

The Effect Assessment of Reading Experience and Use Intention for AR Interactive Device

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ABSTRACT

This research has designed the "Interactive Device – Food Island" with the intention of promoting the concept of food safety in an interactive way. In order to examine the value of interactive devices in the aspect of the reading experience and the purpose of reuse. This research will ask people to take the "Interactive Device" survey to explore the reading experience. This research has obtained 192 valid questionnaires from the surveyors. The results of the analysis: (1) a good "Interface design" could have positive influence on the "Technology acceptance model". (2) The explanation rate reaches 41.7% in the "Reading experience" for the "Interactive Device – Food Island". "Interface design", "Usability", and "Perceived enjoyment" could have a positive impact on the "Reading experience". (3) Compared with the "Interface design", the "Usability", and the "Reading experience", the factor of "Perceived enjoyment" may be more effective in the "Intention to reuse", the explanation rate reaches 44.8%. Thus, this research has concluded that the "Interactive Device – Food Island" could improve the positive "Reading experience" so to attract the user to use it again. The conclusion of this research can be a reference for food safety education in digital communication.

Keywords: computation design, technology education, science education

INTRODUCTION

Since 2011, Taiwan has gone through several food safety crises; that is why food safety has become a crucial issue in Taiwan. As seen in the theme of food safety, it has been presented by the candidates in the 2014 Taipei mayor election, as well as the 2016 presidential election in Taiwan. According to the Taiwan Communication Survey in 2015, the data shown that: 93.4% of the population in Taiwan are very concerned on the issue of food safety. It is clear that the majority of the citizens care about the issue with food safety; 49.1% of the population consider their health is heavily influenced by the food they consume. Thus putting emphasis on the education of food safety is a crucial issue that should be taken in to consideration (TCS, 2017).

Education on Food safety could be practiced through "product's procedure" and "users' recognition". (1) Product's procedure education: to improve the quality of the mandatory training for the job. In addition to further educate the employees and their attentiveness, on the importance of sanitation and etc. Also to further advocate the Food safety system - Hazard Analysis and Critical Control Point (Bucknavage & Cutter, 2009), with the standard procedure of the system could help us acquire the accurate insight on food safety. (2) Users' awareness to enhance the familiarity of food products, such as the method of planting, nutrition and the ingredients in the food we consume can be used to educate people on the correct concept on food safety. The purpose of the procedure is to educate the workers in the food industry, as well as the public. Part of the users' education can help to provide information on the subject of food safety. While under the laws of food safety, the supervision system of the central administration, the crisis on food safety is still problematic. Thus, the ability to recognize the importance of health and food safety will be a significant matter. This makes it a key factor in promoting the concept of food safety to the public. How do we effectively educate the concept of food safety to improve people's health? This is the primary issue concerning the health of the Taiwanese, and the conclusion will be essential to the question of this research.

Contribution of this paper to the literature

- This research has testified that the interactive technology could create a reading experience, as well as to enhance the acceptance of the content of the theme.
- The “Interface design”, “Usability”, and “Perceived enjoyment” influence the “Reading experience” and the “Intention of reuse” that was proven by this research.
- This research has concluded that interactive devices could be an effective medium to help educate the importance on food safety to the public.

In order to convey the idea of food safety, a good majority of the governments in other countries have been using interactive devices as a tool incorporating art and design within it. For evoking the user’s interest of self-exploration, the American Association of Museums has helped input information into individuals by enhancing the sensory experience and instilling knowledge to the user by using the interactive method (AAM, 1992). Along with the advancement of technology; Governments, enterprises, and schools are using digital interactive media to communicate with people (Fan, Xiao and Su, 2015). In recent years, we can see that digital technology has been evolving to make education more diverse; for example by using; Augmented Reality (AR), Virtual Reality (VR), 3D drama, sensor technology, and so forth. Furthermore, Ellington, Adinall and Percival (1982) proposed that games, that are fun, encouraged students to have longer attention spans and cultivated higher cognitive skills in the learning process (Fan, et al., 2015). It can be seen with the use of digital interactive devices, it can improve the quality of education to the public (Chang, et al., 2017). Thus, by incorporating the digital interactive devices into food safety education whether or not it can enhance the effectiveness of its message is the second research question that will be explored in this study.

In 2016, this research designed the “Interactive Device – Food Island” and took up “Food safety” as the theme to present the fads in agricultural food to the public. Through the device, the user could be educated on Food and Agriculture and could have fun while learning about food safety. This research will further examine the user’s experiences with the “Interactive Device”. With a survey, this research will further analyze the effectiveness of interactive technology.

LITERATURE REVIEW

Museums Digital Guide

In Museums, we can see the object, pictures, and text. Museums have been using interactive media to educate the public in many ways (Watts, 1999). The American Association of Museums have revealed the museums’ mission; the museum is a nonprofit organization that provides social services, as well as a help store, a place of research, communication, a guide to the concrete objects that have been collected for the sake of research, to educate, and to enhance culture (AAM, 1992). It is obvious that museums are the most effective learning place using the systematical and widely communicative method.

The development of museums could be clearly perceived. Nowadays, museums have the functions for entertainment, educating, and presenting information. The way of communication is different from the traditional methods of research, from the collections, storing, and exhibition. Including museums guides, it has multiple approaches: tour guides, illustrative guides, audio guides, and video guides. It has been known with digital media, it could enhance museum goers’ experience. It encourages people to return. In order to meet the users’ understanding of the exhibited objects, as well as the make a more interesting experience, the museum uses digital interactive device as educational media. However, with digital the interactive device it requires a friendly and flexible system. With the application of the digital interactive device it has some challenges: (1) the interface should have a straight perspective, to help the users focus. (2) The information should be clearly presented in detail to allow the user to acquire the knowledge. (3) The device should be available for each individual needs (Kuflik, et al., 2011; Fan, et al., 2015). While the “Interactive Device – Food Island” is processing, this research will further examine, if the experience could be useful and engaging to the users. And further explore the positive affect of this form of media. With these results, this research will then conclude whether if the interactive device, such as the “Interactive Device – Food Island”, could cater to the needs of the user.

The Users Assessments

“Interaction” is a way of communication, through interactive media to convey the message to the user for them to recognize, understand, receive a reaction, and feedback. The purpose of interactive devices is to enhance the experiences of the users by creating various spaces to help the users communicate with others in their life or during work by interactive approaches (Winogard, 1997). This form of interaction has been recognized as the users’

Table 1. The food list in Interactive Device – Food Island

Number	1	2	3	4	5	6
Food	Dried fruit	Cola	Jelly	Candy	Sausage	Pudding
Number	7	8	9	10	11	12
Food	Instant noodles	Fried chips	Ice cream	Potato chips	Fried chicken	Package juice

communication media of perceived experience in the digital era. In part of interactive interface design, Kristof and Satran (1995) puts an emphasis on the six principles of the interface design: (1) orientation and navigation; (2) the combination of images and metaphors; (3) the usage of hypertext to replace of the linear guide; (4) system feedback in consistency; (5) the functionality of the design have to meet the usability; (6) the functionality: the easier it is to use, the better. For the digital interaction design study, this research should take the four aspects into consideration, to evaluate the interface design: (1) Orientation (2) Navigation (3) Usability (4) Functionality. In regards of the information system acceptance evaluation, Hsu & Lin proposed “Technology acceptance factors” could be the method used to evaluate the users’ acceptance degree (Hsu & Lin, 2008). Technology acceptance factors include “Perceived usefulness”, “Perceived ease-of-use”, and “Perceived enjoyment”. “Usefulness” could be used to measure the usefulness of the interactive device. “Perceived ease-of-use” could be defined as a way to evaluate how difficult or user friendly it is while the user is using the device.

The Reading Experience

The reading response of this research refers to the immersed reaction that is created through the experience of the interactive device – such as the “Interactive Device – Food Island”. Csikszentmihalyi (1975) by using the immersed experience theory and studying it further academically. Based on the theory, Massimini and Carli (1988) have proposed a stricter and more constructive theory on the immersive experience. Csikszentmihalyi suggested that the immersive experience is a state when a person cannot be distracted by other things since he or she is completely focused on one thing. While people are immersed in something, they might be immersed in certain states: (1) to put all of their focus on a thing; (2) loss of ego; (3) subconscious and self-control; (4) creating an interesting experience. Flow experience is a mental state where people are doing something with a singled-mind focus, and they could subconsciously ignore any distraction. At this moment, there will be a stable balance of the mind and the body (Jackson & Csikszentmihalyi, 1999). Most of the “Interactive Device – Food Island” users can go into this immersive state when they are using this device. An immersive experience has full of meaning and value. This is a positive mental state. Thus, the immersive experiences could have a positive value to help promote the education on Food Safety. The “Interactive Device – Food Island” the immersive experience is created by the interactive device, we could see some situations, with immersive reading, enhanced concentration, with an immersive virtual world, and an immersive plot. The reading experience in this research indicates that the result is created through the process of experiencing the “Interactive Device – Food Island”. In the meantime the entertainment in the reading and the act of sharing could be produced with the concept of Food Safety.

Based on the reading experience and the users’ assessment from the interactive device – the “Interactive Device – Food Island”, this research will then take the “Reading experience” and the users’ “Technology acceptance factors” as the construction to examine the users’ intention of reuse in the future.

DESIGN AND PRACTICE

The Concept of the Design

The content of the “Interactive Device – Food Island”, this research has selected twelve kinds of food that people usually consume and then analyze the type of food they consume to help the user recognize the composition and the ingredients, and how do those ingredients affect us. The contents of the food is shown in **Table 1**.

After selecting the food, this research will then randomly select four to six ingredients from the food, and then divide them into two parts: the natural and the artificial, to further examine the impact that might affect the person. Then, the user can press the “test” button to initiate the test to see if they could recognize the information that was provided from the “Interactive Device – Food Island”.

Hardware

In terms of the hardware that is used in the “Interactive Device – Food Island”, this research takes the multimedia integrated mode as the approach to combine smart phone technology and AR technology to present the easiest way for users to use. The device could be easily maintained with this method. In addition, with the use of touch screens makes it even more accessible to its users.



Figure 1. The content of the "food ingredients analysis"

Software

This research uses Windows 7 to develop the "Interactive Device - Food Island", and uses Unity 3D game engine to design the content, and promote the process by the Playmaker. Regarding the design, this research will take 2D models and Photoshop to render the visual design, explanation, visual effect, interface UI design, and so forth. Therefore, this research will use 3D MAX to execute the part of the food models, UV, and sticker setting.

The Result of Exhibition

While interactive device has been presented in the Exhibition Hall of Shih Hsin University Library from December 2016 to May 2017, the devices continually integrated itself into the college curriculums - human machine interface, and the graduate curriculum- interactive research. The research has presented the interactive device to help the public understand food safety concept in an interactive way. The content of the interface design could be seen in Figure 1. The statistic subjects are the faculties, the students, and the librarian at Hsin Shin University; the number of the users is more than 500. While the user was using the device, one on one interview was conducted. 230 questionnaires were obtained at random, which this research has then collected a total of 192 valid questionnaires. The valid feedback rate is 83.4% positive.

THE USER ASSESSMENT

Based on the theory of TAM mode (Davis, 1989), the research model was adopted four interface design features that Kristof and Satran pointed out (Kristof & Satran, 1995), as well as the "Technology acceptance factors" that Hsu and Lin have proposed (Hsu & Lin, 2008). This research will then evaluate the interactive device- the "Interactive Device - Food Island" by the assessment methods mentioned above.

Kristof and Satran proposed six principles for the interface design. In the multimedia design, images and hypertext have been applied in part of the "Orientation", "Navigation", "Usability" and "Functionality". The definition of the "Usability" is the degree of "Perceived ease-of-use" as well as the level of "Perceived usefulness" (Nielsen, 1995). This research will take the "Perceived ease-of-use" and the "Perceived usefulness" as the main factors to evaluate "Usability".

The theme of the "Interactive Device - Food Island" is to promote education on Food Safety. This research will take up Usability to conclude the value. As Jakob Nielsen has mentioned the definition of "Usability" provides the contents or features that the user need (Nielsen, 1995). Moon and Kim (2001) proposed the perceived enjoyment of cognitive, is personal intrinsic motivation. They regarded that this may affect the users' attitudes and willingness using network-related entertainment or multimedia systems. It could help them have fun while they are operating the device. The process of engaging interaction that could help attract the user to be immersed, this research will

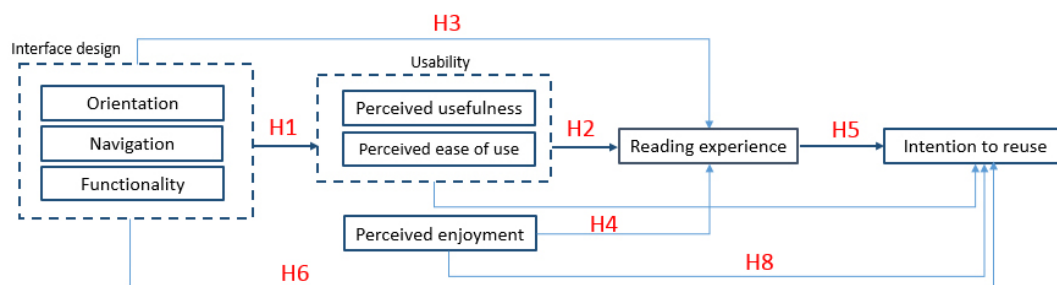


Figure 2. The diagram of the effects assessment for this study

take up the “Perceived Enjoyment” as the influential factors to examine the true value of the “Interactive Device – Food Island”.

Experience is a state when people reach a certain level of emotion, feeling, intelligence, and even spiritual. At this moment, an amazing feeling could be created (Pine II and Gilmore, 1999). According to the definition of experiences mentioned above, the “immersive experience” was adjusted into the “Reading experience” by this research. While reading, the mental state has reactions from the experience. Those reactions will be presented when the user immerse themselves into the “Interactive Device – Food Island”. Based on the theory of the “immersive experience” that Jackson and Csikszentmihalyi (1999) have stated, this research will adjust into the new theory: “Reading experience”; it could define the reaction of the user while they are using the interactive device.

TAM model has been practiced method to measure the acceptance of technology to the user. Most relevant literature reviews have already proved that “Perceived usefulness” and the “Perceived ease-of-use” are the crucial factors that could help the user create a positive (or a negative) response, and further influence the user’s behavior. In the TAM model, the perceived belief-feeling-behavior has been verified to predict the user’s IT acceptance (Davis, 1989; Teo et al., 1999; Luo and Strong, 2000; Moon and Kim, 2001; Mathieson and Chin, 2001; Venkatesh et al., 2002; Hsu and Lu, 2007). Thus, this research will use the TAM mode as the way to examine the user’s willingness to reuse the “Interactive Device – Food Island”. By taking the quantitative approach, this research will collect the feedback from the survey to testify the hypotheses (Confirmatory factor analysis). The diagram is illustrated in **Figure 2**.

Research Hypotheses

This research will use the theory of TAM belief-feeling-intention relationship, to examine the research hypotheses. From related literature reviews, the positive relationship between the “Perceived ease-of-use”, “Perceived usefulness” and the “Flow experience” could be proved (Moon and Kim, 2001; Mathieson and Chin, 2001; Rettie, 2001; Venkatesh et al., 2002; Hsu and Lu, 2007). Here is the construction of the research hypotheses in the following:

- H1:** “Interface design” can positively affect “Usability”;
- H2:** “Usability” can positively affect “Reading experience”;
- H3:** “Interface design” can positively affect “Reading experience”;
- H4:** “Perceived enjoyment” can positively affect “Reading experience”;
- H5:** “Reading experience” can positively affect “Intention to reuse”;
- H6:** “Interface design” can positively affect “Intention to reuse”;
- H7:** “Usability” can positively affect “Intention to reuse”;
- H8:** “Perceived enjoyment” can positively affect “Intention to reuse”.

The subjects of this research have been selected from the users during the exhibition period, through personal interviews, collected from the surveys. To further explore the results of the “Interactive Device – Food Island”. The questionnaire had 35 questions that were divided into two parts. The survey was then carried out after a brief explanation. There were seven questions on the first part of the questionnaire, personal information of the targeted user that includes sex, age, address, career, educational background, income, and so forth. For the second part of the survey, it was their feedback from using the “Interactive Device – Food Island”. In order to examine the relationship between the users and the device, this research placed some questions that was based on the “Interface design”.

There were four questions that was about “Orientation” and “Navigation”; There were five questions about “Functionality”. The definition of this research take up the theory of the Usability that Nielsen (1995) has stated, as

Table 2. The construction of the questionnaire and the reference resource of the design

Construction	Variable factors	The explanation of the contraction	Related literature review	The method of measure	The number of the question
Interface design	Orientation	If the user knows how to use, it and their experience with the sufficient information.	Nielsen (1995); Kristof & Satran (1995)	5-point Likert scale	4
	Navigation	If the interactive device could help the user understand the information that is given, and how to know more if they are interested.		5-point Likert scale	4
	Functionality	If the user can acquire the information quickly.		5-point Likert scale	5
Usability	Perceived usefulness	If the user can get the sufficient information they required through the interactive device.	Nielsen (1995); Hsu & Lu (2007)	5-point Likert scale	4
	Perceived ease-of-use	The factor refers to the evaluation: how difficult or easy when they are using the system.		5-point Likert scale	4
Perceived enjoyment		The user's intrinsic motivation which the activity of the participating for interactive device is perceived to be pleasurable.		5-point Likert scale	4
Reading experience		If the "Interactive Device – Food Island" could create an enjoyable reading experience and the sense of participation.	Chang & Wang (2012)	5-point Likert scale	3
Intention to reuse		The degrees of the user's willingness of returning to play the "Interactive Device – Food Island"	Chang & Wang (2012)	5-point Likert scale	3
Personal information		The user's personal information	Research design	Ordinal Scale	7
Total					47

Table 3. Each construction's average and variable by descriptive statistics

Constructions	Individual	Mean	Standard variable	The variability
Interface design	192	4.226763	.4137375	.171
Usability	192	4.300347	.4470150	.200
Perceived enjoyment	192	4.365885	.4709301	.222
Reading experience	192	4.138889	.5005330	.251
Intention to reuse	192	4.281250	.5135242	.264

well as the theory of interface design that has been proposed by Kristof and Satran (1995). In terms of usability, there are four questions about "Perceived usefulness"; There are four questions that relates to "Perceived ease-of-use"; and "Perceived enjoyment". In these parts of the questions, it will take up the definition of the Technology acceptance factors that Hsu and Lu (2007) have pointed out.

Reading experience refers to the intrinsic cognition and exploration that if the users are motivated when playing with an interactive device, it is easy for them to be immersed in the reading experience. There were three questions regarding the reading experience in the questionnaire. For the "Intention to reuse", this research examines the user's interest of using the "Interactive Device – Food Island" again. There are three questions about it, and by taking the method of the 5-point Likert to measure the user's reaction to the interactive device. 1 is the minimum reaction, 5 is the maximum reaction. The related explanations and definitions are illustrated in Table 2.

This research taken from the exhibition period as the study field, and the use of the "Interactive Device – Food Island" as the research object. By using the method of a one on one interview, this research carried out the survey and collected the questionnaires. The time frame of the survey was from 2016, Mar.26 to May, 15. Out of 230 questionnaires, this research has obtained 192 valid questionnaires; the feedback positive rate being 83.4 %. According to the results' statistics, the average value of each construction will be the average of the variable score. The female users are rate it 62.5% much more positive than the male users 37.5% in comparison. After examining the average of each construction, the user proposed the positive perspective for the "Interactive Device – Food Island" is shown in Table 3.

The Analysis of Reliability

The result of the variables in this research are shown as the following: "Orientation" is 0.828, "Navigation" is 0.732, "Functionality" is 0.881, "Perceived usefulness" is 0.922, "Perceived ease-of-use" is 0.881, "Perceived enjoyment" is 0.914, "Reading experience" is 0.76, "Intention to reuse" is 0.858. It is clear that the reliability of the questionnaire is more than Cronbach *a* value 0.7 which means this research has an acceptable level of reliability.

Table 4. Total interpretation of variance

Factors	Initial eigenvalue			Axis of rotation and load		
	eigenvalue	variable %	Total %	eigenvalue	variable %	Total %
Usability	15.432	49.780	49.780	5.719	18.447	18.447
Interface design	1.675	5.403	55.183	5.392	17.395	35.842
Perceived enjoyment	1.657	5.346	60.529	4.526	14.601	50.443
Intention to reuse	1.458	4.703	65.232	2.976	9.601	60.044
Reading experience	1.108	3.573	68.806	2.716	8.761	68.806

Table 5. Pearson’s Correlation Coefficient Matrix

Factors	Interface design	Usability	Perceived enjoyment	Reading experience	Intention to reuse
Interface design	1				
Usability	.773(**)	1			
Perceived enjoyment	.695(**)	.697(**)	1		
Reading experience	.578(**)	.602(**)	.585(**)	1	
Intention to reuse	.595(**)	.612(**)	.620(**)	.422(**)	1

** It is called significance when reach 0.01 (two- tailed tests)

Each coefficient alphas is more than 0.73. By using the same way measurement of the 5-point Likert, so in general, when Cronbach’s α value <0.35 , this means low reliability of results, there will be a moderate result when the value is between 0.35 and 0.70, as for when α value over 0.7, which means a high reliability. Regarding the degree of reliability, each construction of the questionnaire has a high reliable data that will meet the reliable standard in this research (Nunnally, 1978).

The Analysis of Validity

This research takes Confirmatory Factor Analysis as the method to examine the validity, and Principle Component Analysis which was adopted to investigate the distinctions among constructions. Therefore, by taking the varimax rotation of KMO and Barlett spherical test as the method to testify, the result of KMO value is 0.938, almost reaching 1, and that of Barlett spherical test value is 4857.917; this result is significant enough to imply the questionnaire data is helpful to execute the factor analysis. Each construction eigenvalue must be over 1, then these questions will be combined into a single construction, that also can be seen as one factor. The eigenvalue is higher, the explanation strength is more reliable. By taking the method of “Principal Component Analysis” and “the varimax rotation of KMO”, this research has attained five parts, the result yielded five factors with eigenvalues greater than 1.0; Interface design: 5.392; Usability: 5.719; Perceived enjoyment: 4.526; Reading experience: 2.716; Intention to reuse: 2.976. As seen in **Table 4**, the eigenvalues of Axis of rotation and load are all more than 1. It is clear that the research has obtained the validity data.

The Analysis of the Correlation Coefficient

By using Pearson’s analysis, this research will further examine the variables’ relation to the hypotheses. Based on the analysis result (shown in **Table 5**), this research will then reintegrate the variables’ hypotheses mode. Each variable is significantly relevant with the other. In addition, to the hypotheses mentioned, this research also discovered: (1) there is a positive correlation between the “Interface design” and the “Usability”, the relation value is 0.773; (2) there is positive correlation between the “Interface design” and the “Perceived enjoyment”, the relation value is 0.695; (3) there is positive correlation between the “Interface design” and the “Reading experience”, the relation value is 0.578; (4) there is a positive correlation between the “Interface design” and the “Intention to reuse”, the relation value is 0.595; (5) there is positive correlation between the “Usability” and the “Perceived enjoyment”, the relation value is 0.697; (6) there is a positive correlation between the “Usability” and the “Reading experience”, the relation value is 0.602; (7) there is a positive correlation between the “Usability” and the “Intention to reuse”, the relation value is 0.612; (8) there is positive correlation between the “Perceived enjoyment” and the “Reading experience”, the relation value is 0.585; (9) there is positive correlation between the “Perceived enjoyment” and the “Intention to reuse”, the relation value is 0.62; (10) there is positive correlation between the “Perceived enjoyment” and the “Intention to reuse”, the relation value is 0.422. From the analysis of relation variation, this research can conclude that each construction has either a moderate, or a high positive relationship to each other.

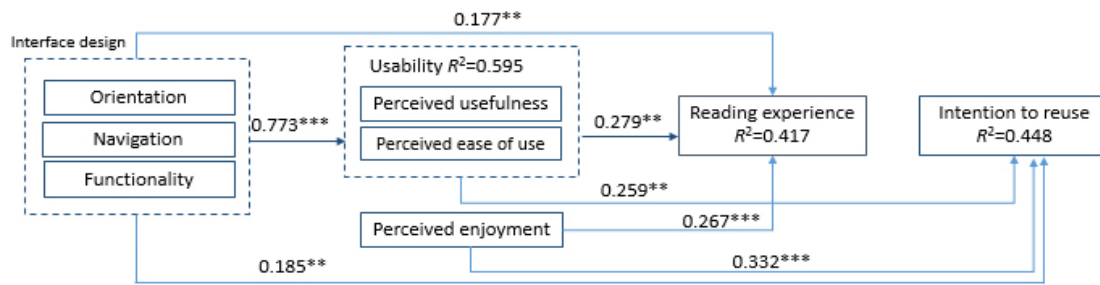


Figure 3. The research diagram of the “Interactive Device – Food Island”

The Hypotheses Analysis

This research will use the method of path analysis to carry out the testing of the hypotheses. Path analysis is the combination of multiple regression analysis. By taking the hypotheses, these factors will be conveyed into a regression function form. This research will then examine the relationships between each variation and the relation of the cause and effect. The coefficient of determination R^2 will then be the judged based value in the multiple regression analysis, the total variation R^2 of dependent variable is the percentage that is explained by the independent variables. By taking the SPSS 14.0 version software to execute multiple regression analysis to evaluate the influence coefficient between the independent variable, then attain β influence coefficient so as to examine if the factor p is significant; take R^2 value to explain whether the causal path exists or not. Here is the path analysis for 7 hypotheses that is explained in the following:

Function 1:

Usability = f {Interface design}; through the statistic of the multiple regression analysis, the influence coefficient of “Interface design” is $\beta=0.773$, and achieves the level of significance ($p<0.001$). It is clear that the “Interface design” is the positive factor that will influence “Usability”; the explained strength of R^2 is significant and reaches as 59.5%. The more attractive the interface design, the higher the “Usability” value will be. Thus, H1 hypothesis is valid.

Function 2:

Reading experience = f {Interface design, Usability, Perceived enjoyment};

Through the statistics of multiple regression analysis, the independent variation of the “Interface design” is $\beta=0.177$, and achieves the level of significance ($p<0.001$). “Usability” ($\beta=0.279$, $p<0.005$); “Perceived enjoyment” ($\beta=0.267$, $p<0.001$). It is clear that the Interface design, the “Usability”, and the “Perceived enjoyment”, are the positive factors that will influence the “Reading experience”; the explained strength is significant and reaches 41.7%. Thus, H2, H3, H4 hypotheses are valid.

Function 3:

Intention to reuse = f {Interface design, Usability, Reading experience, Perceived enjoyment}

Through the statistics of multiple regression analysis, the independent variation of the “Interface design” is $\beta=0.185$, and achieves the level of significance ($p<0.05$). “Usability” ($\beta=0.259$, $p<0.05$); “Reading experience” ($\beta=0.35$, $p=0.627$ not significant); “Perceived enjoyment” ($\beta=0.332$, $p<0.001$). From the result of multiple regression analysis, the most significant factor that could affect the outcome of “Intention to reuse” is the “Perceived enjoyment”, and then “Interface design”, and “Usability” affects less. The explanation strength is 44.8%. Yet the “Reading experience” does not reach the significant standard. It is obvious that there is no significant relationship between the “Reading experience” and the “Intention to reuse”. Thus H5 hypothesis is not valid. However, H6, H7 and H8 hypotheses are still valid.

As seen in Figure 3, the results of multiple regression analysis; if the value has a star mark (*), which means there is a cause of relation that has already been testified; whereas if the value appears without a star mark, this means there is no direct relation with the factors.

According to the statistic result illustrated above, this research has discovered:

- (1) Function 1 has proven that while the user is operating the interactive device, the method to provide a better UI interface, for the “Perceived usefulness”, the “Perceived ease of use” is the most crucial factor for the willingness of the acceptance towards the interactive device.
- (2) Function 2 has proven that a positive reading experience is created from the positive reactions towards the device, which the user may feel that the device is useful and interesting. Thus, the content of food safety

that was provided by this interactive device, whether if it could help the user perceive the usefulness, professionalism, trustworthiness was the crucial deciding factor to the results of the users' reading experience.

- (3) Function 3 has proven that perceived enjoyment is the main factor to the user's willingness of continuing to use the product. Incorporating food safety education and to promote accurate information with the help of interactive digital technology can provide an enjoyable reading experience to the user.

CONCLUSION

In Taiwan, the government and citizens have been concerned about the issue with food safety and the impact on their health and is looking forward to the new policies and education on Food safety. Thus, the purpose of this research is (1) to prove that whether the interactive device can effectively convey food safety education, and if it can establish an accurate concept to the public, as well (2) to examine the effectiveness of food safety education through the interactive device.

With the features of the interactive design that Kristof and Satran have pointed out (1995), and the Technology acceptance model that Hsu & Lin have proposed, this research will evaluate then build a verified model to carry out the descriptive statistics and the quantitative testify, as well as the reliability analysis, analysis of validity, relevant analysis, and multiple regression analysis. The result of this study are explained in the following:

1. This research has discovered that during the exhibition period of our interactive device, the female users of the "Interactive Device - Food Island" were more positive than the male users; this means women are more interested in issues on food safety that is being presented through an interactive device from the exhibition of this study.
2. Interface design can have an impact on the users' recognition towards the aspects of "Usability". This research has discovered that a good interface design will influence the user's recognition, "Reading experience", and "Intention to reuse".
3. A good reading experience will be created by a good interface design as well as the user's recognition of "Usability" and "Perceived enjoyment", these could be acquired through the "Interactive Device - Food Island"; the interface must be creative and innovative, in order to provide an enjoyable experience for the user.
4. The "Intention to reuse" of the "Interactive Device - Food Island" could be measured by the APP's "Interface design", "Usability", and "Perceived enjoyment". Despite the fact that the hypothesis of H5 does not exist in this study, the rest of hypotheses are testified: "Perceived enjoyment" is the most significant factor to "Intention to reuse"; this means that the user will be interested in the technical entertainments from the interactive device - the "Interactive Device - Food Island"; this innovated method is different from the traditional designs and methods. Thus, this research proves that "Interactive Device - Food Island" will effectively attract the user to reuse in the future.

With the theme of food agriculture education and multimedia in the exhibition period, the "Interactive Device - Food Island" has created an enjoyable reading experience. While the users are being educated on food safety from the "Interactive Device - Food Island". This research could be a reference for related academic studies in the future to promote the concept of food safety education via digital interactive devices.

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Personal Information

Sex:

Male Female

Address:

Taipei other city (_____)

Age:

below 19 20~24 25~29 30~34 35~39 40~44 over 45

Career:

housekeeper free industry agriculture forestry industry military police industry government sectors (public administration, education and research organization) business (finance, insurance, or real estate) social service sector (nonprofit organization) mass communication (advertising, publishing, or media) industry sector (technology information, manufacturing, construction) service sectors (Food and beverage service industry, sales, tourism industry, health and beauty industry, transportation and logistics industry) other _____)

Education background:

Elementary school junior high school high school bachelor's degree master's degree

Monthly income:

less 10,000 10,001~30,000 30,001~50,000 50,001~100,000 more than 100,001

How do you know about the information of Food Safety? (Check all that apply) knowing from:

friends or teachers the Internet TV newspaper broadcast in radio magazine other _____

The User Interface

Interface design - Orientation

1. Interface design provide sufficient information to help me operate the device.
2. I feel intuitive to operate the interface.
3. I could get the feedback by operating the interface.
4. It is very smooth when doing the interface by switching pages.

Interface design - Navigation

1. The function of the interface help me know how to operate the device.
2. The interactive device help the user recognize what is the next step to continue the whole process of interactive learning.
3. The interface has pop-up function that helps to interact with the device.
4. The interface could inform users about what is going on, through appropriate feedback within reasonable time.

Interface design -Functionality

1. I can quickly find out the information that I intend to acquire.
2. The device could provide the design of error prevention, support undo, and redo function.
3. The function of the interactive devices is simple and effective.
4. The device allows users to operate frequent actions quickly.
5. Any information would easy to search, and focus on the user's requirement.

Usability - Perceived usefulness

1. Interactive Device could help me understand the knowledge of the food safety.
2. Interactive Device could provide the core value of the food safety.

3. Interactive Device help me more recognize the concept of the food safety.
4. Interactive Device could convey a positive communication of the food safety.

Usability – Perceived ease of use

1. I feel it's easy to operate the selection design.
2. I can recognize quickly how to accurately operate the interactive device
3. The interface design help me know to operate the device.
4. Overall, I feel the interactive device is easy to operate.

Perceived enjoyment

1. I feel happy and get fun while I am using the interactive device.
2. The interactive device give me the sense of participation.
3. The test of the Interactive device provide me the sense of achievement.
4. I have fun when I interact with the device.

Reading experience

1. I can focus on the interaction with the interactive device.
2. I might forget the time and the things around me while I am operating the interactive device.
3. The process of doing the interactive device, I feel concentrate.

Intention to reuse

1. I would like to spend the time on the interactive device because the content of that really attract me.
2. I will recommend the interactive device to people.
3. Overall, I have positive viewpoint to the interactive device.

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