

Usability Evaluation of Mobile Banking Application Interfaces

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Abstract: Mobile banking (m-Banking) application is one of the emerging trends of mobile commerce application. m-Banking application allowed customers to perform their transactions at their own convenience time. Usability issues is one of the major problems faced by m-Banking applications and there is less research on comparing usability issues based on user's age, gender, qualification and experience. The objectives of this study are to identify usability issues and levels of differences among the m-Banking users based on their age, gender, qualification and experience. This study employed quantitative approach and has obtained one hundred and fifty respondents from three banks in Nigeria. The finding of this study indicates that the banks have usability issues on privacy and reliability of their m-Banking application interfaces. This study also revealed that male users have less usability issues than female users, younger and middle age users also have few usability issues than the old age users. For qualification of the users with lower qualification, they have more usability issues than those that have higher qualification. While in years of experience using the mobile, the result shows that there are not much usability issues for the whole category of years.

Key words: Usability evaluation application interface, mobile commerce, mobile banking, mobile, experience, approach, interfaces issues

INTRODUCTION

Mobile banking (m-Banking) is a part of mobile commerce or m-commerce services that allows customers or users to perform many banking transactions such as check balance and transfer of fund through the use of mobile phones (Corbitt and Barnes, 2003). Similarly, m-banking can be defined as transactions and services that are carried out by users or customers at their own convenience time at anywhere through the use of mobile phones especially smartphones (Abubakar *et al.*, 2015).

Research on the field of usability evaluation of m-Banking application interface has become a new area of research which faces limited methodologies to address issues associated to usability of such application (Coursaris and Kim, 2011). Furthermore, there are high demands to form a proper usability evaluation framework that will evaluate the usability of mobile devices and application interfaces (Ji *et al.*, 2006). At the same time, there are less study on the usability evaluation of m-Banking application associated to age, gender, qualification and experience because most of the studies are more focused on the adoption of m-Banking applications. The success of m-Banking application in Nigeria remains an issue for the customers when performing transactions using m-Banking application.

Literature review: The problems of usability issues such as login navigation, interface structure, mobile device compatibility, screen size and privacy are the major issues. Many researches mention that there is problem among the m-Banking users on age, gender and qualification (Merdenyan *et al.*, 2014; Kang and Yoon, 2008; Mayhorn *et al.*, 2012; Page, 2014).

Usability evaluation is an issue that can be found on any kind of groups of people either on age group, gender, qualification and experience and each any of this group can have their own usability problems when interacting with either computers or mobile phones. Mobile phone applications provide many supports to different age group user's but the use of mobile interface between the middle age and adult age is becoming an issue to some of them especially the adult age (Kurniawan, 2008). They conducted a detailed experiment on the different age groups and they found that the adult age of 50 years and above has problem in operating the interface and also those with mobile phone experience are better than those without experience in operating the mobile application interfaces. Similarly, another research shows that older age users are more difficult to operate the computer system or other electronics devices because their performance during the use of devices interface was very poor in terms of usability issues compared to younger

people (Ghayas *et al.*, 2013). The research also mentioned that older age users took longer time and perform many errors in operating the computer but also mentioned more usability problems occurred during the use of mobile phones. Similarly, the research also mentioned another usability issues of mobile phone interfaces experienced by this group are also due to their qualification and experience (Ghayas *et al.*, 2013).

In another study on age differences in usability issues mentioned that age differences play a vital role in usability issues in Personal Digital Assistants (PDA) as older age users required longer time to complete a task and committed more errors while performing a task compared to younger age users (Mayhorn *et al.*, 2012). Similarly, other research also found that older age users between sixty and above experience are more difficultly to use mobile phones compared to younger age users and also male users are sharper than the female users (Kang and Yoon, 2008). Also in another research on the use of mobile phones by elderly people revealed that older users always have problems related to usability issues when using mobile phones due to small screen and button size compared to younger users (Nasir *et al.*, 2008). Similarly, another study on the usability issues of touch screen mobile devices found that the younger age users found it easier to operate smartphones and have more experiences compared to old age users when performing a task using the smartphones (Kurniawan, 2008).

MATERIALS AND METHODS

This study employed the use of quantitative approach where in this study random sampling approach was used with a total number of one hundred and fifty respondents using online questionnaire, Facebook and e-Mail were used to identify the respondents. This study employed the use of questionnaire for measuring user interface satisfaction as designed by Abubakar *et al.* (2015). The questionnaire content 6 Sections, Section A (Respondent's) profile, Section B (Mobile device compatibility), Section C (Learning ability), Section D (Interface structure and layout), Section E (Task structure and presentation), Section F (Privacy and reliability) and Section G (Overall user impression about the application). Therefore, this study used three banks as a case study namely: GTBank, Diamond and Skye Bank users in Nigeria, irrespective of gender, age, qualification and experience. Among the respondents 119 are male and 31 are female.

This study collected data from different categories such as gender, age, qualification and experience. The SPSS was used to run the collected data using descriptive

statistic in depended sampling t-test and Analysis of Variance (ANOVA) to find out the significant difference among the age, gender, qualification and experience in order to identify the usability issues of m-Banking application. Furthermore, the results of the analysis will be used to determine the significance differences if exist between the participants based on the defined categories: gender, age qualification and experience.

RESULTS AND DISCUSSION

Experimental result: Table 1 shows the analysis of data using descriptive statistics for finding the mean of each bank and compared the result to find out the significant differences between them in terms of usability issues in m-Banking application interface. Table 1 shows that the 3 banks have usability problems but, Diamond Bank has more usability issues than the others by looking at their mean score of 6.3276 followed by Sykebank with 6.5736 and GTBank with fewer problems.

Therefore, Table 2 explains the main usability issues. The mean score of task structure and presentation significance is 0.229 which indicates not significance because is $p > 0.005$. The mean score of learning ability significance is 0.631 which also not significance and indicate that there is a less problem compared to task structure and presentation. The mean score of interface structure and layout significance level is 0.261 which is also not significant. The mean score of mobile device compatibility significance level is 0.462 which is also not significant while the mean score of privacy reliability is significant at 0.001 and this shows that users from these three banks have more usability problems issues on the privacy and reliability as shown on Table 1.

An independent sample t-test was conducted to compare the usability issues of mean score for male and female users of m-Banking application. Table 3 shows that there was a significant difference in mean score between the male ($M = 6.5137$, $SD = 1.23516$) and female ($M = 6.1534$, $SD = 0.86292$, $t(148) = 1.545$, $p = 0.124$, two-tailed). While Table 4 shows that the Levene's test for equality of variance was not statistically significant ($t = 1.545$, $df = 148$, $p > 0.05$).

Table 5 and 6 shows ANOVA result which was conducted to explore the impact of age groups on the use of m-Banking application. The participants were divided into 4 groups according to their age (Group 1: 20-30 years; Groups 2: 31-40 years; Group 3: 41-50 years; Group 4: 51 years and above). There was no statistically significant difference at the $p > 0.05$ level in usability score for the 4 age groups: $F(3, 146) = 1.191$, $p = 0.315$. Despite that there was no statistical significant differences, the actual

Table 1: General usability issues on Nigerian Banks

Mobile banking	No. of participants	Mean	SD
GTBank	77	6.7994	1.41333
Skye Bank	41	6.5736	1.02556
Diamon Bank	32	6.3276	1.01085

Table 2: Main usability issues

Usability issues	F-values	Sig.
Task structure and presentation		
Between groups	1.489	0.229
within groups		
Learning ability		
Between groups	0.462	0.631
within groups		
Interface structure and layout		
Between groups	1.354	0.261
within groups		
Mobile device compatibility		
Between groups	0.777	0.462
within groups	250.5	-
Privacy reliability		
Between groups	7.484	0.001
within groups	266.1	-

Table 3: Independent sample t-test group statistics

Gender	No. of respondent	Mean	SD
Usability issues			
Male	119	6.5137	1.23516
Female	31	6.1534	0.77231

Table 4: Independent samples test

Usability issues	Levene's test for equality of variances		t-test for equality of means		
	F-value	Sig.	t-value	df	Sig. (2-tailed)
Equal variances assumed	5.561	0.020	1.545	148.00	0.124
Equal variances not assumed			2.012	74.849	0.048

Table 5: Usability issues on age using anova

Groups	Sum of squares	df	Mean square	F-value	Sig.
Between	4.805	3	1.602	1.191	0.315
Within	196.304	146	1.345	-	-
Total	201.109	149	-	-	-

Table 6: Descriptive of age group using Anova

Age groups	No. of participants	Mean	SD
20-30	24	6.2928	1.21956
31-40	78	6.5114	1.27239
41-50	40	6.5209	0.86774
51 and above	8	5.7669	1.07362
Total	150	-	-

differences in mean scores between the groups were quite differ from each other. Post-hoc comparisons using the Tukey HSD test indicated that means score for Group 1 (M = 6.293, SD = 1.2196) was significantly different from Group 4 (M = 5.7669, SD = 1.074), Group 2 (M = 6.5114, SD = 1.2724) did not significantly differ from Group 3 (M = 6.5209, SD = 0.86774). This result shows that older age users have more usability issues on m-Banking application than the middle and younger age users.

Table 7: ANOVA significance between qualification groups

Groups	Sum of square	df	Mean square	F-value	Sig.
Between	12.932	4	3.233	2.491	0.046
Within	188.177	145	1.298	-	-
Total	201.109	149	-	-	-

Table 8: Descriptive mean differences for each qualification group

Qualification	No. of participants	Mean	SD
Secondary school	1	4.7297	-
Diploma	6	5.2658	0.72469
First degree	73	6.4432	1.13410
Masters	64	6.5291	1.15550
PhD	6	6.8919	1.32889
Total	150	-	-

Table 9: ANOVA significance between groups based on years of experience

Groups	Sum of square	df	Mean square	F-value	Sig.
Between	12.186	4	3.046	2.338	0.058
Within	188.923	145	1.303	-	-
Total	201.109	149	-	-	-

Table 10: Descriptive by years of experience groups

Years of experience	No. of participants	Mean	SD
1-2	32	5.9814	1.58434
3-4	55	6.4010	0.98540
5-6	33	6.7748	0.81650
7-8	18	6.7447	0.81905
9 and above	12	6.4550	1.53555
Total	150	-	-

Table 7 and 8 show the ANOVA results which was conducted to explore the impact of qualification groups on the use of m-Banking application. The participants were divided into five groups based on their levels of qualification (Group 1: Secondary school; Groups 2: Diploma; Group 3: First degree; Group 4: Masters; Group 5: PhD). The result shows that there was no statistically significant difference at the $p > 0.05$ level on usability score for the 5 qualification groups: $F(4,145) = 2.491, p = 0.046$. Despite that there is statistical significant differences, the actual differences in mean scores between the groups were quite differ from each other. Post-hoc comparisons using the Tukey HSD test indicated that means score for Group 1 (M = 4.7297) was significantly different from Group 5 (M = 6.8919, SD = 1.32889), Group 2 (M = 5.2658, SD = 0.72469) was significantly differ from Group 3 (M = 6.4432, SD = 1.13410) and Group 4 (M = 6.5291, SD = 1.15550) did not differ significantly from either Group 3 or 5. This result shows that users with higher qualification have few usability issues despite that they are old age but there qualifications really help them to overcome some usability issues while for those with lower qualification have more usability issues despite that they are young age.

Table 9 and 10 show ANOVA results which was conducted to explore the impact of years of experience groups on the use of m-Banking application. The

participants were divided into 5 groups based on their years of experience (Group 1: 1-2 years; Groups 2: 3-4 years; Group 3: 5-6 years; Group 4: 7-8 years; Group 5: 9 years and above). The result also shows there was no statistically significant differences at the $p > 0.05$ level in usability score for the 5 qualification groups; $F(4.145) = 2.338$, $p = 0.058$. Despite that there was no statistical significant difference but the actual differences in mean scores between the groups were quite different from each other. Post-hoc comparisons using the Tukey HSD test indicated that means score for Group 1 ($M = 5.9814$, $SD = 1.58434$) was significantly different from Group 3 ($M = 6.7748$, $SD = 0.81650$) and Group 4 ($M = 6.7447$, $SD = 0.81905$) but Group 2 ($M = 6.4010$, $SD = 0.98540$) did not differ significantly from Group 5 ($M = 6.4550$, $SD = 1.53555$).

The findings of this study shows that the three banks have more usability issues on privacy and reliability because the level of significance is 0.001 which indicates that 99% of the three banks have issues of privacy while the learning ability, interface structure and layout, task structure and presentation and mobile device compatibility are all not significance as shows in Table 5. But for the usability issues on age, gender, qualification and years of experience shows that there are differences between them though some of them the difference is not much when comparing with the mean values. For the gender the result shows that male users perform better and have less usability issues than the female users. For the age group also shows that younger and middle age users have few usability issues than the older age as mention by Nasir *et al.* (2008) and Kurniawan (2008).

This finding also shows that users with higher qualification have fewer usability issues despite that they are older in age but there qualifications really help them to overcome some of usability issues while for those with lower qualification have more usability issues despite that they are young age (Nasir *et al.*, 2008). For the years of experience, the result shows that users with fewer years of experiences have more usability issues follow by those with highest years of experience though they have the maximum years of experience but they are also old age but those with average years of experience have few usability issues because they are middle and young age. The result also shows that users with higher qualification have fewer usability issues despite that they are with older ages but their qualifications really help them to overcome some usability issues while for those with lower qualification, they have more usability issues despite that they are with younger ages.

CONCLUSION

m-Banking application interface become one of the most growing emergent m-commerce applications today

that allowed the users to perform transactions easily and conveniently without any difficulties. This study investigated the usability issues of three Nigerian Banks and compared the mean differences between different age group, gender, qualification and experience. The result of this study shows that it is important for the future development of m-Banking application interface to consider older age users and also those with lower knowledge background and also the users with less experience in m-Banking application. Improving the m-Banking application interface to allow users with different age group, gender, qualification and experience to use the application easily because today many users are performing there transactions using m-Banking application.

RECOMMENDATION

In addition, further study can focus on the security aspect of m-Banking application and the various types of mobile devices since users perform these transactions using different mobile devices so, that to avoid any incompatibility issues in using m-Banking applications interface.

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