers in Libraries*, Vol. 30 No. 2, pp. 20-24.

Korat, O. (2009), "The effects of CD-ROM storybook reading on children's emergent literacy as a function of age group and repeated reading", *Education and Information Technologies*, Vol. 14 No. 1, pp. 39-53.

Korat, O. (2010), "Reading electronic books as a support for vocabulary, story comprehension and word reading in kindergarten and first grade", *Computers & Education*, Vol. 55 No. 1, pp. 24-31.

Kukulska-Humle, A. and Traxler, J. (2005), *Mobile Learning: a Handbook for Educators and Trainers*, Routledge, London.

Kumbhar, R. (2012), "E-books: review of research and writing during 2010", *The Electronic Library*, Vol. 30 No. 6, pp. 777-795.

Kuo, R.Z. and Lee, G.G. (2011), "Knowledge management system adoption: exploring the effects of empowering leadership, task-technology fit and compatibility", *Behaviour & Information Technology*, Vol. 30 No. 1, pp. 113-129.

Landoni, M. and Hanlon, G. (2007), "E-book reading groups: interacting with e-books in public libraries", *The Electronic Library*, Vol. 25 No. 5, pp. 599-612.

Lin, T.C. and Huang, C.C. (2008), "Understanding knowledge management system usage antecedents: an integration of social cognitive theory and task technology fit", *Information & Management*, Vol. 45 No. 6, pp. 410-417.

Macedo-Rouet, M., Rouet, J.F., Epstein, I. and Fayard, P. (2003), "Effects of online reading on popular science comprehension", *Science Communication*, Vol. 25 No. 2, pp. 99-128.

Maceviciute, E., Borg, M., Kuzminiene, R. and Konrad, K. (2014), "The acquisition of e-books in the libraries of the Swedish higher education institutions", *Information Research*, Vol. 19 No. 2, paper 620, available at: http://InformationR.net/ir/19-2/paper620.html

Mandler, J.M. and Johnson, N.S. (1977), "Remembrance of things parsed: story structure and recall", *Cognitive Psychology*, Vol. 9 No. 1, pp. 111-151.

Merriam-Webster.com (2013), "e-Book", available at: www.merriam-webster.com/dictionary/e-book (accessed June 1, 2013).

Nielsen, J. (2010), "iPad and Kindle reading speeds", available at: www.nngroup.com/articles/ipad-and-kindle-reading-speeds/ (accessed June 1, 2013).

Pagani, M. (2006), "Determinants of adoption of high speed data services in the business market: evidence for a combined technology acceptance model with task technology fit model", *Information & Management*, Vol. 43 No. 7, pp. 847-860.

Park, S.Y., Nam, M.W. and Cha, S.B. (2012), "University students' behavioral intention to use mobile learning: evaluating the technology acceptance model", *British Journal of Educational Technology*, Vol. 43 No. 4, pp. 592-605.

Richardson, J.V. Jr and Mahmood, K. (2012), "eBook readers: user satisfaction and usability issues", *Library Hi Tech*, Vol. 30 No. 1, pp. 170-185.

Shaw, W. (2010), "The forgotten book market", *Information Today*, Vol. 27 No. 6, p. 22.

Shelburne, W.A. (2009), "E-book usage in an academic library: user attitudes and behaviors", *Library Collections, Acquisitions, and Technical Services*, Vol. 33 Nos 2/3, pp. 59-72.

Shereff, D. (2010), "Electronic books for biomedical information", *Journal of Electronic Resources in Medical Libraries*, Vol. 7 No. 2, pp. 115-125.

Szajna, B. (1996), "Empirical evaluation of the revised technology acceptance model", *Management Science*, Vol. 42 No. 1, pp. 85-92.

Teo, T. (2011), "Factors influencing teachers' intention to use technology: model development and test", *Computers & Education*, Vol. 57 No. 4, pp. 2432-2440.

Venkatesh, V. and Davis, F.D. (2000), "Extrinsic and intrinsic motivation to use computers in the work place", *Journal of Applied Psychology*, Vol. 22 No. 14, pp. 1111-1132.

Wilson, T.D. (2014), "The e-book phenomenon: a disruptive technology", *Information Research*, Vol. 19 No. 2, paper 612, available at: http://InformationR.net/ir/19-2/paper612.html

Wu, A. and Mitchell, A.M. (2010), "Mass management of e-book catalog records: approaches, challenges, and solutions", *Library Resources & Technical Services*, Vol. 54 No. 3, pp. 164-174.

Wu, M. and Chen, S. (2010), "The impact of electronic resources on humanities graduate student theses", *Online Information Review*, Vol. 34 No. 3, pp. 457-472.

Yen, D.C., Wu, C.S., Cheng, F.F. and Huang, Y.W. (2010), "Determinants of users' intention to adopt wireless technology: an empirical study by integrating TTF with TAM", *Computers in Human Behavior*, Vol. 26 No. 5, pp. 906-915.

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