

User Feedback: An Essential Interface Design Strategy for Developing Easy-to-use Banking ATM System Interfaces in Nigeria.

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Abstract

Banking automated teller machine (ATM) technological innovations in Nigeria have significant importance and benefits. However, illiterate and semiliterate Nigerians, representing about 40.33%, do not perceive them as useful or easy-to-use. ATM user interface systems design processes failed to center on knowledge and understanding of user-feedback or around the users' cultural backgrounds and literacy levels. The purpose of this case study was to identify the role user feedback plays in the development process of creating easy-to-use banking ATM system interfaces in Nigeria. The technology acceptance model was adopted as the conceptual framework. One organization in Enugu, Nigeria was used for this study's population. Data were collected through semi-structured, in-depth face-to-face interviews with nine banking ATM system interface developers and the analysis of 11 documents. Findings from the participants were validated through member checking. One major theme that emerged through methodological triangulation was: importance of user feedback as essential interface design, that encompass four important components: (a) user feedback through audio and video records at ATM service point, (b) user feedback through help desk services, emails and phone call, (c) user feedback through administration of questionnaires, and (d) through evaluation of system traffic. The findings in this study provide direction for the future development of strategies to create easy-to-use ATM system interfaces for people with varying abilities and literacy levels and for other information technology systems that are user interface technology dependent.

Keywords: *ATM system interface, user feedback, easy-to-use, literacy levels, user-centered*

1. Introduction

The growing opportunities of ATM technological innovations in Nigeria have been hindered by the ATM system interfaces offered by ATM software developers in Nigeria, especially in the banking sectors (Adjei, 2015; Sahi & Gupta, 2013). The existing ATM system interfaces in Nigeria have failed to provide easy-to-use ATM system interfaces for variety of people with varying abilities and literacy levels. A survey report by Enhancing Financial Innovation and Access (EFInA) revealed that only 7.9% of Nigerians use ATMs, and 53% of adults who are bank customers use their ATM cards (EFInA, 2014). Written

language level used by software developers in their design is one of the important factors that affect easy-to-use ATM system interfaces (Jimoh & Babatunde, 2014). United Nations Educational, Scientific, and Cultural Organization Statistic Report found that 40.33% of Nigerians aged 15 years or older are illiterate or semiliterate (UNESCO, 2015). In Nigeria, the existing banking ATMs do not adequately cater for these 40.33% illiterate or semiliterate adults because banking ATMs lack customized user-friendly interface, not flexible, expressive, and easy to use. As a result, the ATMs appear complex and difficult to use. Easy-to-use banking ATM system interfaces are a major dimension of ATM usability (Sagib & Zapan, 2014). The World ATM Benchmarking Study 2014 and Industry Report also indicated that a positive significant relationship exists between ATM interface and usability (as cited in Burelli, Gorelikov, & Labianca, 2014).

Usability defines how easy it is for the user to use a product to perform prescribed tasks and achieve the desired goals (Park & Song, 2015). An interface that fails to incorporate the user, and “compromise” the users’ varying abilities and capabilities that determines whether or not the product will be easy-to-use, has failed. (Hyysalo & Johnson, 2014). To the ATM user, the interface is the product, not necessarily the ATM machine (Zhang, Wang, Deng, & Yin, 2013) and the most critical component of the ATM system that determines ATM acceptability by users (Darejeh & Singh, 2014a). Poorly designed ATM user interface is not easy-to-use or usable, no matter how well the machine performs (Alshameri & Karim-Bangura, 2014). Software developers of banking ATM systems in Nigeria have been inventive through understudying and presenting of information about users’ literacy levels and cultural differences as they affect users’ interaction with the ATM system interfaces. With the availability of information on cultural and literacy differences among users, one might think that designing easy to use system interfaces would appear easy. But if designing system interfaces appeared so easy with the available information on cultural and literacy

differences among users, why are some software developers of banking ATM systems in Nigeria lack strategies to create easy-to-use ATM system interfaces for a variety of people with varying abilities and literacy levels? This is probably because some banking ATM system interface developers have not incorporated enough the use of user feedback in their usability design strategies.

User feedback is regarded as technology acceptance enablers and an important design strategy to actualize easy-to-use system interface product (Abu-Dalbouh, 2016). This is because Usability principles are related to user feedback (Pribeanu, 2017), which brings the necessity of engaging design strategies that incorporate the user, and “compromise” the users’ varying abilities and capabilities for the purpose of developing interfaces that are customized, user-friendly, user-centered, flexible, expressive and easy to use by different users (Rodrigo, Ricardo da Silva, & Marcos, 2014). User feedback are important resources of information for the development of adaptive, easy-to-use, and user-centered system interfaces that can cater for the different literacy levels of users (Karami, Fleury, Boonaert, & Lecoeuche, 2016). User feedback is also considered as an enabler of system developers, usability design strategies, and guidance (Karami, et al., 2016; Pribeanu, 2017). This is because usability principles and ability to develop user-centered and easy-to-use interfaces are related to user feedback (Pribeanu, 2017). Therefore, we are interested in how developers create user-centered and easy-to-use banking ATM system interfaces in a user dependent or user feedback approach. This proposed approach works under the assumption that some software developers of banking ATM system interfaces have in-depth understanding of strategies to create easy-to-use systems based on users’ positive and negative feedback regarding the system actions and acceptability.

We postulate that the general IT problem is the lack of user feedback approach resulting in lack of easy-to-use ATM system interfaces for people with varying abilities and

literacy levels, while the specific IT problem is that some software developers of banking ATM systems in Nigeria lack user feedback approach in their design strategies to create easy-to-use ATM system interfaces for a variety of people with varying abilities and literacy levels. This study has one research question: “What are user feedback strategies used by software developers of banking ATM systems in Nigeria to create easy-to-use ATM system interfaces?”, and is not intended to test any hypothesis. It is intended to explore and gain subjective in-depth knowledge of user feedback design approach developers use to create easy-to-use banking ATM system interfaces. The target population for this study were qualified and experienced banking ATM system interface developers who had strategies to create easy-to-use ATM system interfaces for people with varying abilities and literacy levels. The geographical location was the Enugu State of Nigeria. One ATM system interface developer organization in Enugu served as the case study. Two major sources of data, which were semistructured interviews and 11 documents that focused on strategies to create an easy-to-use banking ATM system interface were used.

2. Literature Review

In this section, we presented related literature in user interface systems that primarily majored on existing banking ATM user interface systems whose design processes centered around the users’ cultural backgrounds and literacy levels and based on knowledge and understanding of user-feedback. Some peculiar usability challenges of ATMs in Nigeria that hinged of effective user-feedback design strategies for developing easy-to-use ATM system interfaces were studied. We also provided an overview of useful concepts and conceptual framework that framed the descriptions of our studies and presented the framework we used for our analysis. We provided some existing relationship among user-feedback and ATM system service quality. Finally, we described the concept of user-feedback design strategies and how we can leverage this idea to create easy-to-use ATM system interfaces for people

with varying abilities and literacy levels. These laid the foundation and motivation for this study and helped to understanding the synergetic impact of the components needed for ATM system interface developers to adopt user-feedback design strategies for the success of creating easy-to-use ATM system interfaces for people with varying abilities and literacy levels. In this review, we also uncovered new approaches to sustainable user-feedback interface design strategies.

2.1. Conceptual Framework

This study's conceptual framework is founded on the information system theory called the technology acceptance model (TAM). The TAM was developed by Davis in 1989, based upon the psychology-based theory of reasoned action (TRA) and theory of planned behavior (TPB). TAM was adopted because it demonstrates how users come to accept and use technology by presuming two variables called perceived ease of use (PEOU) and perceived usefulness (PU) as primary determinants in a complex but mediating relationship between system characteristics (external variables) and potential system usage. PU reflects the expected benefits from using the new technology, while PEOU reflects the perceived behavioral attitude in the theory of planned behavior (Davis, 1989). TAM's major determinants: PU and PEOU support strategies for developing user interface for banking ATM and user-centered design that will cater for a variety of users with varying literacy levels and culture. According to Martinsa, Oliveiraa, and Popovi'ca (2014), it is only through the study and analysis of users' feedback within the design process that understanding of what constitutes the three external variables that are determinants of TAM's PEOU and PU: perceived risk, social influence, and facilitating conditions, can be evaluated. In other words, TAM is validated by the study and analysis of user's feedback within the design process

A conceptual framework that integrates TAM and the external variables that often influence PU and PEOU enumerated above, were insightful to the understanding of user-

feedback design as an important strategy to create easy-to-use banking ATM system interfaces for people with varying abilities and literacy levels. This is because, according to Joo, Lee, and Ham (2014), user centered design interface is powered by user-feedback design strategies that significantly influence PU, and perceived ease-of-use, which in turn has a significant effect on satisfaction among users. User feedback represents design strategies to impact users perceived ease of use and usefulness of the interface product. User feedback must serve as the pivot for user centered and easy-to-use design strategies because all designs strategies to create user centered and easy-to-use interfaces work around analysis and reanalysis of user feedback data to develop a user centered system consistent with two major determinants of technology acceptance model: PU and PEOU. Therefore, TAM is regarded as one of the most popular and effective models for evaluation of user feedback process (Abu-Dalbouh, 2016). Effective user-feedback evaluation is necessary to ensure the intended system interface adequately meets users' requirements and scope of the system (Joo, et al., 2014). This claim is supported by Bhattacharya and Laha (2013), who stated that for an interface design process to support TAM's PEOU and PU, it should consider user feedback in terms of knowing the users and tasks, who they are, and what goals they try to achieve. Such interface design process, according to Kwan, Paquette, Magee, and Betke (2014) can only support TAM's PEOU and PU and eventually deploy easy-to-use interface through the end-user feedback approach for design and evaluation process. In other words, User feedback design process is evaluated when users perceived the product as useful and ease of use. This property of TAM makes TAM to be the preferred user-acceptance model for this study.

2.2. Relevance of User-Feedback in Developing Easy-to-Use System Interfaces

There are contributions in recent literature that pointed to existing and peculiar usability challenges of ATMs in Nigeria. While there are varied opinions and contributions to usability challenges of banking ATM user interfaces in Nigeria, one central core and

significant usability challenges conceived among the authors were that banking ATM system adoption in Nigeria showed usability defects and user experience issues that can be frustrating (Jegede, 2014), manifested by lack of customized user-friendly interfaces that are tied to users' literacy levels, and cultural differences, and lack of user feedback design approach. Contributing to this, Zhang, et al. (2013) argues that ATM interface developers in Nigeria have failed to realize that, to the ATM user, the interface is the product and the most critical component that determines ATM acceptability. As a result, the utilization and profitability of ATM systems in Nigeria are affected by how the ATM system interface influences users in terms of users' literacy levels, and cultural differences. This is supported by Darejeh and Singh (2014a), and Jimoh and Babatunde (2014) who claimed that banking ATM user interfaces in Nigeria lack simple and easily understandable design and contents, that rendered them not easy-to-use or not well understood by all users with varying abilities and literacy levels.

ATM usability answers to how easy-to-use the interface is which is tied to a user-centered design process that incorporates consistent and iterative elicitation of end-user feedback necessary to ensure that the system design supports users' tasks by providing developers the right information to work with. The ability to identify and understand feedback received from users is important to developers to create easy-to-use system interfaces for people with varying abilities and literacy levels. Building on these concepts, we claim that user-feedback received will incorporate data that will be used to design the required system that meets overall users' needs. It is only through empathy, end-user feedback, and resultant data analysis that system developers can design services that meet user needs (German, 2017). Approaches by banking ATM system interface developers to provide and facilitate design services that meet user needs to close the challenging gaps should involve the use of user-feedback design strategies to analyze user requirements and

device accessibility, extracted from existing standards and guidelines (Mi, Cavuoto, Benson, Smith-jackson, & Nussbaum, 2014).

We postulate that effective implementing of an interface platform that will cater for both the literate, semi-literate and the illiterate begins with the understanding that the illiterate group forms the 'skeleton' of the design input because this understanding provides insight into how user-centered and user-friendly interface design techniques can be applied to this multiple target user groups: literate, semi-literate and the illiterate users. For all users with varying literacy levels to use the same banking ATM system interface and find them useful and easy to use, the ATM interface must provide effective communication platform that is understood and usable by all user groups. The ATM user interface should be designed or redesigned with the user in mind, meaning that the principles of user feedback interaction design should be incorporated into the ATM interface design process to produce secure authentication interfaces that are effortless, and easier for users (Betab, & Sandhu, 2014). Receiving feedback as to whether their design is easy to use and acceptable is important because user acceptance of a technology is often considered more important than usability and convenience (Betab, & Sandhu, 2014). Kassem, Mekky, and EL-Awady (2014) emphasized the importance of user feedback as essential interface design or redesigned process because developers must have the user in mind, in order to incorporate into the ATM interface design process, a secured authentication interfaces that are effortless, and easier for users. This idea addresses one major concern of ATM system interface developers in Nigeria, and that is regular evaluation of ATM interface challenges and situations which initiates a redesign process that goes beyond system and terminal interfaces. According Lay, Patton, and Chalhoub-deville (2017), user-feedback facilitates individualized, complex assessment experiences, and focuses on the next level of attainment that ensures that ATM system interfaces are perceived as useful and easy to use by all users. Contributions by Ilyas, Ahmed,

and Alshamari (2013), also recognized the importance of user feedback as essential interface design process because interface usability answers to users' peculiarity to a locality or country: the literacy levels, culture and behavior. This assertion is also supported by finding by German (2017) that put developers' ability to identify with, and understand users' feelings or difficulties, received as feedback, as an important requirement for the design of user-centered interface system that can meet the needs of user groups. German also noted that design process does not only begins and ends with the end user but also includes consistent and repeated elicitation of end-user's feedback which is essential to ensure that the system design supports the developers' tasks and decision-making processes by providing the right information at the right time, and in an intuitive manner. Petersen and Hempler (2017) noted that design rethinking focuses on rapid prototyping by turning ideas into actual products that are then tested, iterated, and refined, based on end-user feedback. According to Petersen and Hempler, there is a significant positive relationship between design rethinking and end-user feedback. The co-creation inherent in the design rethinking processes during system interface development and testing were vital to creating easy to use system interface, and value for users. During usability tests, developers often want to know and validate that they are interpreting their results correctly by incorporating interactive activities that provide immediate end-user feedback (Boronow, et al., 2017). This puts end-user feedback is an essential strategy employed by developers to create easy-to-use interfaces because prototypes are iteratively revised based on end-user feedback, and results from the feedback provides help to developers, which shows how users understood the system (Silva, Jimenez, Blomberg, & Luis, 2017). Another important usefulness of end-user feedback is that it helps in the design process to ensure easy-to-use system interfaces by generating the development and distribution processes that creates new features, and involving end-users, resulting in subsequent collection of much feedback as possible and creation of effective solutions during

the development process (Chin-Feng, Po-Sheng, Yueh-Min, Chen, & Tien-Chi, 2014). The results of this study support the work of Silva, et al. (2017), who reported that use of user feedback is an essential and important design process to create good user interfaces that are customized, intuitive, interactive, tailor-made and easy-to-use. Silva, et al. (2017) further stated that new features are developed according to end-user feedback and implemented in a development branch, passing through several analyses, tests and end-user feedback stages. The literature aligns with study's findings. Five of the interviewed participants stated that the design of the developers' codebook is always refined in response to end-user feedback and subsequently reevaluated.

User feedback is a design strategy to impact users perceived ease of use and usefulness and serves as a complementary approach to understanding users' perceptions and formation that may lead to system interface product acceptance. Apart from user-feedback design strategy serving as developers' guidance and strategy on the path to user-centered interface design (Pribeanu, 2017), it also serves as a loop between interface developers and users that should be maintained in the design strategies to create easy-to-use system interfaces for varied user groups, exemplified by their peculiar iterative process of needs assessment and product adjustment (Ienca, Kressig, Jotterand, & Elger, 2017). ATM system interfaces to be perceived as useful or easy to use by the user, such interface design process must adequately adopt end-user feedback as an essential design strategy. Given the complexity of varied user groups and specialization, feedback from representative end-users is essential for acceptance of the user-centered software (Lin, Guerguerian, Tomasi, Laussen, & Trbovich, 2017). In a user-centered design aimed to identify strategies software developers of banking ATM systems in Nigeria use to create easy-to-use ATM system interfaces for variety of people with varying abilities and literacy levels, opening the possibility of perfecting the design based on the feedback of the users is very essential. Our focus is to

identify the components of user-feedback or indicators of a system interface that is suitable with the users' needs.

3. Methodology

The research question that guided our study was: What are strategies used by software developers of banking ATM systems in Nigeria to create easy-to-use ATM system interfaces? We adopted a qualitative case study design methodology that provided rich, in-depth study of the participants' experiences, and the adoption of context-based multiple in-depth data collection from multiple sources, and primarily inductive analysis and reporting. Our focus for this study is exploratory in nature. Therefore, we adopted a qualitative research that offers best opportunity to explore multiple, in-depth data collection that explored the case, generate the expected reports, codes and themes. Our data for this research study came from semistructured interviews we conducted with one ATM system interface developer organization in Enugu, Nigeria, and from documentation from participant case organizations and other nonparticipant case organizations. Data also came from the field notes and reflective journals.

Our intention was to gain subjective in-depth knowledge of strategies developers use to create easy-to-use banking ATM system interfaces. So, we selected a qualitative single case study approach. Subjective in-depth gathering of knowledge to explore and discover meaning are often associated with data generally gathered in words, texts, and images (Odeyemi, 2017). Qualitative case study approach is involved in the gathering of data that are subjective in nature and are generally gathered in words, texts, images, including non-verbal cues, to explore in-depth thoughts of participants, qualitative approach will be suitable. (Odeyemi, 2017). Our study interview questions in this study were concerned with how and what strategies used by participants because our interest was centered on the participant's thoughts, aimed to create understanding and to reflect the diversity in the population of study.

Qualitative case study research method was deemed suitable because our research is largely exploratory in nature and intended to gain in-depth understanding and richness of insights from participants' thoughts, to the generalizability of the results from data.

The major characteristic that distinguished case study design from other qualitative designs is that it provides tools for researchers to explore in-depth study of a contemporary phenomenon within some real-life context, that allow researchers focus on the interest of specific case itself and not on the participants (Yohannes, 2017). Also, case studies are typically designed to answer "how" or "why" questions (Fagerholm, Kuhmann, & Münch, 2017), and to emphasize the use multiple data sources to gain multiple perspectives and validation of data (Carter, Bryant-Lukosius, Blythe, & Neville, 2014). The phenomenon of interest (the case) is the strategies used by ATM system interface developers to create easy-to-use ATM system interfaces for people with varying abilities and literacy levels. The analysis methods adopted in this study further developed and explored the case because the analysis processed interview data, generated reports, codes that will continue to impact new understanding of the study topic, as revealed by the themes and sub-themes. We deemed single case study design appropriate for our study.

One organization that has successfully demonstrated experience and strategies in creating easy-to-use banking ATM system interfaces based on user feedback approach for people with varying abilities and literacy levels was selected as our target population. We selected participants from this banking ATM interface developer organization who have the required English proficiency, are 18 years or older, have strategies to create easy-to-use ATM system interfaces for people with varying literacy levels, within the last three years, and live in Enugu, Nigeria. A set of techniques that clearly defines the boundaries for participants by stating a set of inclusion or exclusion criteria for the samples is important (Dixon, 2015; Robinson, 2014). Such eligibility criteria, which are formally documented as part of the

protocol for the study are perceived to be necessary for selecting participants in a qualitative case study because they majorly result to less varied populations (Morar, et al., 2015; Noyes, et al., 2016). Our contact with the case study organization provided an estimated population size of twelve developers who meet the participation eligibility criteria. Because of the small population size, resulting from the eligibility criteria that defined the population of the study, we interviewed all the twelve participants who were eligible for individual in-depth interviews. According to Etikan, Musa, and Alkassim (2016), census sampling, a type of purposeful sampling is generally chosen where the number of cases being investigated is relatively small. We used purposeful census sampling and identified all twelve members of the eligible participants that meet the eligibility criteria. . Interviews in a qualitative case study are often considered an intrusion into participants' privacy with regard to the level of sensitivity of questions asked, and participants' time taken (Alshenqeeti, 2014). Therefore, we maintained a high standard of ethical considerations throughout the stages of the interview process.

4. Data Collection and Analysis

From the case organization selected, 12 developers meet the participation eligibility criteria. One participant declined, and another travelled out of town (Enugu), leaving a total of 10 participants who could be interviewed. As a strategy towards conducting credible research and to ensure data saturation, we interviewed all participants who consented and were available until there was no new information being provided and no new major emerging codes and categories. Data saturation from the interview data was reached with the ninth participant. Data collection process included semistructured, in-depth face-to-face interviews with these 9 banking ATM system interface developers and the analysis of 11 documents: 5 from participant case organizations and 6 from nonparticipant case organizations. Five documents provided for use by the participant case organization centered

on regulations and ATM technology and specification, user interface design guidelines for creating easy to use interfaces, user requirements analysis procedures, proactive and reactive (feedback) guidelines, and system development and simulation procedures. We were also provided with six documents from nonparticipant case organizations, two of which came from Central Bank of Nigeria. One other document specifically contained 80 ATM system interface screen shots. Other documents included our field notes and reflective journals that contained some major issues raised during the interviews. The distribution of these 11 documents is shown in Table 1.

Table 1

Documents Reviewed by Sources

Sources of Documents Reviewed					
Participant case organization	Nonparticipant case organization				
	CBN	80 ATM system interface screen shots	Systems Development Life-Cycle Phases	Field notes	Reflective journals
n=5	n=2	n=1	n=1	n=1	n=1
Regulations and ATM technology and specification	Standards and guidelines on ATM operations in Nigeria	80 ATM system interface screen shots	Systems Development Life-Cycle Phases	Field notes	Reflective journals
User interface design guidelines for creating easy to use interfaces	Guidelines on Operations of Electronic Payment Channels in Nigeria				
User requirements analysis (proactive) procedures					
Reactive (feedback) guidelines					
System development and simulation procedures					

Note. n = number of documents

The hallmark of case study research has been emphasized by researchers as the use of multiple data sources, a strategy to gain multiple perspectives and validation of data (Ledo-Andión, López-Gómez, & Castelló-Mayo, 2017), which also enhances data credibility, and triangulation (Hanney, Greenhalgh, Blatch-Jones, Glover, & Raftery, 2017). The consensus

of many qualitative case study researchers on data saturation, is that data saturation is achieved by continuous collection of enough data to the point where additional input from further sources of data do not continue to generate new information (Veletsianos, & Shepherdson, 2016), or continue to impact the research question (Suárez-Guerrero, Lloret-Catalá, & Mengual-Andrés, 2016), or generate new themes (Coorey, et al., 2017). We achieved data saturation when the transcripts are no longer revealing new information or new themes in the subsequent interview data. We further ensured data saturation by gathering multiple sources of data from participant interviews, case organizations' regulations, policies, and design guidelines documents that are focused on strategies to create easy-to-use banking ATM system interface from participant case organization and from other non-participant case organizations. Member checking was recommended by researchers as the most crucial technique for establishing validity and credibility of instruments used in a qualitative case study (Morse, Lowery, & Steury, 2014). We used member checking to increase the reliability and validity of the findings from the participants by providing each participant a summary of the interview to verify we understand the intent of the responses. Through member checking, we also allowed participants an opportunity to verify the accuracy of the interview. For a case study that employs both interviews data and data from other sources, methodological triangulation has been recommended to further secure data saturation (Ray, 2017). We employed methodological triangulation to facilitate validation of multiple sources of data collected through interviews, observations, and documents. Analysis of data was facilitated using ATLAS.ti7 (version 7).

5. Findings

One emergent theme from data analysis was importance of user feedback as essential interface design. The role user feedback plays in the development process of creating easy-to-use ATM interfaces was prevalent in our findings from the interviews with the participants

and consistent with literature prior to our data collection. Table 2 shows four important techniques for obtaining user feedback from ATM system users as evident from this study and the frequency (number) of participants who indicated these techniques for engaging user feedback were essential to interface design. Table 2 also shows the number of supporting documents that contained these important components of user feedback as essential interface design. These frequencies are not mutually exclusive, meaning that two or more of these components may appear in one document.

Table 2

Frequency of Second Major Theme

Source of data collection	Important components of user feedback as essential interface design			
	Through audio and video records at ATM service point (f)	Through help desk services, emails and phone calls (f)	Through administration of questionnaires (f)	Through evaluation of system traffic (f)
Participants	9	9	4	4
Documents	5	7	6	4

Note. *f* = frequency

Our finding from the participants showed that user-feedback was usually obtained through (a) user feedback through audio and video records at ATM service point, (b) user feedback through help desk services, emails and phone call, (c) user feedback through administration of questionnaires, and (d) through evaluation of system traffic. Participants noted that a user-centered design process should incorporate a consistent and iterative elicitation of end-user feedback necessary to ensure that the system design supports users' tasks by providing developers the right information to work with. Participants indicated that ability to identify and understand feedback received from users is important to developers to create easy-to-use system interfaces for people with varying abilities and literacy levels. This

is because the feedback received will incorporate data that will be used to design the required system that meets overall users' needs. This ties our study findings with findings from a similar study by German (2017) who found that it is only through empathy, end-user feedback, and resultant data analysis that system developers can design services that meet user needs. This finding also supports the works of Mi, et al. (2014) in the literature review that proposed the need for developers of user interfaces to analyze user requirements and device accessibility, extracted from existing standards and guidelines, to facilitate design services that meet user needs to close the challenging gaps.

During our interviews with participants, we noted that participants # 2, 4, and 7 claimed that receiving feedback as to whether their design is easy to use and acceptable is important because user acceptance of a technology is often considered more important than usability and convenience. Moreover, participants # 1 and 9 noted that it is difficult to know how innovative technologies are evaluated from the point of view of user acceptance without end-user feedback. Participants provided varying feedback procedures that align with the organizational feedback template. Nine participants noted that they obtain feedback on system acceptability primarily through audio and video records from ATM users at the ATM service point as part of security surveillance. At ATM service points, users talk, and in some cases, express their honest opinion, possibly in their own language.

These comments are usually honest since ATM users are unaware that their comments are being recorded. They also claimed they collect feedback on system acceptability through one on one interaction with users, through help desk services and through emails and phone calls. Four participants receive feedback through administration of questionnaires on users to get immediate responses and through evaluation of system traffic, knowing whether it is on the increase or decrease from the point of implementation. Participants # 8 and # 6 noted their feedback from users can be obtained through the ATM system, especially when there is a

transmission problem, such as use of wrong ATM code, trying to overdraw the account, exceeding the daily allowance or using expired ATM card. Participants # 3 and # 5 talked about monthly ATM feedback survey forms handed out or emailed to ATM customers, and during campaign and short seminar presentations. Participant #9 suggested the incorporation of a feedback bottom in the ATM system interface to give users the opportunity to rate the system interface whether it is easy to use and acceptable.

Although there were several avenues to get feedback from users, despite the varied feedbacks, developers do not look for consensus but welcome all forms of feedbacks to enable consideration of all potential difficulties from all the user groups. Participants emphasized that creating system interface for both literate, semi-literate, and the illiterate is a difficult one for user-interface developers; hence interaction with the target user groups is essential. In addition, developers conducted follow-up interviews after these changes to ensure all were attended to, and that there were no new major errors or problems created. One important comment received from all the nine participants was the need to consider all variety of users while analyzing the feedback data. Participants maintained that analysis of feedback data is done in two levels: first the system is tested and evaluated with the feedback from the literate group and improved according to the suggestions of this user group. Second, the system is evaluated with the feedback from the illiterate group and evaluated according to the suggestions of this user group. This two-step method allows developers to solve any usability errors and put the system easy-to-use with these two levels before making the system available to the end users.

Participants claimed they adopted this method to avoid the illiterate group being demotivated by the literate group. This ensures that the system interface is user-centered and easy-to-use for users with varying abilities and literacy levels. This finding is consistent with a recent study by Pinegger, Hiebel, Wriessnegger, and Müller-Putz (2017) who explored and

evaluated feedback gathered from different groups into combined steps and strategies to further develop and improve the product. This finding also supports the work of Hoehle, Zhang, and Venkatesh (2015) as noted in the review of literature, that suggested user interface design strategies motivated by feedbacks gathered from a combined consideration of varied endogenous and exogenous inputs from the end users. This finding therefore provided an answer to the research question for this study because end-user feedback and resultant data analysis form part of strategies banking ATM system interfaces use to create easy-to-use interfaces that will cater for people with varying abilities and literacy levels. Another recent study that supported this study findings was from Steen and van Bueren (2017), who also added that feedback and evaluation gathered from different user groups at different steps are used to develop easy-to-use system interfaces.

Methodological triangulation was achieved with the documents that supported the four important techniques for obtaining user feedback from ATM system users as shown in Table 2. Two documents, user requirements analysis (proactive) procedures and Reactive (feedback) guidelines, revealed templates used by this study's case organization for transiting from proactive and reactive (feedback) stages. The proactive template stores the developers' "feed-in", gathered from prior research, knowledge or intuition. guidelines, and system development and simulation procedures. This is evaluated and implemented at its first stage to be reactively assessed by the intended users to produce a possible first end-user feedback. This is often referred to as template version 1, test 1. User requirements analysis uses the template to the proactive assessment for the developers to make adjustment or add new features, ready to go for another reactive assessment that will yield another end-user feedback. This is template 2 test 2. With the help of a user requirements analysis, developers become aware of potential users and of their requirements on the intended interface to be developed. This forms part of the strategies used by developers to create easy-to-use system

interface. These documents support the theme. This iterative end-user feedback evaluation continues until the system usefulness, credibility, and desirability is achieved.

Interviews from participants support the findings from these documents. Participant # 2, #3 and #6 who categorically stated that there is no ending to proactive assessment by developers and reactive assessment (end-user feedback), as long as the product is in demand. Two other participants, participants #8 and 9 made it clear that, even after a system is designed, future users might not often have clear understanding of the implications new interface technologies will have on their lives so there is limit to the input they can give into the design decisions. According to participant #8, “we as developers do not only study the end users’ abilities and literacy levels, we also collect inputs from these end users that strive to understand the contexts, challenges, relationships, environments, culture, and emotions, especially where a design problem is situated”. Recent research by Ienca, et al. (2017) supported these findings, and noted that using end-user feedback from the user testing to make changes to the template continues with a follow-up interviews after these changes are made to ensure there were no new major changes observed or old ones left unattended to. This approach ensures that developed interfaces are user-centered and easy-to-use.

Recent literature supported the theme: importance of user feedback as essential interface design process. German (2017) asserted that end-user feedback is an important component of user-centered design strategy, adding that it is only through empathy, end-user feedback, and resultant data analysis that system developers can design services that meet user needs. This addresses one major concern of ATM system interface developers in Nigeria, and that is regular evaluation of ATM interface challenges and situations which initiates a redesign process that goes beyond system and terminal interfaces. These efforts serve as feedback to the ATM builders to ensure that ATM system interfaces are perceived as useful and easy to use by all users. The theme also supports previous researchers, Betab and

Sandhu (2014), Kassem et al. (2014), and Kumar, et al. (2014), cited in the review of professional and academic literature of this study and is consistent with the conceptual framework for this study. Betab and Sandhu (2014), Kassem et al. (2014), and Kumar, et al. (2014), emphasized the importance of user feedback as essential interface design or redesigned process because developers must have the user in mind, in order to incorporate into the ATM interface design process, a secured authentication interfaces that are effortless, and easier for users. Contributions by Ilyas et al. (2013), as cited in the review of professional and academic literature of this study, also recognized the importance of user feedback as essential interface design process because interface usability answers to users' peculiarity to a locality or country: the literacy levels, culture and behavior. Also, a recent study by German (2017) supported findings from this study that put developers' ability to identify with, and understand users' feelings or difficulties, received as feedback, as an important requirement for the design of user-centered interface system that can meet the needs of user groups. German also noted that design process does not only begins and ends with the end user but also includes consistent and repeated elicitation of end-user's feedback which is essential to ensure that the system design supports the developers' tasks and decision-making processes by providing the right information at the right time, and in an intuitive manner

Another recent study also supported the findings that link design rethinking to end-user feedback. Petersen and Hempler (2017) noted that design rethinking focuses on rapid prototyping by turning ideas into actual products that are then tested, iterated, and refined, based on end-user feedback. According to Petersen and Hempler, the co-creation inherent in the design rethinking processes during system interface development and testing were vital to creating easy to use system interface, and value for users. In another development, Boronow, et al. (2017) indicated that during usability tests, developers often want to know and validate that they are interpreting their results correctly by incorporating interactive activities that

provide immediate end-user feedback. According to Boronow, et al. (2017), end-user feedback is an essential strategy employed by developers to create easy-to-use interfaces because prototypes are iteratively revised based on end-user feedback, and results from the feedback provides help to developers, which shows how users understood the system.

Silva, et al. (2017) asserted that one important usefulness of end-user feedback is that it helps in the design process to ensure easy-to-use system interfaces by generating the development and distribution processes that creates new features, and involving end-users, resulting in subsequent collection of much feedback as possible and creation of effective solutions during the development process. The results of this study support the work of Chin-Feng, et al. (2014), who reported that use of user feedback is an essential and important design process to create good user interfaces that are customized, intuitive, interactive, tailor-made and easy-to-use. Silva, et al. (2017) further stated that new features are developed according to end-user feedback and implemented in a development branch, passing through several analyses, tests and end-user feedback stages. The literature aligns with the theme and ties back to our study's findings. Five of the interviewed participants stated that the design of the developers' codebook is always refined in response to end-user feedback and subsequently reevaluated.

Findings from participants are consistent with TAM's two major determinants: PU and PEOU, in that users' feedback design process is evaluated when users perceived the product as useful and ease of use. User feedback therefore serves as the pivot for user centered and easy-to-use design strategies because all designs strategies to create user centered and easy-to-use interfaces work around the analysis and reanalysis of user feedback data to ensure alignment and consistency with the two major determinants of TAM: PU and PEOU. The implication here is that, for a user-centered interface design to be most beneficial as to influence user's PU and PEOU, appropriate end-user feedback must be in place. This

was possibly why participants # 4 and #7 noted that users feedback evaluation must include features in the intended or new system, otherwise it might result in a fake evaluation of the new system interface product or technology acceptance. Findings from the participants is supported by the theme and aligns with the result of the studies by Abu-Dalbouh (2016). Findings from Abu-Dalbouh's study reported that effective feedback evaluation is necessary to ensure the intended system interface adequately meets users' requirements and scope of the of the system. Abu-Dalbouh also stated that TAM is one of the most popular and effective models for evaluation of user feedback process. Discussing design strategies to create interfaces that support TAM's PEOU and PU; Bhattacharya and Laha (2013) stated that any interface design process should consider user feedback in terms of knowing the users and tasks, who they are, and what goals they try to achieve. Such interface design process, according to Kwan, et al. (2014) can only deploy easy-to-use interface through the end-user feedback approach for design and evaluation process. This study's finding therefore supports previous studies and TAM conceptual framework for this study. This theme supports this literature and also aligns well with TAM's conceptual framework for this study in that the major determinants of TAM: PU and PEOU are also the major result from good user feedback evaluation process.

6. Discussion and Conclusion

Developers of banking ATM system interfaces should take advantage of user feedback to promote continued updates of their systems. In a user-centered design aimed to identify strategies software developers of banking ATM systems in Nigeria use to create easy-to-use ATM system interfaces for a variety of people with varying abilities and literacy levels, opening the possibility of perfecting the design based on the feedback from end-users is very essential. Easy-to-use is an important criterion to assess the quality of banking ATM

systems, and one of the success indicators of a system that is suitable with the users' needs.

However, this process is perfected during the engagement of feedback from end-user.

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