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Teachers' Perception and Attitude toward the Use of Handheld Technologies in the Instructional Process in Secondary Schools in Zamfara State, Nigeria

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Abstract
Handheld Technologies are numerous and they range from mobile phones, e-book readers, laptops, and personal digital assistants (PDA), all the made mentioned have become teaching and learning tools over the time and they have great potential with respect to their uses in classroom settings and in outdoor learning. However, research conducted has showcased their uses for educational purposes but their quantitative study is not much. Therefore, the study investigated teachers' perceptions and attitudes toward the use of hand-held technologies for the instructional process in secondary schools in Zamfara state. The study highlights the need for a deliberate shift in focus and practice towards the used of handheld technologies in this digitized era, Therefore, the study examined some available handheld technologies used for instructional processes by teachers in secondary schools across the state, which aimed at finding out whether the teachers have access to such technologies for instructional usage and do they perceive their usefulness and ease of use of the technologies for instructional process. Similarly, it explores major inhibiting factors to the effective use of the available handheld technologies for the instructional process. In total, 788 out of 835 teachers were served with the questionnaire. Four research questions were answered. Standard deviation and mean scores statistical measures were used to answer the research questions. Some of the findings as regards teachers' access are: laptops had the highest percentage of respondents with 635 (79.4%), follow by smartphones with respondents of 589 (60.6%). Cell phone had access respondents of 532 (50.4%); multimedia players had access respondents of 491(45.0%). Tablet pc had teachers' access respondents of 326(27.1%), while E-book reader had access respondent of 276(23.0%) and Netbooks among others. Some of the recommendations made include Professional development training for pre-service and in-service teachers in the state and an improved infrastructure that will support the use of handheld devices within the school system.

Keywords: Perception, Handheld, Technology, Instructional Process, Teachers

Introduction

In the current Nigeria educational provisions, it has been observed that as a result of explosion of knowledge in all areas of human endeavour and with the utilization of one media or another, this has brought development to learning and has led to an upgrade of human knowledge in this 21st Century. Therefore, the significant role of Information and Communication Technologies (ICT) in the improvement of education cannot be overemphasised. Hence, effective integration of ICT has a crucial role to play in the improvement of quality instructional delivery within and outside the classroom system. There are research evidences which has proven that no country can claim to be educationally advanced without embracing the use of technology for its educational processes. Given this fact, teachers are expected to be professionally trained so as to bring about the effectiveness and efficiency needed for optimum instructional delivery during teaching and learning process. In this perspective, it is noteworthy to reiterate that, the pedagogic application of ICT involves effective learning with the support of computers and other related information technologies as learning tools and they play complementary roles in the classroom if they are effectively deployed and with better access to educational resources. (Morgan, 2022; Minshew & Anderson, 2005; Olakulehin, 2007 & Olawale et al., 2020)

Secondary School Teachers in the country's educational system heavily rely on the traditional chalk and talk method of teaching and learning in the classroom instead of integrating relevant technologies which often takes care of the recent challenge of overcrowding environment due to the high enrolment numbers of learners in our today's classroom. It is a known fact that, though, technologies development and utilization are not well

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established in most of the Nigerian secondary schools due to the fact that most of the secondary school's teachers' lack the needed pedagogical knowledge in the usage of technologies for learning. More so, it was further observed that the non-availability of some ICT infrastructure and facilities in schools affects secondary school teachers to use technology of any kind in classroom settings. Additionally, inadequate search skills and access are other inhibiting factors that secondary school teachers face in the use of technology. (Adomi & Kpangban, 2010; Okwudishu, 2005)

Handheld technologies can best be described as those technologies that are portable and can be carried along either by the teachers or students and possess the characteristics of a small computer enough to hold and operate in the hand which typically has a flat-screen interface, providing a touchscreen interface with digital buttons and keyboard or physical buttons. This technology can connect to the internet and connect with other devices such as car entertainment systems or headsets via Wi-Fi, Bluetooth cellular networks with integrated cameras, which has the capability to receive voice and video telephone calls, video games and as well Global Positioning System (GPS). Usually, Power is typically provided by battery and lithium-ion. These hand-held technologies include but not limited to the following: Mobile Phone devices, Personal Digital Assistant (PDA); Mobile Pc; Hand-held game consoles among others, they are all relatively small technologies that the teachers and students can carry along. (Sujir et al., 2018)

Perception: This simply means a sensory experience of the world around us and it involves how individuals recognizes and interpreted sensory information systems. It equally includes how one responds to stimuli around him. Perception entails all human sense organs of vision, touch, sound, smell, and taste. All these senses help one to understand the surroundings he lives and help him to respond to its demands. Therefore, perception in summary can be seen as the organization, identification, and interpretation of sensory information in order to represent and understand the presented information or environment of individuals. All perception involves signals that go through the nervous system, which in turn result from physical or chemical stimulation of the sensory system**.** (Sujir et al., 2018)

Attitude: Literarily, attitude can simply be interpreted as the way one look at life or the way one chooses to see things and events then, thereafter, respond to such situations. Attitude is chosen and created by thoughts, and one chooses his/her thoughts. Attitude is not something that happens suddenly but rather one is an architect of such with frame of one's mind. An individual decided upon how to perceive and process information, things and or events of life and work which could be as a result of mindset either positive or negative. Attitude is, therefore, refers to the feelings and beliefs concerning one's done or don't as regard to his motive. This attitude reflects ways and manners of how an individual is thinking or feeling about something (Object or Subject) and is usually reflected in behaviour this is why psychologists, refer to attitude as a set of human emotions, beliefs, and behaviours toward a particular object, person, thing, or event.

Following this perspective, Secondary School Teachers' attitudes towards the use of handheld technologies would ultimately be influenced by their conceived intent to use it for instructional process or not. If teachers recognize that handheld technology as a teaching tool is vital for student-centered learning in the classroom and realize its potential in classrooms for encouraging participation and enabling students to gain the dual advantage of using it for the instructional process ultimately, he/she would willingly accept and use it for learning and if otherwise he might not. (Fleischer, 2012; Fisher, 2015) Therefore, with this assumption being positive, hand-held technologies such as small laptops, tablets pc, iPads, and smartphones would find themselves in our classroom setting and being used for instructional purposes. These technologies would go a long way in replacing hard-copy textbooks and journals. Tablets pc are the new faces of textbooks in the classroom and they offer different features in different ways, with the potential to sustain the users' interest. Thus, they change the way teachers deliver instruction to their students in classrooms. The impact handheld technology would have in future of education would be the implementation of instant educational resources by teachers and students, resulting in cooperative learning groups where students engage with peers to discover new meanings. (Asoodeh et al., 2012; Bista, 2011 & Bista, 2011; Bebell & O'Dwyer, 2011; Fleischer, 2012; Fisher,2015 & Jacques, 2015)

Hence, handheld technology-supported instruction and in turn instruction supports classroom teaching and helps students and teachers by providing significant opportunities for their learning and this is because handheld devices are everywhere among students and have the potential to improve the dynamics of learning. The prevalence of handheld technology has therefore emerged as a part of classroom teaching alternatives to traditional teaching. Different ways of teaching through technology are common in classrooms which require student-centred instruction delivery to respond to individual needs so that students can adequately understand the content of the

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subject. Student-centred instruction is active teaching in which students influence the content and direct their own learning to become independent learners (Asoodeh et al., 2012; Bista, 2011 & Bista, 2011).

The following are some of the typologies or categorizations of handheld technologies that can be used for instructional processes as identified by Fleischer, 2012 & Fisher,2015

- Smart Phones,
- Tablet pc
- Mini laptop Computers,
- E-book reader
- Personal computer (PC)
- Personal Digital Assistants (PDAs),
- Global Positioning Systems (GPS)
- iPad-Tech
- Notebook among others

Conceptual Framework

Conceptual framework is a representation of the relationship between variables or characteristics and properties in a study. This can be written or visual, however, it ought to be based on a literature review of existing studies of a given topic. The conceptual framework should include the key factors, variables, or specific topic of study. Hence, the conceptual framework for this research would be in an illustrative form and as well in narratives. The study conceptual framework is therefore been adapted from the diffusion of innovation theory and Technology Acceptance Model (TAM) proposed by Davis et al. (1989) which is a popular modern theory for use and acceptance of technology information systems for educational usage. This fact pre-supposes educational innovations would likely be positively accepted and diffused if the adopters (users) were positively convinced that the innovation in question is as: having an advantages over its use for both parties (Teachers and Students) and it is compatible with current trend and practices, without being too complex to handle and use for the major purpose This technology acceptance model (TAM) is similar to the theory of diffusion of new innovation in the sense that it places emphasis on psychological predilection (Positive) and social influences on the beliefs, attitudes in adopting the said technology. TAM is based on identifying the relationship between two main determinants: perceived usefulness (PU) and perceived ease of use (PEOU); the user's attitude (ATT), intentions (BI) and actual acceptance and usage behaviour (Davis, et.al., 1989)

In the view of Toper, (2010), recognized that success innovation is not simply a matter of mobbing a resource from A to B, but the capability on the part of the recipient to do something useful with what the resource, in other words, to innovate effectively. They acknowledge that innovation is not an instantaneous event, but a time-based process involved several stages. They identify the stages as: I. Initial recognition of opportunity or need, 2. Search, 3. Comparison, 4. Selection, 5. Acquisition, 6. Implementation and 7. Long-term use (involving learning and development).

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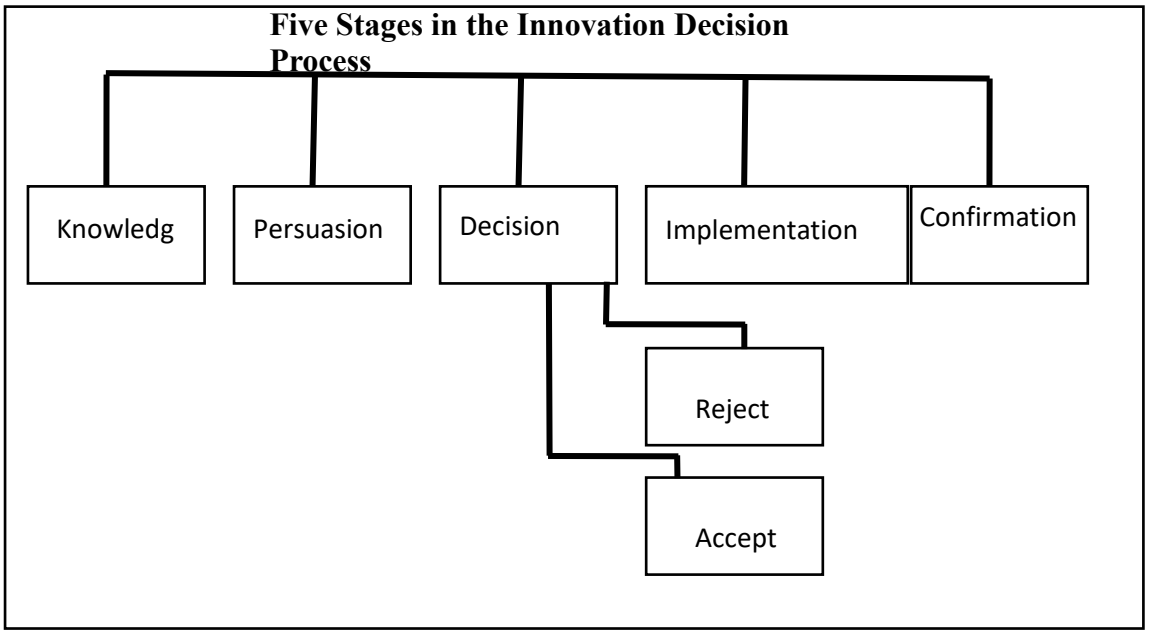

Figure 1: Five. Stages in innovation-decision process. Source: Roger (2003)

The second way in which time is involved in diffusion is in the innovativeness of an individual or other unit of adoption. Innovativeness is the means by which an individual or other unit of adoption is relatively easier to apply new ideas than other members of a social system. It is the relative time with which an innovation is adopted by an innovation is adopted by an individual (Toper, 2010; Traxler 2011: Traxler, 2005: & Wagner, 2005)

five adopter categories or classifications of the members of a social system on the basis of their innovativeness. Has been identified and they include the following:
Innovators: The first 2.5 percent of the individuals in a system apply an innovation. The application process begins with a tiny number of visionaries, imaginative innovators. They often use great time, energy and creativity to develop new ideas and gadgets such as Communication patterns and friendships among a clique of innovators are common, even though the geographical distance between the innovators may be considerable. (Toper, 2010; Traxler 2011: Traxler, 2005: & Wagner, 2005)

Early adopters: The next is 13.5 percent of the individuals in a system to make use of an innovation. Once the importance starts to become noticeable, early adopters leap in. They are on the lookout for a means to go forward in their lives or business and are quick to make connections between clever innovations and their personal needs. This adopter category is generally sought by change agents as a local missionary to speed the diffusion process The early adopter is respected by his or her peers, and is the embodiment of successful, discrete use of new ideas. The early adopter decreases uncertainty about a new idea by adopting it, and then conveying a subjective evaluation of the innovation to near-peers through interpersonal networks (Toper, 2010; Traxler 2011: Traxler, 2005: & Wagner, 2005)

Early majority: The next 34 percent of the individuals in a system to apply an innovation are the ones referred to as early majority adopters, that apply new ideas just before the average member of a system. Assuming the product or behaviour leaps the chasm, it may eventually reach the majority of audiences. Early majorities are pragmatists, comfortable with moderately progressive ideas, but won't act without solid proof of benefit The early majorities occupy unique position between the very early and the relatively late to adopt making them an important link in the diffusion process. They provide relationships in the system's interpersonal networks, and they follow with deliberate willingness to adopt innovations, but not often lead. (Traxler, 2005: & Wagner, 2005)

Late Majority: The late majority are the next 34 percent of the individuals in a system to adopt an innovation. They are the conservative pragmatists who hate risk and are not comfortable with new idea. Practically, their only driver is the fear of not fitting in, hence they will follow mainstream fashions and established standards. Adoption

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may be the result of increasing network pressures from peers. Innovations are approached with a skeptical and caution air, and the late majority do not accept until most others in their system have done so.

Laggards: The last 16 percent of the individuals in a system apply an innovation. They process almost no opinion leadership. They are people who see a high risk in adopting a particular product or behaviour. Many are nearly isolated in the social network of their system. The point of reference for the Laggard is the past. Decisions are often made in terms of what has been done previously. (Venkatesh & Bala, 2008; Venkatesh & Davis, 2000; Venkatesh, et al; 2009)

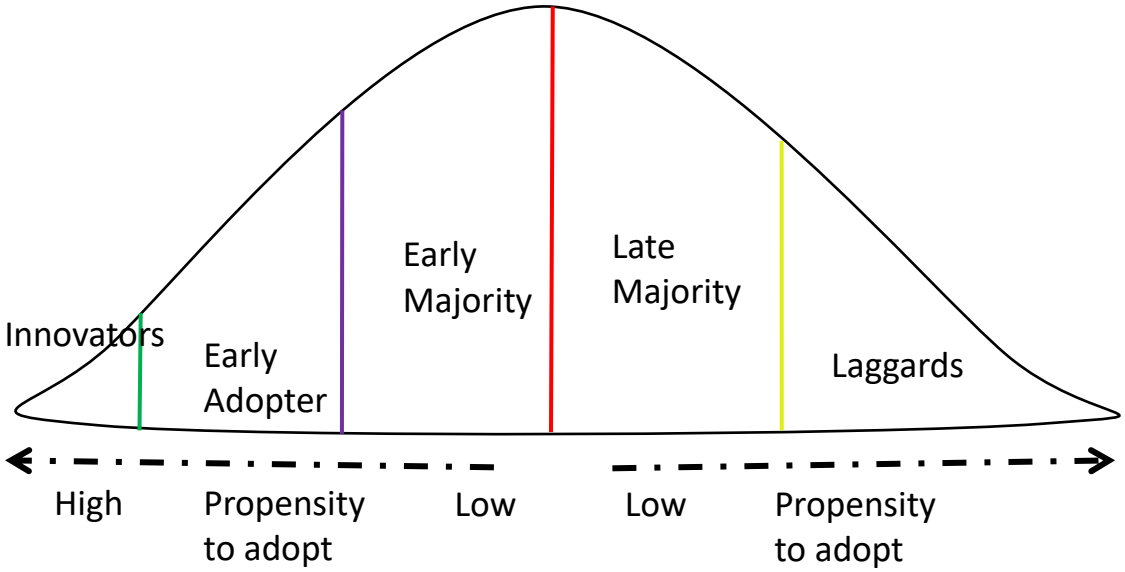

Figure 2: five adopter categories

Source: Venkatesh & Bala, 2008; Venkatesh

More so, the adoption of Automated Teller Machine (ATM) in Nigeria: was another remarkable achievement Similarly, An Application of the Theory of Diffusion of Innovations which the study found out the attributes of the theory of diffusion of innovation empirically, using the Automated Teller Machines (ATMs) as the target innovation. The study was situated in Jos, Plateau State of Nigeria. The demographical characteristics of the respondents show that most of them were students and youths. Therefore, the framework on Perception of the use of handheld technologies for instruction pre-supposes that the use of information systems will largely depend on the perception that the user has of that technology. If the user has a positive perception of the information technology to be used, he or she would want to use it (intention) and if negative perception is conceived by the user there is tendency that they might not want to use it. This has a link with domestication theoretical paradigm which unveiled the adoption of technology in everyday life and was propounded (Venkatesh & Bala, 2008; Venkatesh & Davis, 2000; Venkatesh et al., 2009)

The technology Adoption Model is a model developed for predicting user acceptance of computer technologies and their usage. Technology acceptance was defined as an individual's willingness or state of mind with respect to his or her use of a particular technology. TAM is used in this study for the acceptance of handheld technologies for instruction in Secondary Schools in Zamfara State-Nigerian. While what perceived usefulness, and perceived ease of use have towards integration. The Technology Acceptance Model has received great respect in the information technology and information systems literature (Davis, 1989; Davis., 1989).

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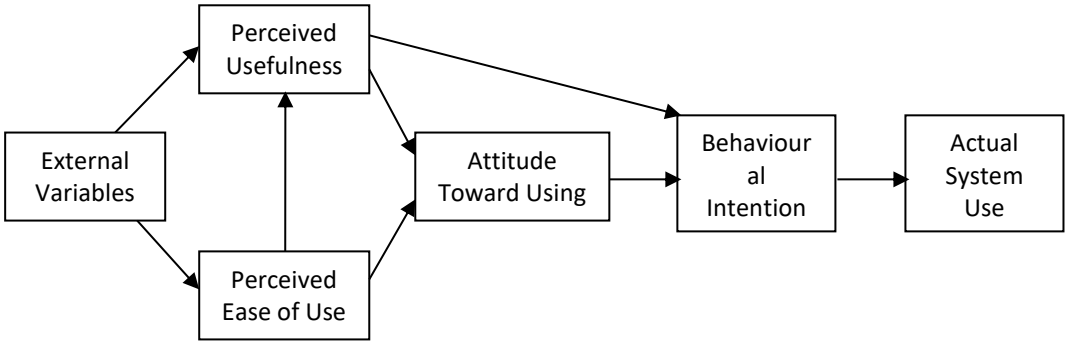

Figure 3: Technology Adoption Model Source: Technology Acceptance Model (Davis, Bagozzi, and Warsaw, 1989, p 985)

In the Technology Acceptance Model, it suggests that when users are presented with a new technology, a number of factors influence the decision about how and when it will be used. Perceived usefulness (PU) is the degree to which an individual, groups, or organization believes that using a particular technology or system would enhance job performance (Davis, Bagozzi & Warsaw, 1989). Perceived usefulness (U) shows the extent to which a user is convinced that a specific technology will increase individual performance. A user of a technology system that the individual perceives to be very useful will experience a positive use-performance relationship. Therefore, the perceived usefulness of mobile technologies for instruction will lead to positive intention, in this respect, lecturers in the Northwest Universities will want to use the system for the teaching and learning process (Davis, 1989). Perceived ease of use is the extent to which a person believes that using a given technology or system would be free from mental effort (Davis, Bagozzi & Warsaw, 1989). Davis (1989) explains that all else being equal, an application perceived to be easy to use in comparison to another is more likely to be accepted by the user. The easier users perceive the more they tend to form positive attitudes toward using mobile technologies for instruction. Attitude is an important key in the field of technology integration. There is an extensive body of literature that demonstrates the importance of attitudes on technology acceptance. It has been noted that attitudes stand to be a determinant towards innovativeness because it is seen as a strong predictor to adopt a different form of technological innovations among users effort (Davis, Bagozzi & Warsaw, 1989

Statement of the Problem

Globally, educational industry is finding relevance in the use of technologies in the provision of effective teaching and learning processes at all levels and this is because it has been found to have the potential of making learning a Child-Centre and enabling learning to happen anywhere and anytime. Handheld technologies have the capability and characteristics of providing access to users through Internet sources and connectivity and these include such digital technologies as thus: Personal digital assistants (PDAs), smartphones, BlackBerries, iPhones, iPods, cameras, and a variety of other related hand-held which has the characteristics of playing audio and video, can use different kinds of software that can be used for learning purposes The portability and affordability of handheld technologies are distinct advantages for school use. (Venkatesh & Bala, 2008; Venkatesh & Davis, 2000; Venkatesh et al., 2009)

Research conducted around the educational **uses** of handheld technologies has become well-known over time however, there is a need to do more to expose and showcase how it goes a long way to democratise knowledge and make it affordable to all learners. Such research includes but is not limited to the following Venkatesh & Bala, (2008) conducted an experiment using mobile phones to teach mathematics to 32 eighth-grade students. Some of the findings revealed that Mobile phones helped students learn mathematics outdoors and explore mathematics independently. Indicated how learners learn mathematics in real-life situations and demonstrated how mathematics, uses new and advanced technologies to perform diversified mathematical problems and arrive at solutions. Similarly, ESL classrooms in elementary and middle schools explore the effect of iPods on student achievement, using "audiobooks" via the iPods. Data was collected on verbal responses, test responses, journals, and pre/post scores on a language test. The researchers' findings revealed that the iPod provides a tool for engagement but does not, in and of itself, teach or lead to higher scores. While, in related research conducted by Venkatesh & Davis, (2000; found out that the use of iPods could enhance learning in school and this is because

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he practically observed classrooms in which students were using iPods and the finding revealed that the iPods have the capability to provide students with learning through audio listening (Hani, 2010). With this development, it's justifiable to conduct similar research on the use of hand-held technologies for instructional purposes in school

Objectives of the study

The main objective of this study is to find out Teachers' perception & attitudes toward the use of handheld technologies for instruction in secondary schools in Zamfara State- Nigeria. Therefore, the research would specifically:

1. Investigate Teachers' access to Handheld technologies for instruction.
2. Examine Teachers' perceived usefulness of Handheld technologies for instruction.
3. Examine Teachers' perceived ease of use of Handheld technologies for instruction.
4. Find out problems associated with the use of handheld technologies for instructions.

Research Questions

The following research questions were raised to guide the achievement of this research study as thus;

1. Do teachers have access to handheld technologies for instruction?
2. How do teachers perceive the use of handheld technologies for instruction?
3. Do the teachers perceive the ease of use of handheld technologies for instruction?
4. What are the challenges associated with the use of hand-held technologies for instructional process?

Methodology

This study investigates Teachers' Perceptions and Attitudes in the Use of Hand-held Technologies for Instructional Process in Secondary Schools in Zamfara State-Nigeria. The study used a researcher-adapted questionnaire to obtain necessary information from respondents and the categories of variables were the independent variables of perceived usefulness and ease of use, The population for this study were all teachers from Zamfara State Teachers Board, Science Board and Female Education board. These teachers were selected using proportional sampling strategy. In the sample size, a confidence level of 95% on the population size was used at the confidence interval of 5%. Hence, the study examined some available categories of handheld technologies used for instructional processes by teachers in secondary schools across the state, which aimed to find out whether the teachers have access to such technologies for instructional usage and do they perceive their usefulness and ease of use of the technologies for instructional process. The study will equally find out major inhibiting factors to the effective use of the available handheld technologies for instructional process. In total, 788 out of 835 teachers were served with the questionnaire. Research questions raised were answered and analyzed using standard deviation and mean scores statistics. The research instrument distributed was therefore 835 out of which 788 were adequately responded to and were used for analysis in this study.

Results

Research Question 1: Do Teachers have access to handheld technologies for instruction?

To find out teachers' access to handheld technologies for instruction, the frequency count of respondents and percentages on different types of handheld technologies were classified as *I have access personally, I have access through the school administrator* and I *don't have*.

Table 1: Respondents' access to Handheld technologies for instruction

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S/N	Mobile technologies	I have personal device		I have access through school administrator		I don't have	
		Response	Percent	Response	Percent	Response	Percent
1.	Smartphone (iPhone, Android, Blackberry, Windows OS,)	728	60.6	29	2.4	445	37.0
2.	PDAs	98	8.2	143	11.9	961	80.0
3.	Apple's iPad	88	7.3	89	7.4	1025	85.3
4.	Game Console (X-Box, Place station)	65	5.4	8	0.7	1129	93.9
5.	Tablet Pc (iPad, Samsung GL, Motorola)	326	27.1	141	11.7	735	61.1
6.	E-Book Reader (Nook, Kindle e-reader)	276	23.0	39	3.2	887	73.8
7.	Laptop	954	79.4	17	1.4	231	19.2
8.	Multimedia Players (iPod, Mp3, Mp4)	541	45.0	52	4.3	609	50.7
9.	Ultra-mobile pc	98	8.2	32	2.7	1072	89.2
10.	Personal Media Player (PMPs)	106	8.8	84	7.0	1012	84.2
11.	GPS Navigation Device	103	8.6	53	4.4	1046	87.0
12.	Netbooks	219	18.2	75	6.2	908	75.5
13.	Cell Phone (Regular cell phone)	612	50.9	10	0.8	580	48.3
14.	Other handheld audio and multimedia guide (Specify) if use	260	21.6	42	3.5	900	74.9

Table 1, Item 1 reveals that access to handheld technologies for instruction, by smartphone; such as Android, Blackberry, iPhone has the highest respondents of 728 (60.6%) in terms of personal access, while access through school was 29 respondents (2.4%) and I don't have respondents had 445 (37.0%). Item 2, Respondents to I have personally has 98 (8.2%), while access through school administrator was 143 (11.9%) and I don't have access had the highest number of respondents 767 (80.0%). The result indicates that PDA was not commonly owned by the respondents this is because both access of personal and administrator access was not up to 50% of the total sample of seven hundred and eighty-eight. Item 3, reveals that an Apple iPad responded "I have personally" were 88 representing (7.3%), while access through administrator was 89 (7.4%) and "I don't have" responses accounted for the highest number of 635 (85.3%). This shows that Apple iPad was not commonly possessed by most of the respondents Item 4, the result reveals respondents to "I have personally" were 65 representing (5.4%), access through department stands at 8 (0.7%), while "I don't have" respondents were 708 representing (93.9%). Item 5, result shows that Tablet Pc had respondents of 326 which represents (27.1%) and this account for "personal access", access through school administrator were 141 (11.7%), while "I don't have" access respondents were 735 (61.1%). Among others

Research Question 2: How do teachers perceive the use of handheld technologies for instruction?

To find out the perception of teachers on the usefulness of handheld technologies for instruction the mean (X) score was used. The results obtained are shown in Table 2.

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Table 2: Perception of respondents to the usefulness of handheld technologies for instruction

S/N	Perceive use of handheld technologies for instruction	Mean (X)
1	Using handheld technologies for instruction would improve the quality of my work.	3.43
2	The use of handheld technologies for instruction would afford greater control over my course.	3.19
3	Handheld technologies for instruction would enable the accomplishment of course content within the time frame.	3.38
4	The use of handheld technologies for instruction would enhance productivity in the teaching and learning process.	3.25
5	Using handheld technologies for instruction would improve job performance and give me the opportunity to engage in other academic and administrative activities.	3.26
6	The use of handheld technologies for instruction would improve students' teacher relationship through improved interaction	3.18
7	I would find it difficult to use handheld technologies for instruction therefore traditional mode of instruction is preferred.	2.60
8	Handheld technologies would afford the opportunity to teach course content effectively because the students were digital natives.	3.24
9	Utilization of handheld technologies for instruction would make it easier to complete the curriculum in good time.	3.27
	Grand Mean (X)	**3.20**

Table 2: reveals the overall that respondents perceived the usefulness of hand technologies for instruction with a grand mean of 3.20. Even though, respondents on using handheld technologies for instruction would improve the quality of work had the highest mean score of (3.43), followed by respondents that the use of handheld technologies for instruction would enable accomplishment of course content within the time frame with a mean score of (3.38). Similarly, respondents on utilizing handheld technologies for instruction make it easier to complete the curriculum in good time and handheld technologies would improve job performance had mean scores of (3.27) and (3.26) respectively. Furthermore, respondents on the perceived difficulty in using handheld technologies for instruction with preference to traditional mode of instruction has the lowest mean score of 2.60. using the benchmark of 2.0 and in comparison, with the total grand mean score of 3.20, the conclusion can be drawn that respondents had a positive perception to the usefulness of handheld technologies for instruction in Secondary Schools in Zamfara State- Nigeria

Research Question 3: Do the teachers perceive the ease of use of handheld technologies for instruction?
To find out the teachers' perception of the ease of use of handheld technologies for instruction the mean (X) score was used. Table 3 shows this:

Table 3: Perception of respondents towards the ease of use of handheld technologies for instruction

S/N	Perceive ease of use of handheld technology	Means (X)
1	The flexibility of handheld technology would ensure easy dissemination of knowledge and information to students.	2.92
2	It would be easy to remember how to perform teaching tasks using handheld technologies.	3.14
3	Handheld technologies would be easy to use because it is internet internet-enabled.	2.78
4	Using handheld technology is clear and understandable	3.04
5	It is easy for me to become skilful at using handheld technology for instruction	3.12
6	It is easy to remember how to perform tasks using handheld technology	3.00
7	Assessment and other modes of evaluation would be made easy with handheld technologies.	3.26
8	It is easy to customize handheld technology for educational uses	2.62
9	It would not demand a lot of effort to become skilful in using handheld technologies for instructional process.	3.08
10	The application of handheld technologies for teaching is relatively easy for me.	2.78
	Grand Mean (X)	**2.97**

Table 3 reveals that assessment and other modes of evaluation would be made easy with handheld technologies, with the highest mean score of (3.26), follow by respondents with the perception that, It would be easy to remember how to perform teaching tasks using handheld technologies with mean score of (3.14). Closed to this was respondents on item 5 that is, it is easy for me to become skilful at using handheld technology for instruction

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with a mean value of (3.12). Additionally, respondents on It would not demand a lot of effort to become skilful in using handheld technologies for instructional processes, using handheld technology is clear and understandable and It is easy to remember how to perform tasks using handheld technologies had mean scores of (3.08, 3.04 and 3.00) the mean scores that are within the same range of values and they are high means for ease of use of handheld technologies. The remaining items 1, 3, 8 and 10 were responded to with mean scores of (2.92, 2.78, 2.62 and 2.78) respectfully. Given the benchmark of 2.0 for the accepted mean value and the total grand mean score of 2.97, it can be deduced that the totality of all the respondent's mean scores are tenable and the Perception of respondents on ease of use of handheld technologies for instruction was positive

Research Question 4: What are the challenges associated with the use of hand-held technologies for the instructional process?

To find out the challenges associated with the use of hand-held technologies by teachers as possible inhibiting factors the mean (X) score was used. The results are shown in Table 54

Table 4: Respondents on problems identified as inhibiting factors for handheld technology use for instruction

S/N	Inhibiting Factors to Handheld Technologies use for Instruction	Mean (X)
1	Teachers do not have access to handheld technologies usage for instruction in the school.	2.61
2	Teachers' personal handheld technologies cannot be used for instruction.	2.38
3	Teachers' gender influences handheld technologies use for instruction.	1.82
4	Teachers' teaching experiences influence handheld technologies for instruction.	2.52
5	Teachers' specialization doesn't influence handheld technologies use for instruction.	2.71
6	The existing Web 3.0 connectivity within the school was not supportive enough for handheld technologies use for instruction.	2.61
7	Utilizing handheld technologies for instruction is relatively difficult because school administrators do not allow access to handheld technologies therefore; traditional mode of instruction is preferred.	1.81
8	Teachers are not willing to use handheld technologies for instruction because of their uneasiness and naivety to technology.	1.96
9	Most of the handheld technologies are not deliberately manufactured for mobile education, hence lacks some functionality for effective usage for instruction.	2.43
	Grand Mean ($\bar{X}$)	**2.28**

Table 4: Results indicates respondents to item 5 that their area of specialization influences the use of handheld technologies for instruction, the item has the highest mean score of 2.71 meaning respondents' areas of specialization do not have an influence on the use of handheld technologies for instruction. Next to this were items 1 and 6th with the same mean scores of 2.61 and 2.61 respectively, respondents on teachers' lack of access to handheld technologies usage for instruction and the existing web 3.0 connectivity within the school system was not supporting the effective use of handheld technologies for instruction. The mean value for these two items signifies that there is access to handheld technologies for instruction and connectivity within secondary schools was not affecting the use of handheld technologies. More so items 4, 2, and 9 underscore the same mean range values of 2.52, 2.43 and 2.38 meaning that the teachers' teaching experiences do not influence the use of handheld technologies for instruction, that most of the handheld technologies are not deliberately manufactured for mobile education can effectively be used for instruction and respondents on teachers' personal handheld technologies can be used for instruction.

Discussion

From the foregoing result analysed it has been revealed that, Teachers access to handheld technologies for instruction was examined using research question one (1). The results indicated laptops had the highest percentage of respondents with 635 (79.4%), followed by smartphones with respondents of 589 (60.6%). Cell phones had access respondents of 532 (50.4%); multimedia players had access respondents of 491(45.0%). Tablet pc had teachers' access respondents of 326(27.1%), while E-book readers had access respondents of 276(23.0%) and Netbooks had respondents access of 219(18.2%) respectively. The access percentages indicated above, imply that secondary school teachers had access to different varieties of handheld technologies for instruction.

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Similarly, the perception of secondary school teachers towards the usefulness of handheld technologies for instruction was examined using research question 2. The usefulness includes among others; Handheld technologies for instruction improve the quality of work; Handheld technologies for instruction afford greater control over the course; handheld technologies for instruction would enable accomplishing course content within the time frame; handheld technologies for instruction enhance productivity in teaching and learning process; handheld technologies for instruction improved students' teacher relationship through improved interaction etc. the result of the mean value established that Teachers positively perceived the usefulness of Handheld technologies for instruction. The finding indicated that students perceived ease of use had a significant influence on attitude towards usage subsequently, perceived ease of use had the strongest significant influence on perceived usefulness.

Furthermore, the results analysed revealed that the Teachers Perceived Ease of Use of Handheld Technologies for Instruction as thus: That, assessment and other modes of evaluation would be made easy with handheld technologies, and this had the highest mean score of (3.26), followed by respondents with the perception that, it would be easy to remember how to perform teaching tasks using handheld technologies with a mean score of (3.14). Closed to this were respondents on item 5 that is, it is easy for me to become skillful at using handheld technology for instruction with a mean value of (3.12). Additionally, respondents that it would not demand a lot of effort to become skilful in using handheld technologies for instructional process, using handheld technology is clear and understandable and it is easy to remember how to perform tasks using handheld technologies had mean scores of (3.08, 3.04 and 3.00) the mean scores that are within the same range of values and they are high means for ease of use of handheld technologies. The remaining items 1, 3, 8 and 10 were responded to with mean scores of (2.92, 2.78, 2.62 and 2.78) respectfully. Given the benchmark of 2.0 for the accepted mean value and the total grand mean score of 2.97, it can be deduce that the totality of all the respondent's mean scores are tenable and the Perception of respondents on ease of use of handheld technologies for instruction was positive

Conclusion

Teachers of this contemporary age witnessing technological integration and use in all aspects and sectors of human endeavour with education not being exempted should be motivated to develop the needed skills and competency to use technologies for educational provision, especially, hand-held technology which has the characteristic of portability and affordability is advised to be used by both the teachers and students for instructional purposes in the school system. Therefore, school administrators should highly be supported with the needed infrastructure for this to happen. In addition needed facilities to ensure seamless connectivity should be ensured. With this support, handheld technologies will take their appropriate position in our school system and these learners use the technologies to connect with each other to collaborate on projects and to debate and discuss issues and ideas related to academic purpose.

Recommendations

It has been observed that handheld technology has become omnipresence and both teachers and students have access to one form or another of this technology, but from the findings of this study some recommendations are pertinent in order to improve its usage for instructional process, especially in the secondary school system and these include:

i. Professional development for in-service teachers in the state in order to improve their efficacy and efficiency of the use of handheld technology for instruction
ii. Provide adequate infrastructure that will support seamlessly the use of handheld technology in the school system.
iii. State government to ensure enabling environments are created for effectiveness of the use of hand-held technology in school through the provision of adequate internet facilities and the needed resources for teachers and school administrators.
iv. Through the state secondary education boards (Teachers board, Female board, Science board) induction courses should be provided for teachers to improve their ICT literacy skills in general but with specific emphasis on the use of technologies for the instructional process

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