A study of diffusion and acceptance of an electronic newspaper: The case of an Ehime newspaper

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Abstract

The diffusion of portable network devices such as the iPad and tablet PCs, in addition to especially designed reading devices like Kindle, is transforming people's behaviour with printed media such as newspapers. Newspapers in electronic forms have been in the market for a long time but have had difficulties finding a feasible business model. The diffusion of reading devices other than traditional PCs seems to open a new horizon for this application. However, even though these new technologies are becoming increasingly widespread, their diffusion does not necessarily guarantee success. This study investigates the case of Ehime Newspaper, a rural local newspaper company, which prints about 300,000 morning papers and recently is running a pilot system of PC based electronic newspaper involving only university students and staff.

This study presents findings from a survey of pilot users and analysis of reading behaviours from access logs and diaries. This case of an electronic newspaper is consistent with TAM, however there are differences between the electronic newspaper and the more traditional text-based or multimedia based presentation of news. This study also investigates whether personality traits would affect the adoption of electronic newspapers.

Keywords

e-book, e-Newspaper, online newspaper, Technology Adoption, personality traits.

INTRODUCTION

Smartphones have penetrated the world market very quickly and thoroughly. They are converting large numbers of mobile phone users from those who "talk" to those who "text." During this change, numbers of applications have been invented and re-invented. One of those is the electronic form of newspapers. Newspapers in electronic form were almost as old as the Internet. In fact, online distribution of the text based content of newspaper even pre-dates commercial provisions of the Internet, and was one of the major services of computer based Bulletin Board Services (BBS). These offerings were usually defined as online newspapers. After they moved to the Internet, newspapers had been one of the major content types which was delivered on a for-fee basis. When electronic book readers such as the Kindle emerged, newspapers remained as popular content.

However, the introduction of touchscreens on smartphones brought a considerable change in the way of how newspaper content is presented. Electronic newspapers are developed with specially designed devices with far richer ways that content is presented. The Internet saw the transformation of news content from plain text to multimedia. Now the touchscreen brings another dimension to electronic newspaper content, as navigating content with finger actions allows readers a more paper-like yet different feeling of usability.

These phenomena encouraged a local newspaper, Ehime Shimbun Co., Ltd., to transform its service from a traditional multimedia based online newspaper – that is, essentially an article retrieval service – to a system which has more paper-like presentation capability. Although this system currently only operates on a PC, the direction of the design of the interface is common with that of smartphones.

In this paper, we present an exploratory study investigating adoption of this form of electronic newspaper. We studied users' reactions when people are forced to use a new technology through a test run of Ehime Shimbun's electronic newspaper service in 2011 among college students. In this study, we analysed diaries and access logs and asked survey questions. This paper intends, however, not to re-examine the effectiveness of diffusion theory or technology acceptance theory. Instead, the paper intends to share some findings relating to this test run.

THEORETICAL PERSPECTIVE

There are extensive studies about diffusion and adoption of information communication technology, including electronic newspapers. Key, relevant sources on electronic newspapers and technology acceptance are reviewed

below but due to space limitations it is not possible to exhaustively review all of the literature. In addition, a brief introduction about theory of Big Five Traits of Personality is presented.

Theories of Technology Acceptance

Various theories have been used to explain users' acceptance of new technologies. Venkatesh and Davis' (2000) Technology Acceptance Model (TAM) is a widely accepted idea to explain users' reactions to certain new technology. In TAM, Perceived Usefulness (PU) and Perceived ease-of-use (PEOU) are defining factors technology acceptance in TAM. Similarly, Rogers' (1995) Diffusion of Innovation model has been widely applied to innovations of many kinds. Combining both of these with a range of other theoretical perspectives, including the Theory of Planned Behaviour and the Theory of Reasoned Action, is the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh *et al.* 2003). UTAUT reviewed existing adoption models and proposed a unified model incorporating the key ideas in all of the theories that had been previously proposed.

Online newspapers, e-Books and e-newspapers

Studies about electronically delivered newspapers have employed various theoretical perspectives. In the early stages, literature discussed possibilities of news articles delivered over computer communications, and later over the Internet (Gross 1979, Schilit *et al.* 1999, Hood 2007, Berente *et al.* 2011). More recent literature now addresses the possibility of delivering content to devices dedicated for reading (Lai *et al.* 2010, Gibson *et al.*2011).

Chen and Corkindale (2008) conducted an in-depth study of users' behavioural intention to use online news services, guided by TAM and DOI. Using DOI, Li (2003) confirmed that user adoption of electronic newspapers is influenced by "technology ownership, innovativeness, demographic composition, and mass-media use".

Big Five Traits of Personality

The "Five Factor Model" or the "Big Five factor" of personality is widely used measurement in the study of traits of people. There are five basic dimensions of personality: Extroversion (E), Agreeableness (A), Conscientiousness (C), Emotional Stability/Neuroticism (N), and Intelligence/Openness to experience for experience (O) (Murakami 2004). The Big Five traits are consistent with the Japanese context and have been confirmed with Japanese vocabulary (Table 1) (Murakami and Murakami 1997). The Big Five personality factors can be assessed in Japanese using the Big Five Inventory, which consists of 70 questions (Murakami and Murakami 1999).

Table 1. Japanese application of Big Five Traits of Personality

Big Five Traits	Japanese	Original Japanese Expressions
Extroversion	*Gaikousei*	外向性
Agreeableness	*Kyouchousei*	協調性
Conscientiousness	*Kinbensei*	勤勉性
Emotional Stability/Neuroticism	*Jouchoanteisei*	情緒安定性
Intelligence/Openness to experience for experience	*Chisei*	知性

METHOD

This study was based on a pilot the test of Ehime Shimbun's electronic newspaper system, which incorporates new features such as hyper-zooming. When compared to the existing online newspaper service, the new system realized a closer experience to reading a paper based newspaper, whereas the old system is more like web browsing. The new system is accessible only through web services on a PC. Unlike other newspapers such as

Nikkei, the service is not currently provided via smartphone, however, the pilot test was designed to determine whether there are similar needs for delivery over smartphone networks.

The pilot system is accessible by students of Matsuyama University and its staff. Business Major freshmen and sophomore students who registered in the lecture of Introduction to Management Information System and students who registered in the Information Society and Ethics course were invited with an incentive of 10 points. They were requested to read the electronic newspaper on the system, which is accessible from anywhere via the Internet using the same login name and password used for logging into the e-mail system at Matsuyama University.

The students were obliged to keep diaries as shown in Figure 1 for one week. The diaries required students to answer such questions as: "what was the most remembering article on which page" and "what sort of impression – useful, educational, enjoyable, sad, or upsetting – they had about the article". Furthermore, the diaries asked a question about "what was the most remembering information of the day, and what was the source of it." They also asked, with five-point a Likert-type scale, about such questions shown in Table 2.

The study duration was from 1 – 14 July, and the starting dates were either on July 1st, 5th or 8th. About 200 students participated out of 352 registered in the two classes. Many answer sheets were removed because of unconformity. Ultimately, 176 responses were obtained. From matching with access log, among them, 133 indicated that they actually accessed the system whereas 43 indicated that they did not access the system at all.

Figure 1. Sample of diary

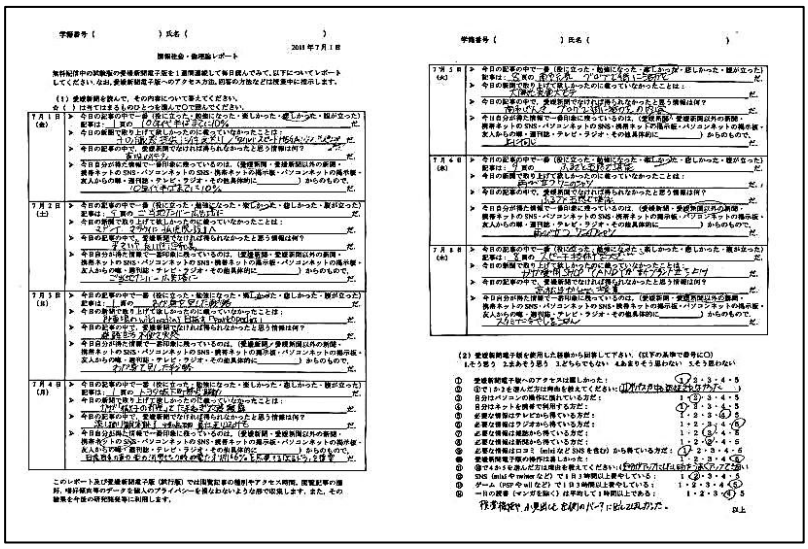

Figure 2. Explanatory flyer

Table 2. Questions asked in the diary

①	Access to the system was difficult
②	If the answer above was 1 or 2, please explain in details: ( )
③	I am confident about how to operate PC
④	I access the Internet with mobile phones
⑤	I obtain necessary information from TV
⑥	I obtain necessary information from radio
⑦	I obtain necessary information from magazines
⑧	I obtain necessary information from newspapers
⑨	I obtain necessary information from word to mouth communication (including SNS)
⑩	It was easy to operate the system
⑪	If the answer above was 4 or 5, please explain in details: ( )
⑫	I spend more than 3 hours on SNS (mixi and twitters, etc.)
⑬	I spend more than 3hours on video games (PSP and wii, etc.)
⑭	I spend on average more than 1 hour on reading (excluding comics)

An important feature about the log keeping, however, is the ability to examine trustworthiness of the responses. The newspaper is subscribed to by about 100,000 households in the vicinity, and is also subscribed to by the library at Matsuyama University. It was evident that some students would not access the system but would read newspapers in printed form and hand in forged diaries because they were eager to gain the 10 point inventive. They were told beforehand that their access logs would be collected, but we expected that for those who were not familiar with ICT, one or two mentions of "collecting access logs" would not raise much attention. We supposed this very reaction of "not following the instructions" is important and would provide us with material for future consideration.

It is not necessarily desirable to expect what may appear to encourage the students to misbehave. However, we thought that this would be an important occasion to teach students how log collection systems work. If students did not hesitate to submit diaries which look as if they accessed the electronic newspaper system while they actually did not, they seem to not understand how their "footprints" are collected electronically. We determined that if there were reactions such as handing in the diaries which were forged, we would not call on those who submitted the diaries one-by-one but issue a severe warning in a lecture showing some examples about log collection systems on the web.

Student volunteers also completed a questionnaire assessing the Big Five personality traits. 159 students completed the questionnaire. Because of the lengthy structure of the questionnaire, it was administered on different dates that the diaries were submitted. Hence, not all participants who submitted the diaries completed the questionnaire. After processing 159 responses in conformity with Murakami (2003), only 53 responses validated. Of these 53, there were 34 that also had diaries submitted.

In order to supplement the findings about the reading newspapers, a web-based survey was conducted on September 23, 2011. Of the 258 students of MIS at Matsuyama University, 247 samples are collected and of these 247, 55 also submitted a diary.

DATA AND RESULTS

Using log data from the system, Table 3 to Table 6 were calculated in order to test the relationship between the subjective or perceived characteristics of the respondents and the actual behaviour of whether they accessed the system. Table 3 presents the results from the chi-square tests of proportions between those who accessed the Ehime Shimbun's system and those who did not (only results which indicate statistical significance are shown), while Table 4 presents differences between those who accessed the system and those who did not.

Tables 5 and 6 are the analysis of what factors influenced people's behaviours of using Ehime Shimbun's new system. Table 5 presents the results from the statistical test about the relationship between the numbers of access per week and ICT literacy. Table 6 presents the results from the test of the relationship between the total access time per week and ICT literacy.

Table 7 to Table 9 present the numbers of responses accumulated from the diaries. These figures simply aggregate all the responses written on the sheets. For example, if the response for "Impression" from a particular diary indicated only "1" for seven days, it accounted for 7 "Useful" "Impression." The number of diaries included in this data set is 193.

All the statistical analysis was conducted by the statistical add-on package for Excel called "Ankeito Taiko ver 5.06." Significance levels are indicated as "*" for 5%, "**" for 1% confidence level.

Table 3. Differences between those who accessed and those who did not, tested by chi-square test of proportions

Total n = 176	Accessed or not?		n		Proportions		Differ-ences	Z-score	p-score	sig.
① Access to the system was difficult										
Strongly Agree	Yes	No	133	43	4.5%	16.3%	11.8%	2.565	0.010	[*]
Agree	Yes	No	133	43	4.5%	7.0%	2.5%	0.638	0.523	[ ]
Neither	Yes	No	133	43	12.0%	30.2%	18.2%	2.797	0.005	[**]
Not Agree	Yes	No	133	43	35.3%	30.2%	5.1%	0.614	0.539	[ ]
Strongly Not Agree	Yes	No	133	43	43.6%	16.3%	27.3%	3.228	0.001	[**]
③ I am confident about how to operate PC										
Strongly Agree	Yes	No	132	42	9.8%	2.4%	7.5%	1.550	0.121	[ ]
Agree	Yes	No	132	42	30.3%	33.3%	3.0%	0.370	0.712	[ ]
Neither	Yes	No	132	42	34.8%	23.8%	11.0%	1.334	0.182	[ ]
Not Agree	Yes	No	132	42	18.9%	16.7%	2.3%	0.331	0.741	[ ]
Strongly Not Agree	Yes	No	132	42	6.1%	23.8%	17.7%	3.290	0.001	[**]
⑧ I obtain necessary information from newspapers										
Strongly Agree	Yes	No	133	42	3.0%	4.8%	1.8%	0.545	0.586	[ ]
Agree	Yes	No	133	42	18.8%	4.8%	14.0%	2.195	0.028	[*]
Neither	Yes	No	133	42	20.3%	28.6%	8.3%	1.123	0.262	[ ]
Not Agree	Yes	No	133	42	30.1%	47.6%	17.5%	2.088	0.037	[*]
Strongly Not Agree	Yes	No	133	42	27.8%	14.3%	13.5%	1.776	0.076	[ ]
⑩ It was easy to operate the system										
Strongly Agree	Yes	No	131	42	31.3%	14.3%	17.0%	2.157	0.031	[*]
Agree	Yes	No	131	42	33.6%	31.0%	2.6%	0.316	0.752	[ ]
Neither	Yes	No	131	42	26.7%	45.2%	18.5%	2.254	0.024	[*]
Not Agree	Yes	No	131	42	6.1%	2.4%	3.7%	0.946	0.344	[ ]
Strongly Not Agree	Yes	No	131	42	2.3%	7.1%	4.9%	1.496	0.135	[ ]
⑭ I spend on average more than 1 hour on reading (excluding comics)										
Strongly Agree	Yes	No	133	43	7.5%	7.0%	0.5%	0.118	0.906	[ ]
Agree	Yes	No	133	43	7.5%	4.7%	2.9%	0.649	0.517	[ ]
Neither	Yes	No	133	43	13.5%	18.6%	5.1%	0.815	0.415	[ ]
Not Agree	Yes	No	133	43	30.8%	14.0%	16.9%	2.174	0.030	[*]
Strongly Not Agree	Yes	No	133	43	40.6%	55.8%	15.2%	1.746	0.081	[ ]

Table 4. Differences between those who accessed and those who did not

Item Name	chi-square score	Cramer's coefficient of association	p-score	sig.
① Access to the system was difficult	19.527	0.338	0.001	[**]
③ I am confident about how to operate PC	14.585	0.292	0.006	[**]
⑧ I obtain necessary information from newspapers	9.519	0.236	0.049	[*]
⑩ It was easy to operate the system	10.203	0.244	0.037	[*]

Table 5. Relationship of numbers of times accessed to the system and ICT literacy

Item Name	correlation ratio	p-score	sig.
① Access to the system was difficult	0.085	0.005	[**]
③ I am confident about how to operate PC	0.058	0.041	[*]
⑩ It was easy to operate the system	0.065	0.023	[*]

Table 6. Relationship between the total seconds of access per week and ICT literacy

Item Name	correlation ratio	p-score	sig.
⑩ It was easy to operate the system	0.099	0.002	[**]

Table 7. Data and basic statistics about the impression of the most remembered article

Impression	**Numbers (n=1113)**	**Percentages**
“Educational”	334	30.0%
“Upsetting”	252	22.6%
“Useful”	211	19.0%
“Sad”	206	18.5%
“Enjoyable”	110	9.9%

Table 8. Data and basic statistics about top seven categories of the most remembered article

Categories	**Numbers (n=1189)**	**Percentages**
“Highlights Topics”	696	58.7%
“General News Topics”	293	25.1%
“Economy”	51	4.6%
“International Affairs”	44	3.6%
“Sports”	39	3.3%
“Regional Affairs”	30	2.5%
“Life”	12	1.0%

Table 9. Data and basic statistics about the source of the most remembered information of the day

Categories	Numbers (n=1225)	Percentages
“Ehime Shimbun”	513	41.9%
“Mobile phones SNS”	194	15.8%
TV	190	15.5%
“PC SNS”	85	6.9%
“Mobile phones BBS”	60	4.9%
“Newspaper other than Ehime Shimbun”	58	4.7%
“PC BBS”	51	4.2%
“Rumour from friends”	33	2.7%
“Weekly tabloids”	1	0.1%
Radio	1	0.1%
Others	39	3.2%

Table 10 through Table 12 present the outlook of the students’ newspaper reading behaviour and news sources

Table 10. Frequency of reading printed newspaper

	Total	Frequency of reading printed newspaper (%)							
		Everyday	1 in 2 days	1 in 3 days	1 in 4 days	1 in 5 days	1 in 6 days	Do not Read	n.a.
Total	247	8.9	8.9	11.7	6.1	5.7	27.9	30.8	0.0
Done Ehime Newspaper survey	55	3.6	9.1	9.1	9.1	5.5	21.8	41.8	0.0
Not-done Ehime Newspaper survey	192	10.4	8.9	12.5	5.2	5.7	29.7	27.6	0.0

Table 11. The most used news source

	Total	The most used news source (%)												
		Printed NP	TV	Radio	Online-NP from PC	BBS & Portals from PC	SNS from PC	Online-NP from Mobile Phone (MP)	BBS & Portals from MP	SNS from MP	Magazine	Rumour	Parents, Supervisors	n.a.
Total	247	4.5	48.6	0.8	8.1	13.0	8.1	4.0	2.0	10.9	0	0	0	0
Joined Ehime Newspaper survey	55	0.0	43.6	1.8	3.6	14.5	9.1	9.1	1.8	16.4	0	0	0	0
Not-joined Ehime Newspaper survey	192	5.7	50.0	0.5	9.4	12.5	7.8	2.6	2.1	9.4	0	0	0	0

Table 12. Mostly used news source

	Total	Mostly used news source (%)												
		Printed NP	TV	Radio	Online-NP from PC	BBS & Portals from PC	SNS from PC	Online-NP from Mobile Phone (MP)	BBS & Portals from MP	SNS from MP	Magazine	Rumour	Parents, Supervisors	n.a.
Total	246	39.8	84.6	3.7	31.7	26.4	28.0	17.5	16.3	33.3	6.9	24.0	19.1	0
Joined Ehime Newspaper survey	54	25.9	88.9	3.7	24.1	29.6	31.5	16.7	11.1	40.7	9.3	29.6	20.4	0
Not-joined Ehime Newspaper survey	192	43.8	83.3	3.6	33.9	25.5	27.1	17.7	17.7	31.3	6.3	22.4	18.8	0

Table 13 and Table 14 are scores from the result of Big Five personal traits. After screened, valid 34 samples were classified into categories shown in Table 13. The thresholds about Z-score of below 40 or above 60 are used in accordance to Murakami's 1 point classification. (Murakami & Murakami 2008)

Table 14 shows the results from the chi-square tests of proportions. For each of personal traits from Big Five tests grouped into below 40 or above 60, the proportions of those who accessed to the system and those who did not access the system are calculated.

Table 13. Overall results for Big Five Scores

n of Accessed	**n of Not-accessed**	**Total**
26	8	34
76.5%	23.5%	100.0%

Table 14. Samples' structure of Big Five personality traits

Big Five Traits	**n with Z-score =< 40**	**n with Z-score >= 60**
Extroversion	8	7
Agreeableness	0	9
Conscientiousness	4	8
Emotional Stability/Neuroticism	4	5
Intelligence/Openness to experience for experience	6	4

Table 15. Difference between Accessed and Not-accessed with reference to Big 5 categories

Big Five Traits	Score of Big 5 test	n & % Accessed	n & % Not-accessed	Difference	Z-Score	p-Score	Sig.
Extroversion	=<40	7 87.5%	1 12.5%	75.0%	2.121	0.034	*
	60=<	4 57.1%	3 42.9%	14.29%	0.378	0.705	
Agreeableness	=<40	-	-	-	-	-	
	60=<	8 88.9%	1 11.1%	77.78%	2.333	0.020	*
Conscientiousness	=<40	3 75.0%	1 25.0%	50.0%	1.0	0.317	
	60=<	7 87.5%	1 12.5%	75.0%	2.121	0.034	*
Emotional Stability/Neuroticism	=<40	3 75.0%	1 25.0%	50.0%	1.0	0.317	
	60=<	3 60.0%	2 40.0%	20.0%	0.477	0.655	
Intelligence/Openness to experience for experience	=<40	6 100.0%	0 0.0%	100.0%	2.449	0.014	*
	60=<	4 100.0%	0 0.0%	100%	2.0	0.046	*

DISCUSSION OF RESULTS

This section discusses the implications of this research for theory and practice.

Implications for theory

The theoretical implications for this research include technology adoption and interpretation of newness about electronic newspaper system. In addition, this paper envisages the relevance of personality traits to the adoption to new technologies.

Technology Adoption. Chi-square testing of differences in proportions between those who accessed and did not access the new system which is shown in Table 3 is in line with Perceived ease-of-use (PEOU) of TAM. The results of comparison between those who actually accessed (i.e. those who adapted to the new technology) and those who actually did not access (i.e. those who did not adopted the technology) are represented by ① and ⑩.

While those who did not use the system responded “it was difficult” accounted for 16.3% of responses, those who actually used the system responded “it was difficult” accounted for only 4.5%. Similarly, like a mirror image, those who actually used the system responded “it was not difficult” accounted for 43.6% while those who did not use and responded “it was not difficult” accounted for only 16.3%.

Likewise, as for operations, those who actually used the system and responded “it was easy to operate” accounted for 31.3% of responses, while those who did not use the system and felt the same way accounted for 14.3% of responses.

Chi-square testing was used to examine the relationship between respondents’ actual behaviour and PEOU, as well as subjective capability of ICT usage. In Table 4, ①, ③, ⑧, ⑩ were identified as items where there are differences with statistical significance. Except ⑧, the result is in conformity with TAM. ① and ⑩ confirm that PEOU is positively influence the adoption of new technology. ③ suggests that subjective confidence about the usability of ICT positively influences the adoption of new technology.

In Table 5, ①, ③, ⑩ were identified as statistically significant. ① is an indication that those who felt that it was difficult to access the system had fewer accesses per period. ③ is an indication that those who see themselves are good at operating PC had more accesses per period. ⑩ is an indication that those who felt it was easy to operate the system had more accesses per period.

Table 6 sees only ⑩ is statistically significant. The entire duration of the access time is longer for those who felt that it was easy to operate the system than those who felt was not easy.

In summary, this pilot system of electronic based Ehime Shimbun newspaper followed the patterns of technology adoption models.

Interpretation of newness. The theory of technology adoption applies to "new" technologies. Therefore, we must consider that whether reading newspaper on PC should be regarded as "new" to the students. According to Table 10, 41.8% of students among the 55 who participated in the pilot study of the new electronic newspaper system indicated that they do not read printed newspapers at all. Similarly, among the 247 respondents to the survey of MIS students, 30.8% reported not reading printed newspapers. Furthermore, as shown in Table 11, the best news sources were considered to be TV (48.6%), BBS & Portals accessed from PC (13.0%), SNS accessed from Mobile phones (10.9%), online newspaper accessed from PC and SNS accessed from PC (8.1%), compared to only 4.5% for printed newspapers. Table 12 shows relatively high responses for printed newspaper (39.8%), however, other sources are also high: TV (84.6%), SNS of Mobile phones (33.3%) and online newspaper of PC (31.7%).

It is debatable whether an electronic newspaper is regarded "new" technology for those who use BBS & Portals accessed from PC and/or SNS accessed from Mobile phones. It could be a new way of presentation but not a new technology. Instead, it may be one of the new technologies which have new kinds of interface. Unfortunately, though, from the results found on Table 10 and Table 11 only we cannot conclude this argument.

Effect of personality trait in Technology Adoption. As shown in the Table 14, there seem to be some indications that suggest there are differences between those who accessed the new system and those who did not. However, this is not borne out by closer analysis. After conducting the statistical test between total numbers of Big Five samples and each of traits' difference of proportions, all of the difference between those who accessed and those who did not in Table 13 only are found to represent the original skewness in the proportion. In this respect, we could not find statistically significant differences which are brought by the differences of personality traits.

Implications for practitioners

In the diary, students were required to express their impressions of the article that made the greatest impression (Table 7). There are two categories, namely, practical and emotional. The practical categories are "Educational" and "Useful," and emotional categories are "Upsetting," "Sad" and "Enjoyable." According to the responses, "Educational" (30%) is highest. The reason for this can be assumed with the support from the result in Table 8: "Highlights Topics" and "General News Topics" constitute more than 80%. In the Ehime Shimbun newspaper, these two appear on the top page and the following two pages. The articles are edited so to attract readers to the first page. In other words, these are the pages which provide news, which are by nature new to the readers. Hence, when providing impressions, they are categorized as "Educational."

There is another aspect about why "Highlights Topics" and "General News Topics" takes more than 80%. From Table 10, it is clear that 60 % of students seldom, if at all, read newspapers. This is the case about printed newspapers. For the electronic newspaper, which is new to the students, there are two hurdles to clear. Firstly, accessing the system is a difficult task. 24.4% of the students actually did not access the system. Instead, they used paper and/or other news sources on the web. According to the data in Table 9, 11 and 12, the major sources of information are TV and SNS accessed from both PCs and mobile phones. There was also a comment from one student saying that because he reads printed newspaper every day, he did not find any benefit of using the system therefore he prepared the diaries according to the printed newspaper.

Secondly, even if they successfully accessed the system, it may have been difficult to move through the pages. In the diaries, there are some comments which explicitly point out the operability of the system was poor. The use of hyper-zooming function with a mouse was considered clumsy. This is also consistent with TAM's emphasis on perceived ease of use.

In all, it would be useful for operators of new kinds of electronic newspapers to know there are some barriers to attract users. For those potential users who do not read printed newspapers, it is other news sources freely available on the web. For users who read printed newspapers, additional benefits are necessary. For both readers and non-readers, both accessibility and operability are the key factors for success.

LIMITATIONS AND FUTURE RESEARCH

It is apparent that the size of the sample, limits this study's findings, particularly with regard to especially Big Five personality traits. A major reason comes from the strictness of data refinement. The available data was eventually composed of only 34 results out of 159 participants, which is about 21%. It is difficult to predict what proportions of data would be available beforehand. One potential solution is to increase the number of participants. Therefore, future research will include a study with a larger sample. In addition, there are some another analyses that could be conducted on the same data. For example, it is possible to look into the relationship between access time length and content, and, as for its extension, a text mining approach of the diaries.

CONCLUSION

This study presented findings from surveys among pilot users, and analysis of reading behaviours from access logs and diaries kept by university students. In doing so it investigated whether an emerging technology, electronic newspapers, is following the patterns expected by TAM. The analysis indicated that PEOU and usability are the significant factors to the act of adoption. This paper raised questions about the interpretation of "newness"; for such a technology as an electronic newspaper, whether regarding it as "new" technology or not is debatable. This study also investigated whether personality traits would affect adoption of electronic newspapers, but could not present concrete findings about the relationship between personality traits and technology adoption.

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