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Engaging Pictorial Images and Voice Prompts Interface Design Strategy to Create Easy to use banking ATM System Interfaces in Nigeria

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Abstract*-The existing banking ATMs in Nigeria do not adequately cater for a variety of people with varying abilities and literacy levels despite the significant importance of ATM technological innovations in Nigeria, especially in the banking sectors. Illiterate and semiliterate Nigerians, representing about 40.33%, do not perceive the ATMs as useful or easy-to-use. The purpose of this case study was to identify strategies used by software developers of banking ATM systems in Nigeria to create 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 from data analysis was value of pictorial images and voice prompts in interface design, that encompass the use of: (a) pictorial images, and enhanced voice prompts with short transaction cycle, (b) voice feedback in users' own language, (c) text-free user interface and extensive use of hand-drawn, and (d) graphics /imagery and voice as inputs.Strategies illustrated by the findings from this study may serve as a basis for positive economic development and social change in this area andmay advance the use of other technology outlets that require easy-to-use system interfaces.*

Keywords: *Banking ATM, pictorial images, Voice prompt, interface design, easy-to-use, ease of use, literacy levels.*

I. Introduction

The general IT problem postulated in this study was the lack of easy-to-use ATM system interfaces for people with varying abilities and literacy levels in Nigeria. The existing banking ATMs in Nigeria do not adequately cater for a variety of people with varying abilities and literacy levels. According to Worldometers (2017) and United Nations World Population Prospects (2015), about 40.33% Nigerians aged 15 years and older are illiterate or semiliterate. Another survey report by Enhancing Financial Innovation and Access, reported that only 7.9% of Nigerians use ATMs, and 53% of adult Nigerians who are bank customers use their ATM cards (EFInA, 2014). Despite the significant importance of ATM technological innovations in Nigeria, especially in the banking sectors (Titilope, 2015), written language level used by software developers in their design has remained one of the important factors that affect easy-to-use banking ATM system interfaces in Nigeria (Jimoh & Babatunde, 2014). This is because these large population of illiterate or semiliterate Nigerians are not adequately catered for by the written language level used by software developers in their design of banking ATM systems interfaces in Nigeria. The specific IT problem is that 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.The existing ATM system interfaces in Nigeria have failed to provide easy-to-use ATM system interfaces for these variety of people with varying abilities and literacy levels which supports the need for this research to identify design strategies to improve ATM interfaces in Nigeria.

Easy-to-use ATM system interfaces that cater for a variety of people with varying abilities and literacy levels in Nigeria is increasingly important and presents new challenges that must be addressed by software developer organizations through prioritizing strategies to create easy-to-use banking ATM system interfaces. ATM system interface developers should take advantage of the new technological innovations designed on high level usability platform to close the existing usability gaps often observed in the ATM systems in Nigeria.One significant setback of banking ATM system adoption in Nigeria is that ATMs failed to "compromise" the users' varying cultural and literacy levels, which often renders the ATM interface product not customized, not flexible, expressive and easy to use, especially by the large illiterate and semi-literate Nigerians. According to the World ATM Benchmarking Study 2014 and Industry Report, the ATM interface affects usability (as cited in Burelli, Gorelikov, & Labianca, 2014), and is generally considered by users as the product (Zhang, Wang, Deng, & Yin, 2013), and the most critical component of the ATM system that determines ATM acceptability (Darejeh &

Singh, 2014a). Usability defines "the effectiveness, the efficiency and the satisfaction with which specified users achieve certain goals in determined contexts" (Conti, Collotta, Pau, & Vitabile, 2014, p. 38).

Software developers of banking ATM systems in Nigeria should understand how culture of user can impact strategies to create easy-to-use ATM system interfaces. They should also be equipped with indebt understanding on how literacy level of user can impact strategies to create easy-to-use ATM system interfaces, and how cultural and literacy differences can effectively be harnessed to create easy-to-use banking ATM system interfaces for a variety of people with varying abilities and literacy levels. Interview questions used for this study provided the platform for indebt study needed to identify, understand, support, and explain strategies software developers of banking ATM systems in Nigeria use to create easy-to-use banking ATM system interfaces. These interview uestionsaddressed our research question: "What are strategies used by software developers of banking ATM systems in Nigeria to create easy-to-use ATM system interfaces"? The target population for this study were qualified and experienced banking ATM system interface developers who 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. 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.

II. Literature Review

Related literature in user interface systems that primarily majored on existing banking ATM user interface systems in Nigeria whose design processes centered around the users' cultural backgrounds and literacy levels and based on knowledge and understanding of pictorial images and voice prompts, are considered in this section. We also looked at some peculiar usability challenges of ATMs in Nigeria, and the existing tools and strategies for developing easy-to-use ATM system interfaces. We also provided a summary 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 usability variables and ATM system service quality. Finally, we described the concept of pictorial images and voice prompt design strategies and how we can leverage this idea to create easy-to-use ATM system interfaces for a variety of 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 pictorial and voice prompt design strategies for the success of creating easy-to-use ATM system interfaces for a variety of people with varying abilities and literacy levels. These reviews also uncovered new approaches to sustainable interface design.

2.1. Conceptual Framework

In this study, we adopted the information system theory called technology acceptance model (TAM) as our conceptual framework. 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). 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). Researchers have made various claims on how PU and PEOU are often determined by a perceived attitude towards technology (Gangwar, Date, & Raoot, 2014; Gao & Bai, 2014); cognitive ability (Chen, Liu, Li, & Yen, 2013); social, cultural, and political influences (Kaushik & Rahman, 2015; Patsiotis, Hughes, & Webber, 2013); self-efficacy (Teoh, Siong, Lin, & Jiat, 2013); facilitating conditions (Chen & Chan, 2013; Tsai, 2015); usability measurement attributes used (Hsiao & Tang, 2015); and effectiveness, efficiency, learnability, and memorability (Chen & Chan, 2013).

Kanjwani and Singh (2014) explored some of these external variables of TAM and found that perceived enjoyment, excitement and satisfaction are determinants of TAM. Teoh, et al. (2013) claimed that perceived learnability, self-efficacy, enjoyment and excitement were significant drivers of TAM. Alalwan, Dwivedi, Rana, Lal, and Williams (2015)and Kelly (2014) found self-efficacy as the most powerful factor influencing users' behavioral intension and trust because ability to effectively use technological services, influence users' trust as well as motivation using the product. These determinants of TAM: perceived enjoyment, excitement and satisfactionthat influence usability of new technology, are influenced by pictorial images and voice prompt design strategies. Also, pictorial images and voice prompt design strategies are positively related to PU and PEOU (Giri,Choudhary, &Verma, 2014). Users' perceived enjoyment during design have significant impact on the acceptance intension of users (Kelly, 2014). This is because pictorial images and voice prompts design strategies provide effective communication platform for learnability, self-efficacy, enjoyment and excitement that culminates in users' PU and PEOU of the systems interface product. Also, pictorial images and voice prompt encourage users that are weak in vocabularies with contexts that agree with the two primary determinants of TAM: PEOU and PU.

A conceptual framework that integrates TAM, and the external variables that often influence PU and PEOU enumerated above, were insightful to the understanding of the use of pictorial symbols, and voice prompt interfaces to help users overcome challenges of text intensive user interfaces, as well as possible fear of technology among others. Engaging pictorial images and voice prompts interface design is as an important strategy to create easy-to-use banking ATM system interfaces for a variety of people with varying abilities and literacy levels. According to Joo, Lee, and Ham (2014), user centered design strategies empowered by pictorial images and voice prompts interface significantly influence PU, and PEOU of users. It is therefore necessary to incorporate pictorial images and voice prompts interfaces within the user centered design factors that will make the new technology acceptable to users. An understanding of how TAM's PU and PEOU are often influenced by pictorial images and voice prompt design strategies will impact strategies developers use to create easy-to-use Banking ATM user interface that will cater for people with varying abilities and literacy levels. This property of TAM makes TAM to be the preferred user-acceptance model for this study which focuses on strategies developers use to create easy-to-use banking ATM system interfaces for a variety of people with varying abilities and literacy levels.

2.2 Existing Pictorial and Voice prompt Interface Design Models and Frameworks

Kajiyama and Satoh (2014) proposed an Intuitive Graphical Search Interface (IGSI) model that should go beyond how people interact with computing technology or how easy to use an interface system is and focus more on how users and systems can inspire one another's internal elements. Existing interaction techniques are not catching up with advances in computing, communication and display technologies to make for effective utilization of the available information flow (Rautaray & Agrawal, 2015). Kajiyama and Satoh (2014) defined "interaction" to mean the inspiring of the internal elements of both users and systems rather than the conventional superficial interactions between users and systems. They proposed an Intuitive Graphical Search Interface (IGSI) model with four user elements: information needs, user knowledge, thinking, and feelings, and five system elements: system knowledge, knowledge base, retrieval algorithm, interaction algorithm, and database (Kajiyama & Satoh, 2014). The authors' key point is that the system has the interaction algorithm that explores users' interface needs to select required knowledge needs from the knowledge base, and a system knowledge that can use users' information needs to create their own kind of system knowledge and synchronize it with user knowledge. Usability tests were performed using the system and applied to verify the effectiveness of this model and the design concept. This model provided real intuitive interactions where users and systems simulate one another's internal elements to realize system interfaces that are perceived as useful and easy-to-use.

Ilyas, Ahmed, & Alshamari (2013) proposed Gadget-Inspired Graphical User Interfaces (GIGI), with completely text-free sign language that can visually transmit sign patterns to convey meaning that meets the International Standard Organization (ISO) definition and standard for Public Information Symbols (PIS), to help users overcome challenges of text intensive user interfaces, as well as possible fear of technology among others. Shaer et al. (2014) designed reality-based interfaces (RBIs) empowered by ideas from embodied cognition that could offer an easy-to-use interaction that minimizes the mental effort required to learn or operate computational systems. Although the domain of the work centered on synthetic biology, the study appears very relevant and can advance ATM interface technology (Shaer et al., 2014). Ssekakubo, Suleman, and Marsden (2013) opined that such interface technology founded on synthetic technological platform may not be easily applicable in developing countries because of system component functionality. However, design services that identify appropriate access strategies to guide design decisions on how to effectively and satisfactorily deliver such services to the users was recommended (Ssekakubo et al., 2013). Chen, et al. (2014), proposed a message-based memory system (MIMS) in preference to the traditional bus-based interface that allows the processors to communicate with the memory system through a universal and flexible message packet interface.

A close study of these existing interface design models and frameworks showed that they exhibit one basic characteristic: usability. These existing interface design models and frameworks identified three major areas of concerns that evaluates usability: effectiveness, efficiency and satisfaction, while considering multiple target user groups (e.g. users with differing abilities and literacy levels), as applicable in this study. Overall, usability was the success criterion for all the proposed models.

2.3 Relevance of Pictorial Images and Voice Prompts Interface Design Strategy

Usability and user interface quality are the major factors recognized in literature for software to succeed (Bakaev, & Avdeenko, 2013; Bhattacharya, & Laha, 2013; Caine et al., 2015; Chu, & Tanaka, 2015; Pribeanu, 2014). In addition, about 50% of all program code produced when information systems applications are built is devoted to user interface quality design (Bakaev, & Avdeenko, 2013). Against this background we reviewed the relevance of pictorial images and voice prompts interface design strategies in the development of easy-to-use banking ATM system interfaces for people with varying abilities and literacy levels.

Pictorial images have proved to be effective for transmitting scientific knowledge and conveying specialized knowledge to interface users with varying abilities and literacy levels (Díaz Andrade, Urquhart, & Arthanari, 2015). Pictorial interface technology has been identified to reduce users' cognitive ability (Chen, et al., 2013), facilitate better communication users (Wu, Lee, Chang, & Liang, 2013), improving users trust (Dastan & Gürler, 2016), minimize users' dependence on memory, and provide a means of which learners actively integrate textual and pictorial information into a coherent mental model (Farías, Obilinovic, Orrego, & Gregersen, 2014). Pictorial images also allow interface developers and researchers to emulate how users respond to technology products and acceptability (Taherdoost, 2018). According to Taherdoost (2018), pictorial images can communicate prompt and rich information of the interface environment, especially for the illiterate and semiliterate users.

User interfaces with pictorial images, beautiful and aesthetic appeal will normally facilitate task performance by users (Reppa & McDougall, 2015), and promote independent usability (Chin-Feng, Po-Sheng, Yueh-Min, Chen, & Tien-Chi, 2014).Chin-Feng, et al., 2014). Moreover, the recent scientific innovations that attached importance to the use of naturalistic reality images design strategies that integrate elements of visual aesthetics into interface systems design explicitly recognizes the importance of images in interface designs (Peak, Prybutok, Wu, & Xu, 2011; Mcneil, 2015). Pictorial images and voice prompts design strategies provide effective communication platform for learnability, self-efficacy, enjoyment and excitement that culminates in users' PU and PEOU of the systems interface product.

III. Methodology

We adopted a qualitative single case study approach to understand strategies software developers of banking ATM systems in Nigeria use to create easy-to-use ATM system interfaces for people with varying abilities and literacy levels. Research methodology has been classified as qualitative, quantitative, or involving both qualitative and quantitative methods, typically referred to as mixed methods (Molina-Azorin, 2016; Hewege & Perera, 2013). Qualitative case study research method was deemed suitable when the research is largely exploratory in nature (Odeyemi, 2017), and intended to gain in-depth understanding and richness of insights from relatively few participants who can describe their in-depth experiences or knowledge (Baškarada, 2014; Dey & Lehner, 2017). We chose qualitative approach because our study was exploratory and intended to gain subjective in-depth knowledge of strategies developers use to create easy-to-use banking ATM system interfaces. Subjective in-depth gathering of knowledge to explore and discover meaning are often associated with data generally gathered in words, texts, and images, including non-verbal cues, to explore phenomena but not to explain phenomena (Odeyemi, 2017). Case studies are typically designed to answer "how" or "why" questions (Fagerholm, Kuhrmann, & Münch, 2017). Our study interview questions were designed to answer "how" or "why" questions and tied to gaining in-depth knowledge of strategies and methodologies to create easy-to-use banking ATM interfaces. Our interest was centered on the participant's thoughts, aimed to create understanding and to reflect the diversity in the population of study.

The sampling method engaged in this study was non-random (non-probability), purposive census sampling. Patton (2015) defined purposeful sampling as distinctively engaged and precise qualitative approach to case study selection. A case study design is an in-depth exploration of the object of study or phenomenon of interest, with a pre-defined population within a specific geographic area (Navroodi, Zarkami, Basati, & Limaei, 2016). 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 study emphasizes 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.

A couple of specific type of case study designs guided by the overall study purpose were considered. Case study designs are categorized as explanatory, exploratory, and descriptive (Lekunze & Strom, 2017, p. 152). Explanatory case study seeks to explain the presumed causal links or mechanism in real-life interventions that are too complex for the survey or experimental strategies (Kreindler, 2017). On the other hand, descriptive case study is used to describe the phenomenon and the real-life context in which it occurred or to simply identify the essential structure of the phenomenon (Englander, 2014). In multiple-case approach, each case is studied as if it is a singular study and is then compared to other cases, with the intention of analyzing each following case based on the knowledge obtained in the analysis of previous cases (Starman, 2013). In contrast, a holistic single case approach explores the same issue not by the generalization of findings, but by the different decisions and opinions explored from different case participants within one specific case (Vesna, Vugec, &Lovrić, 2017). We adopted a holistic single case approach because this study is focused on a specific case. Therefore, single case study was selected for this study.

The analysis methods that are adopted in a case study further develop and explore the case, guided by context and emergent data to generate the expected reports, codes and themes (Brobeck, Odencrants, Bergh, & Hildingh, 2014). The analysis methods adopted in this study further developed and explored the case because the analysis process of interview data, generatedreports, codes that will continue to impact new understanding of the study topic, as revealed by the themes and sub-themes. Case study design was deemed appropriate for this study. Exploratory case study seeks to gain in-depth knowledge of the phenomenon of interest, often with the use of face-to-face interviews conducted in open-ended semi-structured questions (Lekunze & Strom, 2017). To gain in-depth knowledge of strategies and methodologies to create easy-to-use banking ATM interfaces we adopted face-to-face interviews conducted in open-ended semi-structured questionnaires. We also used multiple sources of data from participant observation, interviews, field notes and reflective journals, and documentary to leverage the use methodological triangulation to gain multiple perspectives, maximize reliability and validation of data and build coherent justification of data interpretation. This we further achieved through member checking. Member checking establishes a back and forth conversation between the researcher and her participants around every stage of the process of data collection as a means achieving saturation, by giving participants the ability to read the researcher's interpretations and provide any corrections or additional information (Burda, van den Akker, van der Horst, Lemmens, & Knottnerus, 2016; Simpson & Quigley, 2016). We engaged member checking as a means of achieving saturation, by giving participants the ability to read the transcribed data, interpretations and by providing any corrections or additional information.

IV. Data Collection and Analysis

For this case study, eligibility criteria included developers from one 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). According to Hanson et al. (2016), eligibility criteria in a qualitative case study minimizes the heterogeneity of the study population, thereby providing the required case participants. 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), where the number of cases being investigated is relatively small, census sampling, a type of purposeful sampling is generally chosen. We used purposeful census sampling and identified all twelve members of the eligible participants that meet the eligibility criteria.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 (Marshall, Cardon, Poddar, & Fontenot, 2013; 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; Kline, 2017). Data saturation was reached when the transcripts are no longer revealing new information or new themes or impact new understanding in the subsequent interview data. Data saturation from the interview data was reached with the ninth participant. 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 pictorial images and voice prompts interface design strategies to create easy-to-use banking ATM system interface from participant case organization and from other non-participant case organizations. We collected data using semi-structured, in-depth face-to-face interviews with these 9 banking ATM system interface developers. We also analyzed 11 documents: 5 from participant case organizations and 6 from nonparticipant case organizations with emphasis on pictorial images and voice prompts interface design strategies. 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

Participant case organization	Sources of Documents Reviewed				
	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 use of multiple data sources has been emphasized by researchers as a strategy to gain to gain multiple perspectives and validation of data (Ledo-Andión, López-Gómez, & Castelló-Mayo, 2017), enhances data credibility, and triangulation (Mccardle, & Hadwin, 2015; Patton, 2015). The validity and credibility of instruments used in a qualitative case study can be established using member checking (Morse, Lowery, & Steury, 2014). We used member checking to increase the reliability and validity of our findings from the participants. To achieve this, we provided each participant a summary of the interview to verify if we understood 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; Visser, Bleijenbergh, Benschop, Van Riel, & Bloem, 2016). We employed methodological triangulation to facilitate validation of multiple sources of data collected through interviews, observations, and documents.ATLAS.ti7 (version 7) was used to facilitate data analysis.

4.1 ..... Ethical Considerations

Ethical approval was this study was obtained fromthe Institutional Review Boards (IRB) of Walden University's Center for Research Quality (11-10-17-0512580). We also adopted the Belmont Report's three principles for ethical research: respect for persons, beneficence, and justice (The Belmont Report, 1979) as the standard for conducting this study and for providing the ethical principles required for this study

V. Findings

Value of pictorial images and voice prompts emerged as major theme for this study. Pictorial images and voice prompts are important strategies developers of banking ATM system use to create easy-to-use system interfaces for a variety of people with varying abilities and literacy levels. An interface that will cater for both the literate, semi-literate and the illiterate begins with the understanding that the illiterate user forms the supportive framework of the design input. This understanding provided insight into how pictorial images and voice prompts strategies can be applied to create easy-to-use system interfaces for this user groups. Findings from participants show that pictorial images and voice prompts provide effective communication platform that is understood by all literacy levels. 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 interaction platform that is understood by all users. The theme, value of pictorial images and voice prompts, is important in providing effective interaction between the ATM system interface and users, as strategies to create easy-to-use interfaces.

Table 2
Frequency of Major Theme

Source of data collection	Important components of value of pictorial images and voice prompts			
	Pictorial images, and enhanced voice prompts with short transaction cycle (f)	voice feedback in users' own language (f)	a text-free user interface and extensive use of hand-drawn (f)	graphics /imagery and voice as inputs (f)
Participants	8	5	3	2
Documents	2	1	1	1

Note. f = frequency

One major comment from all the nine participants was the need for effective communication that is understood by all multiple target user groups: the literate, semi-literate, and the illiterate. Table 2 shows four important components of the theme, as evident from this study, and the frequency (number) of participants who indicated these components as effective strategy to create easy-to-use interface for all literacy levels. Table 2 also shows the number of supporting documents that contained these important components of pictorial images and voice prompts. These frequencies are not mutually exclusive, meaning that two or more of these components may appear in one document. Eight participants noted that pictorial images and enhanced voice prompts with short transaction cycle can be used to create interaction between the user and the ATM interface. Voice feedback in users' own language was noted by five participants as a strategy to create easy to use ATM system interface. Participants generally emphasized that user interaction on ATM interface should involve short texts, spoken voice prompts, spoken dialog interface, graphical interface, multimedia user interface, enhanced voice prompt, touch inputs, and language selection that are common to users. Participant # 2, for instance, emphasized the combination of text free or graphics interface with voice prompt, because without the voice feedback, even users who had seen the pictorial images interface may not realize without significant prompting, what they are expected to click on to cause an action or understand what they were clicking on.

Findings from participants indicated that incorporating pictorial and voice prompts emerged as part of strategies they use to create easy to use banking ATM system interfaces for a variety of people with varying abilities and literacy levels. Participant #2 noted that Nigerians, whether literate or illiterate, generally do not have good reading culture. According to participant #5 "Illiterate users of ATM system interface prefer a system with voice prompt, fewer prompts, text free interface with short transaction cycle". Participant #3 specifically noted that strategies to create easy to use ATM system interface that will cater for the cultural and literacy differences among user should incorporate short text, enhanced voice prompts with short transaction cycle. Participant #3, #7, #8 and #9 emphasized the need to strategize interaction in graphical images and voice prompt. This was better explained in the statement of participant #7 "pictorial images and voice prompts are adopted and strategized by using artefacts within the cultural environment of the people or users; such as: "press 1 for English, 2 for Igbo, 3 for Yoruba, and 4 for Hausa". English, Igbo, Yoruba, Hausa are the major spoken languages in Nigeria. Participant #9 also noted the importance of using enhanced voice prompt as input, to encourage users that are weak in vocabularies. These participants indicated that this strategy has helped to effectively harness cultural and literacy differences in establishing good communication protocol between the ATM system and the users, to create easy-to-use Banking ATM system interfaces for a variety of people with varying abilities and literacy levels. These participants reiterated this strategy of engaging voice feedback in users' own language, because it excites the users as they could hear the system speak in their native language. These finding is consistent with the conceptual framework for this study, because developers considered value of pictorial images and voice prompts as important strategies that are successful for creating ATM interfaces that are perceived by users as useful and ease of use. This finding also provided answer to the research question for this study because it attests to one of the strategies banking ATM system interfaces use to create easy-to-use interfaces that will cater for people with varying abilities and literacy levels in Nigeria.

In the review of professional and academic literature, Kajiyama and Satoh (2014) proposed interface models that focus more on the inspiring of the internal elements of both users and systems rather than the conventional superficial interactions between users and systems. According to Kajiyama and Satoh (2014), a good user-centered design strategy should explore users' interface needs by adopting required images and voice prompts that will synchronize with users' varied abilities. SathishKumar and Kamalraj (2014) claimed that the adoption of a combination of text and graphical metaphor may be the best user interface for a variety of people with varying abilities and literacy levels. Therefore, this study's finding supports the findings in the review of professional and academic literature. Recent research by Bhadani, Shankar, and Rao (2016) also supports this strategy of using artefacts within the cultural environment of the users. Bhadani, et al. (2016) noted that supporting interface services in local dialect can act as a catalyst in positioning the system as a socio-economic

empowerment instrument that can enhance strategies to create easy-to-use system interface, promote adoption of multiple services to these multiple user groups. This research finding is consistent with the findings from participants and supports previous literature cited in this study.

Existing literature was consistent with our study's findings regarding the use of pictorial images and voice prompts for effective strategy to create easy to use ATM system interfaces for literate and illiterate users. Recent research shows that visually attractive pictures or icons in an interface that spur individuals' emotions can provide greater satisfaction, excitement, effectiveness, efficiency and enjoyment than text-based interfaces that offer only functional value (Lee, Chen, & Hess, 2017). As mentioned earlier in this section, participant #3, #7, #8 and #9 emphasized that the use of pictorial images and voice prompts design strategies are based on a framework that considers the users' tasks, their peculiarity and what goals they try to achieve. According to these participants, such considerations help to achieve easy-to-use interface product whose contexts agree with or influence users PU and PEOU of the interface product. The theme therefore supports the findings, what was discussed in the literature, and is consistent with the TAM conceptual framework for this study, in that pictorial images and voice prompts design strategy is founded on framework that considers TAM's major determinants: PU and PEOU.

Another recent information system research on affective cues suggests that using such cues as voice prompts in system interface designs can influence a user's perceived usefulness and ease of use of the system during an interaction with the interface (Zhang, 2013). Lee, et al. (2017) and Glaser and Schwan (2015) found that the pictorial appeal of a technology influenced users' perceived enjoyment of using the technology. The wait time literature, according to Lee, et al. (2017), suggests that affective cues such as voice prompts, can improve users' mood and perceptions as they wait their turn to use the system. Recent studies on interface design, have reported that the main strategy to address motor impairments is to create an interface that will minimize movement and physical effort required for input (Dim & Ren, 2014). This can be achieved, using voice prompts, switch control devices, and eye-tracking. A similar recent study by Ernst and Girouard (2016) highlighted that for blind users, the gestures designed should be logical and easy to learn and remember, as blind users rely much on their memories. For users with upper extremity disabilities and Down's syndrome, who face difficulties in precisely controlling their hands, researchers have suggested that developers should consider selecting simple and flexible gestures such as tapping (Choi & Chan, 2015).

Findings from other researchers that studied users with learning or intellectual disabilities on social websites and other interfaces have strategized by creating interface that will minimize the user deficiencies or efforts required for input (Holmes, & O'Loughlin, 2014; Shpigelman, & Gill, 2014a; Shpigelman, & Gill, 2014b). The theme supports these findings that valued pictorial images and voice prompts to minimize and close the gap that could result in understanding some technical and long words of phrases. Also, the theme supports the findings from Davies, et al. (2015) who reported that the main strategy to create easy-to-use interface for illiterate and semi-literate users is to address literacy deficiency or intellectual disability by minimizing the use of technical texts or long text vocabulary required for input. Value of pictorial images and voice prompt are important strategies to create easy-to-use banking ATM system interfaces that are culture sensitive. Usability design should reflect culture in practice in order to improve user experience in the aspect of human interface design (Hoehle, Zhang, & Venkatesh, 2015). Previous work by Davis (1989) indicated that culture does indeed influence interface acceptance, especially interface issues like colors, graphics, signs and placement of voice prompts which are elements that may have different connotations for people with different cultural backgrounds. The theme identified in this study supports the literature, the findings from participants, and is consistent with TAM in that value of pictorial images and voice prompt design strategies reflect culture in practice, that influences system interface acceptance.

Findings from participants showed that pictorial images and voice prompts provide effective communication platform that is understood by all literacy levels, better perception of learnability, self-efficacy, enjoyment and excitement than text-based interfaces, especially among illiterate and semi-literate users.Perceived learnability, self-efficacy, enjoyment and excitement were found in literature to be significant drivers of TAM (Teoh, et al., 2013). According to Alalwan et al. (2015) and Kelly (2014), self-efficacy appears to be the most powerful factor influencing users' behavioral intension and trust because users who believe in their ability to effectively use technological services, are more likely to trust using such technology, as well as being more motivated to use the product. The theme supports this literature and consistent with TAM in that pictorial images and voice prompts design strategies provide effective communication platform for learnability, self-efficacy, enjoyment and excitement that culminates in users' PU and PEOU of the systems interface product. Also, pictorial images and voice prompt encourage users that are weak in vocabularies with contexts that agree with the two primary determinants of TAM: PEOU and PU.

Kanjwani and Singh (2014) explored some external variables of TAM and found that perceived enjoyment, excitement and satisfaction are determinants of TAM. According to Kanjwani and Singh (2014), usability of new technology was not affected by customer satisfaction, but by perceived enjoyment and excitement. Users' perceived enjoyment and entertainment have been found in literature to be positively related

to PU and PEOU (Giri, et al., 2014). These determinants of TAM: perceived enjoyment, excitement and satisfaction are influenced by the theme. Therefore, this theme supports the conceptual framework for this study in that the pictorial images and voice prompt design strategies considered users' perceived enjoyment during design that have significant impact on the acceptance intension of users.

Results from recent literature and previous studies also support this study findings that the text-free designs were strongly preferred over standard text-based interfaces by illiterate and semi-literate user groups. Gabriel, Cunha de Miranda, and Erica (2016) noted that touch screen and voice user interfaces, are being widely used as interaction interfaces because they provide easy-to-use interfaces than onscreen keyboards. The theme in this section, value of pictorial images and voice prompt as strategy for creating easy to use system interfaces, is consistent with the conceptual framework of this study, the purpose of this study, and provided answer to the research question for this study. The value of pictorial images and voice prompt as interface developmental strategy is paramount for the success of creating easy-to-use banking ATM system interfaces that will cater for people with varying abilities and literacy levels in Nigeria.

VI. Discussion and Conclusion

Findings from the review of the professional and academic literature, as well as documents supplied by the organizations, found that Nigeria is likely to be among the top countries that store money in their houses, rather than aligning to the ongoing cashless move (EFInA, 2014, p.12). Emengini and Alio (2014, p.1), Ezeamama, Ndubuisi, Marire, & Mgbodile(2014, p.85), and Itah and Ene (2014, p.363), found that the estimated proportion of cash circulating outside of the banking systemin relation to the total cash in circulation in the Nigerian economywas given as 65%. One of the major reasons for this may be banking customers' inability to use ATMs due to varying levels of literacy. Strategies illustrated by the findings may leverage economic development and social change in this area, as many people in the country may begin to understand, trust, and use the banks and the ATMs by themselves because they are easy-to-use by all people with varying abilities and literacy levels. Recent literature claims that technology is increasingly ubiquitous with interconnected and interdependent facilities (Murray,Durkin, Worthington, & Clark, 2014). Strategies illustrated by the findings from this study may encourage banking ATM organizations in Nigeria to improve their strategies to create easy-to-use ATM system interfaces. Findings from this study, may increase the penetration of these technologies into different domains apart from the banking sector.Strategies illustrated by the findings from this study may serve as a basis for positive social change because it may advance the use of other technology outlets that require easy-to-use system interfaces.

In this study, we made efforts to identify strategies software developers of banking ATM systems in Nigeria use to create easy-to-use Banking ATM system interfaces for a variety of people with varying abilities and literacy levels. One major theme that emerged through methodological triangulation was: value of pictorial images and voice prompts design strategy in creating easy-to-use ATM system interface for a variety of people with varying abilities and literacy levels. Important components of this these are, the use of:

- pictorial images, and enhanced voice prompts with short transaction cycle,
- voice feedback in users' own language,
- a text-free user interface and extensive use of hand-drawn, and
- graphics /imagery and voice as inputs.

There is an ongoing need in Nigeria for banking ATM systems that can cater for a substantial proportion of the population classified as illiterate, semiliterate, vision impaired and hearing-impaired users. Banking ATM system interface development technology in Nigeria may experience tremendous innovation if all these disability categories are incorporated in developing an easy-to-use ATM system interface. The limitations placed on this study, by engaging some relatively small qualified and experienced banking ATM system interface developers from one organization notwithstanding, findings from this study were significant and supported organizational documents and current literature on interface development strategies, and consistent with TAM conceptual framework of this study. Therefore, findings from this study should have greater applicability to other developer organizations as well as other IT organizations that are user interface technology dependent

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