Chapter

Lecturers Awareness, Inclusion and Implementation of Wearable Device as a Means of Enhancing Educational Development in Nigerian Universities

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Abstract

For the 10% of individuals in Nigeria that have utilized a wearable gadget, an increment in use is expected sooner rather than later. The utilization of Smartwatch innovation has been accounted for in numerous instructive practices; suppliers have utilized smartwatches for an assortment of purposes including addresses, courses, and online classes. Be that as it may, the impacts of Smartwatch innovation on the quality and adequacy of upgrading instructive headway in colleges and bastions of learning stay obscure. Input components that are unpretentious and productive in preparing enormous information continuously are needful to gauge quality learning experience in such huge homeroom settings. With the most recent effect of infiltration and reception of web and portable advancements in most creating areas, wearable innovation is an achievable answer for oversee and screen homeroom inclusion; as continuous understudy criticism can be coordinated in the plan and conveyance of guidance all through the study hall. The outcomes from SPSS statistical analyses of the data gathered exhibited suppliers' high proclivity for utilizing Smartwatch gadgets for instruction and dissemination of lecture curriculum and educational plan, yet further exploration is expected to distinguish components by which keen frameworks can be incorporated into the schedules and work processes of lecturers and students.

Keywords: wearable technology, smartphone, smartwatch, performance expectancy

1. Introduction

1.1 Overview

In decades, wearable technology attracted reasonable awareness from educational technology experts. To a layman's idea, this new concept of wearables offers a new form of technology by using psychomotor level of carrying handheld devices. The smartwatches and health tracking bracelets are the most common, even though many of the characteristics included in these types of device represent additional phases beyond anything that is already available in existing hand-helds

and other technology know-how. Given this, the buzz around wearables may seem disappointing; they are nothing more than new and useless electronic toys to those who can afford them. In this perspective, wearables tend to generate initial interest and then quickly fall out of favor (for example, consider the ups and downs of the asymmetrically designed Google Glass wearable camera and head-mounted display system). Not surprisingly, there are staunch skeptics as to whether Wearables and their fans will have much to offer the future of education [1].

Wearable technology refers to computer-based devices that users can wear, examples jewelry, glasses, clothing, shoes or jackets. The advantage of wearable technology is that it can easily incorporate outfits to monitor sleep, association, whereabouts, and social interactions. Using Oculus Rift and other VR headsets, wearables can establish simulated reality. Recently, a new device that integrate seamlessly with the handler's daily existence and engagements. Smartwatches from Apple and other tech giants already allow handlers to crisscross their email and interact with the interface. Acknowledgments to metered measure, this technology can update movement, actions and time [2].

Eventually, adoption and impression of wearables in training and learning services remains invisible. Nevertheless, the guiding locus is that the most efficient forms and usages of wearable technology for prescribed and familiar learning contexts are under developmental exploration. Technology in Education must realize that wearables are not monumental as a set of technologies that will flourish or nose-dive for enlightening commitments. There is diversity in devices and forms of technology incorporation and in user familiarity. Smartwatches and health trailers are some of what is available and possible. Incorporating educational technologies, the efficiency and worth of wearables will finally depend on many collective and anthropological factors and will fluctuate between environments.

Therefore, this article raises the main argument and future questions educational technologists about wearable technologies should be unequivocal about how wearable technologies are used and how their proposed use supports certain forms of teaching and learning. Despite advances in technological innovation, the education area has been unwilling to admit technology to assist learning, even though the introduction of machines in education, predominantly in the instruction of science, is well dispersed in history. Furthermore, technology usage is primarily restricted to moralistic training and knowledge approaches, where teaching is simplified by using computers and the availability of automated teaching resources. Nevertheless, the usage of digital technology behind wearables is not limited to the use of computers, electronic materials and must be well-matched with a student-focused methodology as an option in augmenting the student knowledge involvement.

To ensure full implementation of the national computer education policy in Nigeria, the state government introduced computer education and literacy in secondary schools in 1997 [3]. The general objectives of the computer literacy program are: to encourage computer literacy in every state of Nigeria; develop the use of computers as teaching tools in all subjects and familiarize students with the use of information technology; to enable the current generation of high school students to appreciate the potential of computers and to be able to use computers in various aspects of life and in subsequent work; and to expose teachers and students to the latest scientific knowledge and skills.

Another major effort to increase the integration of wearables in Nigerian society is the 2001 National Information Technology Policy, labeled "US IT" [4]. As a result of these measures, over the years, the education sector has seen a major increase in the capacity of application of wearables in learning and teaching all aspects of the tutelage system. Conversely, the situation in schools, especially in secondary and primary schools in rural areas, has not been fully addressed over a period of time.

Tella et al. [5] compared the 1987 Nigerian Computer Strategy with current school practices and establish that computer training in Nigeria is restricted towards Centralized Institution and is hardly presented in public schools that cover larger percentage of 80% of Nigerian citadel of learning. Nonetheless, the involvement in the private sector to the education structure has increased the usefulness of wearables in probably all private and public schools, especially in metropolitan areas of Nigeria. For example, in a recent study on computer knowledge levels in private and public secondary school students in metropolitan areas of Nigeria. Pitler [6] found that private high school students had more computer access and use than public high school students.

No significant difference was found in terms of Internet access. Given the situation of schools in urban areas, knowledge about the state of computer literacy in rural areas is still little studied. Do schools in rural areas implement the national education policy in Nigeria? And how are rural schoolchildren responding to this new technology in their environment? In response to the global influence of wearables on education, governments and non-governmental organizations in developing countries are now investing in educational technology to bridge the digital divide and enhance teaching and learning in the new information society. In line with these global developments, the federal government of Nigeria, in its national education policy, recognized the major role of wearables in the modern world and has integrated it into education in Nigeria [7].

For example, in 1987, the federal government, at the 32nd meeting of the Council of Ministers of the National Council of Education, established a national committee for computer education, which is tasked with setting national policy on computer education. The universal objective of the plan is to certify that the community gains the effect of information technology on today's civilization; and to enable the current age band of schoolchildren at all levels to appreciate the potential of computers and enable them to be able to use computers in many aspects of their later lifetime [8].

The main objective of this study is to find out how lecturers are responding to wearable technology and admission to the Nigerian educational system. The specific objectives of the study are:

1. Determination of the level of knowledge and acceptance of smart watches by the respondents

2. Measurement of the most influential factors for the acceptance and use of smart watches by the respondents

3. Determination of teachers' perception of the use of the smart watch for teaching and learning.

4. How do lecturers rate the use of smart watch technology in their work?

The presentation of wearable in education has exaggerated instruction and knowledge in various. Wearable is claimed to possess the possibilities of accomplishment used to satisfy the training needs of individual students, promote equality of instructive opportunities; offer top quality learning resources, increase self-efficacy and independence of learning among students, and improve teachers' proficient improvement [9]. Its presentation also ensued to modification within the approaches of training and book learning within the new era teaching space. Olakulehin [10] notes that "this shift which has been driven by the excess information and communication devices now gradually reachable to students in class and

reception, each of which offers new affordances to teachers and students alike for improving student accomplishment and for meeting the mandate for new era skills." Related studies have recognized numerous varieties of wearable attainable for training and education.

Agreeing with [11], wearable obtainable in classrooms take account of modest tool-based demonstrations like Microsoft word, wired depositories of methodical data, main ancient brochures, handheld processors, and two-way remoteness knowledge teaching space. In order to efficaciously function within the newly introduced technology learning setting, identifying wearable implements turn out to be indispensable in place of teachers teaching and students learning. Raij et al. [12] reported that notwithstanding the deceptive remunerations of the utilization of wearable for informative persistence, research revealed that, the teaching possibility of wearable is deprived as many teachers and students are still not fully aware of wearable experience.

Profits derived from the utilization of wearable within learning areas can be exploited when impending handlers are capable within the usage of the newest technological innovation. Research revealed there are connections concerning wearable skills and its application for teaching and learning. And this is why [13] posit that an individual without the working knowledge of computers within the modern technological world will not be ready to go far in life as far as his career options are concerned.

Studies have shown that using wearable in education enables students to take a more active role in their learning rather than a passive observer or listener [14]. Given the part awareness of wearable knowledge affects the new information culture; accepting the Nigerian Policy on Education and executing in secondary schools in the rural regions of Nigeria has grown into noteworthy. Common of reports on the state of wearable in the rural areas only recognized inadequate wearable without insight as to how the situation affects students in the rural communities. According to [15] wearable development and application are not well established in rural areas of Nigeria because of poor information infrastructure.

Zheng et al. [16] say that more than 40% of Africa's population is located in areas not covered by telecommunications services and, as a result, schools located in those areas will have subjectable connectivity issues. However, the full integration of technology into education is far from being achieved. A 2010 study of more than 60,000 classrooms, from elementary to high school in 34 states with various socioeconomic backgrounds and levels, found that 63% of teachers and 73% of students did not use technology [17]. Even as technology advances rapidly, the integration of

Figure 1.
The evolution of wearable.

applications such as those for iOS/Apple products (including the iPad) into education is still in its infancy [18], that is just 2 years ago (**Figure 1**).

According to [10] "a previous review of educational technology research found that the ways in which student and teacher use of technology were measured were often limited," usually measurement using self-report surveys. Few studies measure technology integration through direct observation in the classroom, although observation "can provide a rich source of data to better understand technology use in the classroom" [14]. Although a single case study cannot tell researchers, decision makers and end users all about technology use In schools, it is important to collect as much data as we can to contribute to a general understanding of what is happening in rural schools regarding today's use of technology. Examining how the types of technology used in schools help educators and the research community grow in understanding the issues and needs associated with successful technology integration to improve teaching and learning, in this particular case, regarding the adoption and allocation of rural school technology/iPad funds for those technologies.

2. Adverse effects of educational technology integration

Numerous dynamics stance encounters to effectively incorporating technology into learning. The major factors are support from administrator and wearable awareness quotient. Research revealed that faculty management and backing is necessary in fairly technological skilled improvement enterprises, alongside simple governmental procedures for supervision, misunderstanding, and culpability. With regard to funding, Wearable should provide adequate funding and resources [14] and resources (e.g. computers, iPads, etc.), as teachers report a lack of technology along with major barriers to technology affecting their practice in the classroom [9]. Another obstacle faced by many faculties is the lack of adequate technical support and infrastructure to ensure success with technology [8]. Technical challenges can include the need to carefully plan synchronization logistics and mobile device management as well as to ensure school infrastructure and bandwidth are adequate, powerful enough to support multiple devices directly. These are some of the types of barriers that this study seeks to examine, although administrative support is important for successful technology integration, teacher familiarization with technology is also important. In study [16], respondents classified ignorance with technology as a major barrier impacting teachers' technology integration. Teachers who wish to learn how to incorporate new technologies into education may let their fears interfere with their effective use and may not be motivated to improve their current practice [6]. Studies show that teachers' comfort level with technology affects how often and how they use it in their daily lessons [19].

Furthermore, teachers' confidence in the mastery of new technologies and their perceptions of the usefulness of the latest technologies are important factors in their intention to use them as teaching tools [5]. More important than teacher discipline or level of education is teacher commitment to technology, as teachers typically maintain their students' use of technology in schools, and better "buying" will translate into greater implementation [5]. Another barrier is the lack of professional development adequate for schools that can be subject to technology integration [1]. Interviewing teachers and managers, [4] they identified one of the main adverse effects to technology having much greater effect on teacher instruction as inadequate CPD that boosts teachers to work in partnership so that they would not feel compelled to understand separately in describing the best way to integrate innovative technology.

Teachers reported inadequate time to discovering newest technological abilities, experimenting, planning in preparing teachings as contests to technology [3, 4, 17]. A comprehensive professional development program must be sustainable, relevant, and connect educators through a supportive community practice which includes modeling, observation and interesting lesson scenarios using technology [18]. Efficient models for professional development are for workers to teach each other about how technology can support education and include peer coaching to improve student achievement [12]. Studies show that without effective and continuous professional development focused on quality education, investment in wearable technology will not have the expected outcome [20].

3. Lecturers beliefs, wearable and pedagogy

References [4, 9, 18, 21] have all pointed to the potential of communication technologies for transforming the models and processes of teacher development within the less developed countries (LDCs), as well as for enabling access to quality resources and professional support. Borthwick et al. [1] recommend that wearable agrees that:

Framework tools, which support teachers' construction and understanding of current professional knowledge;

- New learning environments and contexts, enabling teachers to experience new situations, practices and people;
- Communication tools, which facilitate structures of social participation between teachers and other educators (eg collaborative assignments);
- Metacognitive tools, which allow teachers to reflect on the training process, both individually and in groups (eg conferences; shared products such as electronic self-assessments).
- Olakulehin [10] you argue that in this way wearables can make some aspects of teacher pedagogy more efficient, which also has the potential to add to and change the teaching-learning method itself.

4. Integrating wearable into teacher education

Teachers need formal training, but also constant and on-going support from their peers to help them find the best way to integrate technology into their teaching. The use of wearables can enhance teachers' professional knowledge and skills by enabling new forms of collaboration between teachers. Teachers learn to rework their classrooms from a static environment where there is a one-way flow of data from teacher to student, to a student-centered dynamic environment where students interact with peers as a team, both in their own classrooms and in the classroom.

The proceeding with proficient improvement of educators is basic to the accomplishment of innovation and schooling programs. Exploration concentrates like the Digital Education Enhancement Program (DEEP) report that there is no huge relationship between educators' earlier information and potentially experience in the utilization of wearables and subsequently the capacity to effectively foster wearable homeroom rehearses [3]. Instructors need formal preparing, yet in

addition consistent and continuous help from their companions to assist them with tracking down the most ideal way of coordinating innovation into their educating. The utilization of wearables can upgrade educators' expert information and abilities by empowering new types of joint effort between instructors. Educators figure out how to improve their homerooms from a static climate where there is a single direction stream of information from instructor to understudy, to an understudy focused unique climate where understudies interface with peers collectively, both in their own study halls and in the virtual classroom.

Obviously, precise abilities cannot be attained without universal talents, and therefore general abilities are not very useful if teachers do not have detailed abilities to relate wearable clothing in their teaching activities. Zheng et al. [16] identifies four main approaches by which the laptop could be adopted for teacher training and professional development.

This last purpose shifts the stress to construing wearable as a result of the medium additionally because the message of teacher education. Oni and Adebisi [11] concludes that it's potential to support acceptable and property teacher education programme is immense, however that we have got barely began to grapple with these problems effectively. It looks that wearable tools currently gift an opportunity to influence the growing shortage of qualified academics in SSA, and whereas full-time, centre-based teacher education is impractical for in-service provision, a mix

Figure 2.
Portable model in a continuum of portable application approaches for teacher education and development.

of victimization wearable for open and distance learning [8], indicate that alone this could bring its own problems) aboard school-based teacher development offers an attainable and relatively cheap solution (**Figure 2**).

5. Wearable in education

There are few empirical studies that examine the employment of wearable technologies in education [6]. Tella et al. [5] tested the utilization of Google glass medical training. The analysis team terminated that wearable devices have the potential to provide distinctive potentialities in role-play-based learning contexts. Another study examined the employment of Google Glass [18] in academic psychology, and so the researchers terminated that this technology fits seamlessly into the teachings, permitting students to need images and video recordings of learning activities.

Certainly, there are several pedagogic possibilities additionally as problems related to the utilization of wearable technologies. However, so as for academics to integrate wearable technologies into their learning styles and to effectively use them among the classroom, they have to 1st perceive the potential areas of use of the devices [20]. Within education there has been analysis examining however wrist-worn devices will support and assist students with intellectual and organic process disabilities in learning [11]. Oni and Adebisi [11] concluded that wearable have promising potential to support students by conducive to their autonomy and reducing the stigma of obtaining a personal assistant who follows and monitors the disabled students' activities. The potential use of wearable has additionally been studied in regard to e-learning [3, 13, 18, 19], wherever analysis targeted on how the blending of wearable technologies with e-learning systems may support omnipresent learning and collaboration. A study by [6, 17] emphasized moral problems with the employment of wearable in education. Besides the pedagogic opportunities, there are major considerations in terms of privacy, copyright and accessibility There have additionally been studies on using physical activities aboard wearable pursuit technology as a begin line to indicate students regarding acquisition and applied math data. These findings imply a principle for the potential of wearable computers in education, throughout this study; we tend to conceive to understand however wearable computers are used and plan to gain insight into the challenges which can arise in using this kind of technology among the classroom.

6. Methodology

This study was conducted in all departments at Tai Solarin University of Education, Nigeria as a pilot study. Thirty (30) Lecturers in different faculties participated in the study. There were two surveys used for this study. The survey consisted of 15 items and the quarterly survey consisted of 10 items. The items used from these surveys were intended to measure general perceptions of and intention to use mobile technology. Specifically, it included perceptions of: education, hindrances to the adoption of technologies, and participants' intentions to use the device in their own practice. Upon completion of the research they were asked if they would continue the utilization of the Smartwatch in their educational settings.

6.1 Research setting

Tai Solarin University of Education, Nigeria was purposefully selected as the case study for the study. The selection of the school was based on the fact that it is a

pioneer University of Education, located in a rural community, and serving educational needs of people living in that rural community and beyond.

6.2 Data collection and analysis

Two types of data were collected for this study: responses to online surveys and information from focus groups. The researcher asked participants to fill out a series of surveys at the start of the study and then at 3 months. These surveys were distributed via physical means. The surveys asked about everyday use of the Smartwatch and did not collect any sensitive information. The raw data was put into SPSS for basic statistical analysis, including descriptive statistics and 297/parametric analysis. SPSS was used to analyze archival data of the initial survey as well as the follow-up surveys administered after 3 months. The researcher used quantitative inquiry to investigate educational professionals' perception and use of Smartwatch devices in curriculum dissemination. We examined whether the participants' usage rates increased from the start of the of the research study to its completion by applying an Independent Samples t-Test to all responses to the three common questions of the two surveys. We used an Independent Samples t-Test to compare means. In an attempt to examine lecturers' differences in Smartwatch usage, a one-way ANOVA was used to compare the mean response between lecturers and determine whether the type of exposure may have influenced any part of the results.

6.3 Results

The purpose of this study was to identify lecturers' perceptions about the use of Smartwatch technologies for educational enhancement. The results section provides data analysis results about lecturers' perceptions to use of mobile technologies, particularly Smartwatch technology.

6.4 Demographic data

Initial data was collected from 30 participants; at the end of the study, 5 participants were lost at follow-up (N = 25). The demographic data of age, gender, highest level of education, and gender are shown in the following **Tables 1**–**3**.

Table 1 shows that the most common age range among participants was 30–39 years old (37%). The least common age group was 40–49 years old (13%).

Table 2 reflects the highest levels of education for participants in the study. A total of 15 individuals (65% of participants) had a post-graduate degree. The researcher assumed that individuals in this category were comprised of Professors and Associate Professors. A total of 10 (35%) had a least a Bachelor's degree; we can confidently assume that these individuals accounted for the lecturers generalization.

Table 3 reflects the gender of participants enrolled in the study. A total of 17 participants (61%) identified as male. Traditional lecturers are male so this level of participation is representative of the population.

Table 4 indicates how many participants were already using wearable technology at the time of enrolment. A total of 17 participants (71.15%) were not currently using wearable technology.

Table 5 indicates lecturers' perceptions of the value and utility of wearable technology. Mixed reviews on the value of wearable technology for educational enhancement were seen. While perceptions of value of wearable technology at baseline were mostly classified into the "agree" (range: 32–47%) and "strongly agree" (range: 35–47%) category for all of the six questions, there were also some lecturers

Age	Percentage (%)	Count
18–29	27.78	5
30–39	37.04	5
40–49	12.96	5
50+	22.22	10
TOTAL	**100**	**25**

Table 1.
Age of participants.

Response	Percentage (%)	Count
Bachelor's degree	35.5	10
Post-graduate degree	64.5	15
TOTAL	100	25

Table 2.
Lecturers' highest level of education.

Response	Percentage (%)	Count
Female	38.89	8
Male	61.11	17
TOTAL	100	25

Table 3.
Gender of study participants.

Response	Percentage (%)	Count
Yes	28.85	8
No	71.15	17
TOTAL	100	25

Table 4.
Current use of wearable technology.

who answered "neither agree nor disagree" (range: 10–28%). These mixed results may be attributed to the fact that some lecturers were unfamiliar with the use of wearable technology, as noted in **Table 4**.

6.5 Descriptive statistics

Researcher used an Independent Samples t-Test to compare the means of the two surveys. For the statement, "My Smartwatch is a valuable education tool," participants' perception of value at 1 month (M = 3.49, SD = 1.05; t [96] = 1.29, p value 0.2) was slightly higher than their perception of its value at the end of the 12-month study (M = 3.20, SD = 1.79). There was no significant difference in means. During the one-month follow-up, lecturers' rates of "agree" and "neither agree nor disagree" responses to this statement were comparable to those at the 3-month follow-up. There was a trend of decreasing perception of the value of the Smartwatch

for education at the end of the study (**Figure 3**). After examined differences in Smartwatch usage. A one-way ANOVA was used to compare the mean response between lecturers and thereby determine whether the type of enhancement may have influenced any part of the results. We found no statistically significant difference between the group means ($p > .05$). Therefore, we cannot reject the null hypothesis, and we cannot accept the alternative hypothesis.

6.6 Discussion and recommendations

The study focuses on the awareness, inclusion and implementation of wearable in enhancing educational development in rural areas. A pilot study was conducted in Tai Solarin University of Education, Nigeria, to authenticate the objectives of the study. It was revealed that even though the utilization of wearable is not required,

Question	Strongly disagree (%)	Disagree (%)	Neither agree nor disagree	Agree (%)	Strongly agree (%)	Total
Wearable technology devices are valuable educational tools.	4	0	12	47	33	17
Wearable technology devices are valuable assessment tools.	2	0	10	45	43	21
Wearable technology makes it easier to communicate with colleagues.	2	2	14	35	47	20
Wearable technology facilitates increased productivity and efficiency at work.	2	2	16	45	35	25
Wearable technology can help students achieve better health outcomes.	2	0	26	36	36	24
Wearable technology can facilitate better students awareness	2	0	28	32	38	22

Table 5.
Perceptions of value of wearable technology by lecturers.

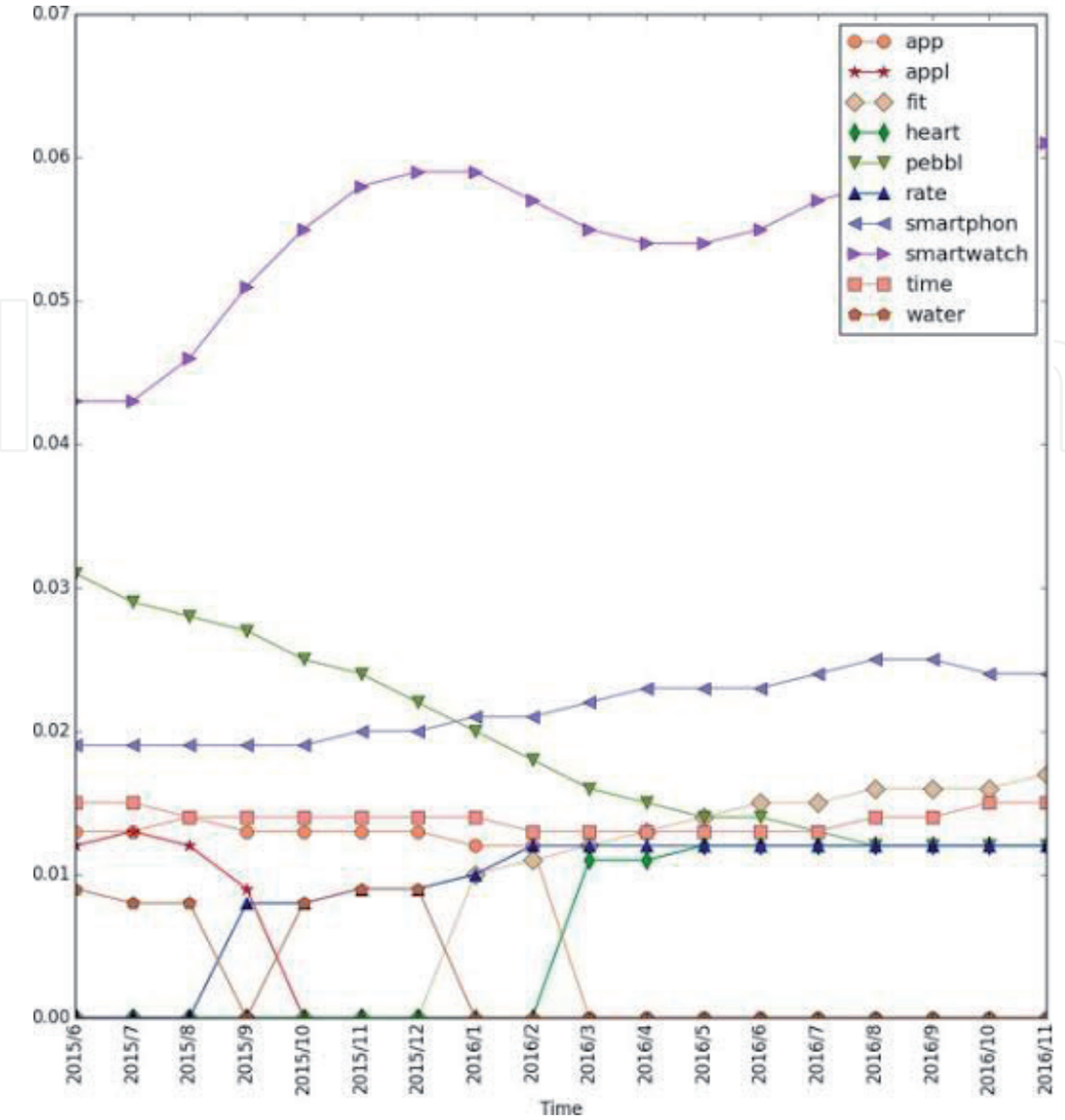

Figure 3.
Graphical trends in wearable technology usage.

nevertheless the magnitude of acceptance among the staffs is still low-slung. The challenges to wearable practice among academic personnel arrays commencing from insufficient resources, incapacitated training, inadequate finance by the college management, incapability to acquire personal ICT facilities, inadequate ICT facilities at workstation, poor power supply, inadequate ICT knowledge, deficient time due to capability, inadequate interest in learning.

The use of printing technologies may include learning from electronic books and other computerized support systems. Positive visual learning strategies can include digital storytelling using multimedia software / presentations or story creation websites. By actively participating in digital storytelling and visual support, students have the advantage that they can draw pictures and images in their own words. In terms of high-tech support, there are support materials that would help the reception of the students and materials that would help in the class. There is a wide variety of educational software that is used to improve reading skills. These include The Waterford Early course of study (www.waterford.org), Headsprout Early Reading (www.headsprout.com), PLATO Focus (www.plato.com), Academy of Reading (www.autoskill.com), LeapTrack (www.leapfrogschool.com/), READ 180 (www.hmhco.com/products/read-180), Scholastic (http://www.scholastic.com/home/),

Knowledge Box Central (www. knowledgeboxcentral.com/), and Pearson Digital Learning (www.pearsonschool. com).

Recommendations made were that, all employed teachers in Federal, State and personal schools should undertake mandatory training and retraining on ICT programmes in introducing them to new technological trends in enhancing teaching and learning within the 21st Century. This is usually to supply them with sensible and useful information of computer, internet and associated areas of ICT for improved effectiveness and potency. The government ought to develop policies and pointers that may support teachers in their educational work and students in their learning.

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