A WEB-BASED DISTANCE LEARNING PLATFORM FOR ADULT LITERACY PROGRAMMES OF COLLEGES OF EDUCATION IN NIGERIA

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Abstract

Adult literacy programmes are designed to help out-of-school and educationally less-privileged individuals attain numeracy and reading skills, and e-learning facilities provide an opportunity to move from conventional adult literacy learning methods to a technologically driven, synergized and adaptable learning method involving learners, instructors, and facilitators. The most common type of adult education in Nigeria is the use of lecture notes and textbooks, but there are challenges such as low learner enrolment, high costs, no centralized monitoring, and difficulty in archiving previous learning materials. This paper is n the development of a web-based adult literacy learning platform for Colleges of Education in Nigeria (a prototype of Kogi State College of Education, Ankpa). The prototype of the proposed system is built using WAMP Server 2.5 and MySQL open-source application programs. The goal is to improve effective teaching-learning activities of adult literacy programmes using computers and mobile technologies. The paper concludes that the proposed system will improve learner-teacher interactions, enhance the generation, collection, and management of learning contents and generally promote the attainment of learning objectives. It is recommended that the college managements provide infrastructures, enabling environment and training for staff. Furthermore, there should be standards and policies on the implementation of web-based adult literacy programmes across all the colleges of education in Nigeria.

Keywords: Adult Literacy, Web based, E-Learning, Technology, Teaching, Learning,

1. Introduction

It is impossible to overstate the importance of an information and knowledge society, which may be realized by creating an information environment that prioritizes the interests of the people. The potential for individuals to realize their full potential, contribute to the growth of their countries, and improve their standard of living might be completely realized via the use of digital technology. The vision of adult literacy can strategically be organized to transform the conventional classroom to the digital classroom for the purpose of engaging students and teachers in their distance learning paradigms (Kara, Erdoğdu, Kokoç, & Cagiltay, 2019; Ovcharuk et al., 2022)

The educational technology industry is looking for solutions to help those who lack access to quality educational resources. It is obvious that traditional classroom training is unable to

provide quick assessments, engaging activities, and instant learning opportunities. In contrast, digital learning tools and technology have been promoted as being able to fill the gap through the usage of smartphones and computers, which calls on educational institutions to embrace them for use in the classroom (Haleem, Javaid, Qadri, & Suman, 2022; Nicolaou & Kalliris, 2020).

Due to previous truncation of learning, adult literacy programmes enrolls its students from the working adult population. These people then go back to finish their formal education using e-learning, which is teaching delivered using computers and multimedia technologies along with the Internet, with the aim of achieving predetermined learning objectives. In this situation, the students are mostly spread out among e-learning facilities rather than present in traditional learning environments to take part in learning modules. 2019 (Dwyer & Walsh). Distance learners are adult students who are enrolled in academic programmes at educational institutions while juggling commitments to their families, jobs, and studies (Lee, Choi, & Hoan, 2019; McGill, Heikkila, & Lazarowicz, 2020). Furthermore, face-to-face learning settings were added to web and distant learning to provide blended learning for the development of autonomous and self-paced learning abilities (Vanslambrouck et al., 2018).

Many institutions use technology-enabled scenarios (such learning management systems) in training, human resource development and adult education. This promotes on-demand, and flexible access to learning resources. Trainers may quickly and easily evaluate learners' experiences and perspectives with the use of online and digital platforms (Gegenfurtner, Schmidt-Hertha, & Lewis, 2020; Lee et al., 2019).

Adult education programs are helpful in reducing social isolation, a lack of autonomy, and improving access to resources and services. Again, the adult population feels like they belong in modern society. Delivering digital skills is one strategy, and making information and communications technology (ICT) available to adults has become a crucial way of expanding the knowledge and skills necessary to cross the current generation's digital divide (Garcia et al., 2021). As a result, this study makes an effort to increase the efficacy of adult education in Nigerian institutes of education by adopting a web-based learning environment.

The effects of moving to online learning, teaching, and evaluation on post-secondary educators and trainers in Singapore during the COVID-19 era were examined by Watermeyer, Chen, and Ang (2021). They presented a problematization of a national-and, in fact, global-policy rhetoric that has gained strength throughout the epidemic with the shift of training and education to the web. Thereby viewing educational digitalization as a public benefit.

2. Related Studies

According to Garcia et al. (2021), it is important to teach digital skills to adults to help sustain education activities, reduce social isolation, and access basic digital services. Audio-visual media content and technologies have also contributed significantly to the advancement of psychological and physical well-being, education, and lifelong learning. Therefore, the success of adult education today may rely heavily on factors such as digital literacy, appropriate selection of ICT tools, creation of effective audio-visual platforms, and how educators organize

their lesson plans and content, as noted by Nicolaou and Kalliris (2020). Moreover, the United Nations' sustainable development goals for 2030, as highlighted by Haleem et al. (2022), suggest that quality and inclusive education can best be achieved through digital technologies.

In Ukraine, digital learning tools were introduced in secondary schools to support distance learning programs. However, Ovcharuk et al. (2022) pointed out that developing digital competencies for both students and teachers, as well as identifying suitable digital instruments, are critical challenges that need to be addressed. The COVID-19 pandemic has accelerated the adoption of educational technologies in delivering distance education. In the aftermath of the pandemic, Kerres and Buchner (2022) advocate for stakeholders and actors to reflect on their experiences and collaborate in leveraging digital technologies to improve adult education.
According to Arrosagaray, González-Peiteado, Pino-juste, & Rodríguez-lópez. (2019), conducted a study aimed at assessing and contrasting students' self-perceived confidence in digital competence, the effect of ICT on their learning, and their perspective on the learning potential of ICT. The authors found that ICT offers learners of different ages a range of adaptable learning formats, including personalized instruction that meets their individual needs and expectations.

Furthermore, (Grotlüschen, Buddeberg, Redmer, Ansen, & Dannath, 2019) emphasized the long-standing issue of people having low reading and numeracy abilities. Education planners now feel a greater feeling of need to pay more attention to this group at risk of institutional exclusion from the social and educational strata.

This is an opportune moment to concentrate on adult development due to significant changes in family life and work. With the increasing acceptance of diverse family structures, including gay marriage, single motherhood, and child-free marriages, adults have a wider range of options to build their families. The nature of work has also evolved, with jobs becoming less physically demanding and more mentally stimulating. While this provides a potential for engaging work, it also poses a risk of being unprepared for the growing skill requirements of modern workplaces. In many countries, individuals are entering into stable adult responsibilities at a later stage than before. However, adult development is now lasting longer than ever, with adults in developed countries typically experiencing extended periods of development. (Arnett, Robinson, & Lachman, 2020).

The adoption of digital media in adult education has not been uniform. Some institutions have embraced it, while others remain resistant. The diversity of applications of digital media in education underscores its value as an innovative tool for teaching and learning. Furthermore, overall, the adoption of digital media in adult education is not just limited to educational tools but also encompasses a wide range of communication and information media. The effective use of digital media requires careful planning and implementation, as well as appropriate training for educators and learners. When used effectively, digital media can revolutionize adult education, creating new opportunities for teaching and learning. (Rohs, Bolten, & Kohl, 2020).

The transition to a knowledge society has fundamentally changed how we live and work, which presents particular difficulties for individuals with modest levels of education. Adult education could be the solution, yet low-educated adults are the ones who engage in adult education the least. Adult education has also garnered a lot of policy attention as digitalization has increased.(Nieuwenhove & Wever, 2021).

Although the number of older persons is increasing more quickly, the majority of them have social, psychological, and physical restrictions. By giving students the necessary tools to promote a healthy society and putting their newly gained theoretical knowledge into reality, higher education should address these issues.(Ruiz-Montero, Chiva-Bartoll, Salvador-Garc, & González-García, 2020).

Adult education is a significant factor in assisting adult employees to adapt to employment changes, according to Chuang (2021). Teachers of adult learners must comprehend how adult literacy theories are used in adult educational contexts in order to assure the efficacy of organizational training initiatives and sustainable learning results. In particular, for constructivist and social learning theories to succeed, there has to be social interaction and human relationships.

The problem-solving abilities of adults are being tested by the rapidly changing technology environment. According to Hämäläinen, Wever, Nissinen, & Cincinnato (2018), the main objective of higher education is to ensure that graduates have a high level of knowledge that is compatible with the shifting needs of technology in business and daily life.

3. System Analysis, Design and Methodology

3.1 Justification of the proposed system

The proposed web-based platform for adult education programme of Colleges of Education in Nigeria will help staff, students and college management through the effective delivery of quality education. Furthermore, it will facilitate teaching and learning activities assisted by computers and mobile technologies. Recently, it has become possible for learners to carry their own personal computing devices that contain exceptional computing power, such as laptops, personal digital assistants (PDAs), tablets, personal computers (PCs), cell phones, and e-book readers. This large amount of computing power and portability, combined with the wireless communication and context sensitivity tools, makes one-to-one computing a learning tool of great potential in both traditional classrooms and outdoor informal learning.

As a result, this encourages innovation in education using information technology. Mobile computing not only supports traditional lecture-style teaching, but also makes it easy to acquire and share knowledge. It can promote innovative teaching methods such as cooperative learning, exploratory learning (outside the classroom) and game-based learning.

The proposed system harnesses the potentials of mobile computing devices for increasing computer accessibility, diverse teaching styles, and academic performance. The proposed

system has various distinctive features such as individualized interfaces, real-time access to information, context sensitivity, instant communication, and feedback. This system enhances the interaction between learner and teacher, which promotes self-directed learning against the traditional styles.

3.2 Conceptual design of the proposed system

The design of the proposed teacher-in-training assessment and evaluation system is composed several operations and sub-sections as shown in Figure 1

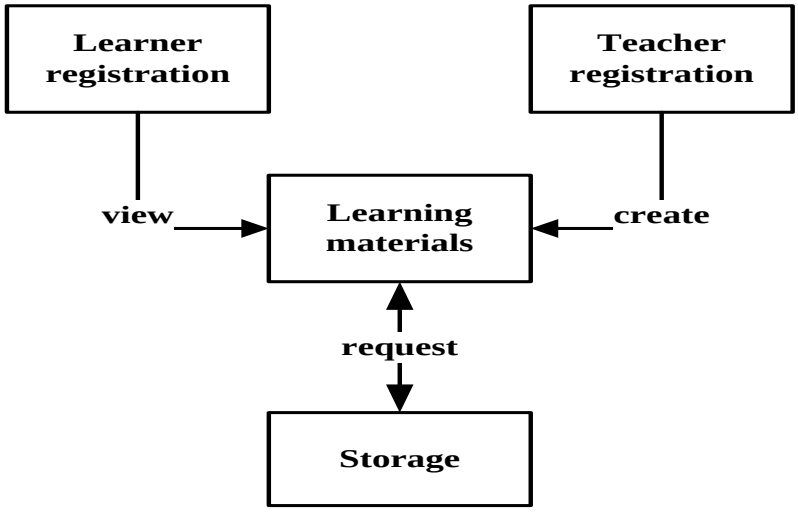

Figure 1: The conceptual design of the proposed system.

In Figure 1, Student subsystem is used to capture data related to personal details, learning and subject details and view of learning content links from the dashboard. The student user profile is created as the user role, whose username and password must be supplied during profile creation. These are required to be correctly given to the system to access all the available functionalities of the proposed system. The supervisor subsystem is responsible for creating teacher registration, learning content management, reports and feedbacks generation for possible actions or related activities derived from the processes. The teachers can upload many learning course materials for purpose student's access and view, and receives learning feedback for immediate improvements.

3.3 Hardware and Software Requirements of the System

The minimum hardware needed for implementing the prototype of the web-based platform for adult education programme are shown in Table 1.

Table 1: The hardware required for the system prototyping.

Parameter	Value
Operating system	Windows 8
HDD	180GB
Processor speed	2.0GB
System processor type	64-bit
Processor name	AMD

Also, the minimum software needed for developing the prototype of the proposed e-learning system are shown in Table 2.

Table 2: The software required for the new system prototype.

Parameter	Value
Operating system	Windows 8
Database	MySQL
Application platform	WAMP Server 2.5
User Interface	HTML/PHP
Server	Apache Web Server
Browser display	IE 10

3.4 System Operational Activities

The sequences of activities to be accomplished for a successful functioning of the proposed system include:

a) The installation of the prototype application software on the hard disk drive (C:\wamp\www\www.kscoea-elearning.com\) of the host computer with the specified parameters.
b) The creation of student and teacher personal data and login details for the manipulation and access to the system functionalities.
c) The teachers initiate their learning activities such as learning material creation and uploads, actual teaching, class management, and students' feedbacks.
d) The adult student enrols for the course of study, access the system and download learning materials from the e-learning platform.
e) The teacher performs the following the following actions:
    i. Update learning content.
    ii. Create learning content.
    iii. Review feedback.
    iv. Generate reports
f) The electronic records of all activities on the e-learning platform are saved daily, semesterly, and yearly.

3.5 System Operational Flowchart

The complete flow of activities in the proposed web-based platform for adult education programme in colleges of education are illustrated in Figure 3.

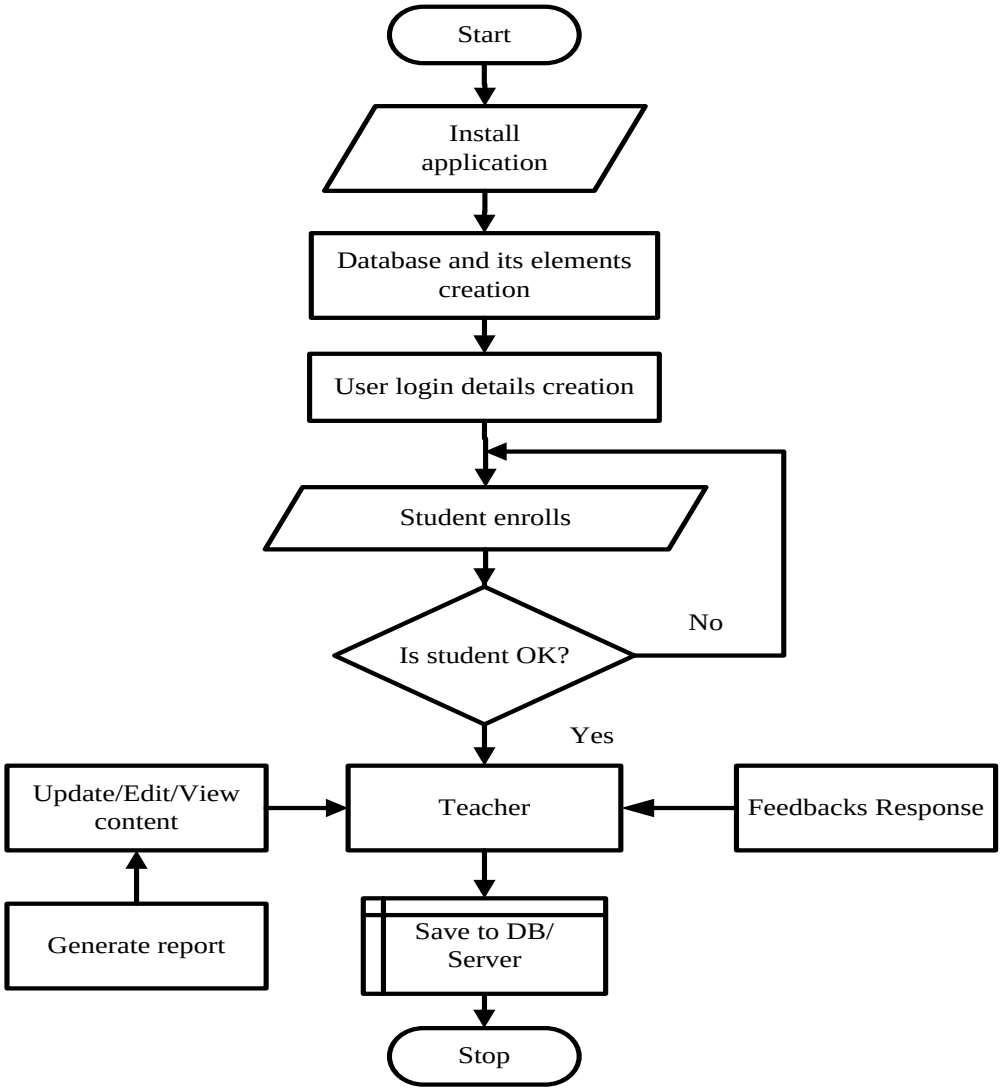

Figure 3: Flowchart of the proposed web-based platform for adult education programme.

3.6 Use Case Diagram of the System

The system actors, cases and flow of activities are presented in the use diagram of the system are illustrated in Figure 4.

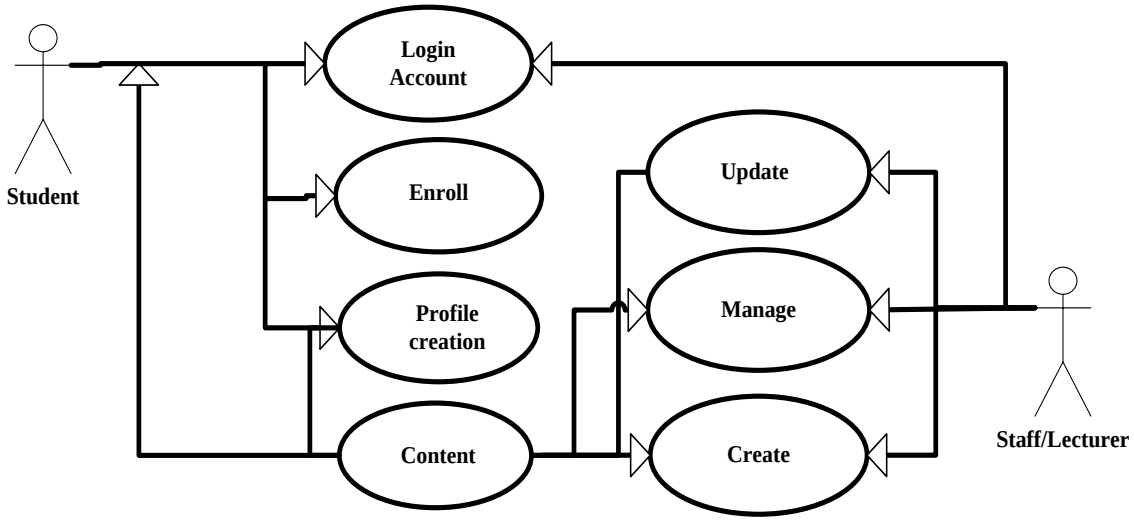

Figure 4: The use case diagram of the system.

4.0 System Implementation

4.1 Prototype System Installation

The foremost operation for the developed prototype system is the setting up or installation of databases and dependencies using the index page on the basis of the requirements specified earlier in section 3.3 as shown in Figure 5.

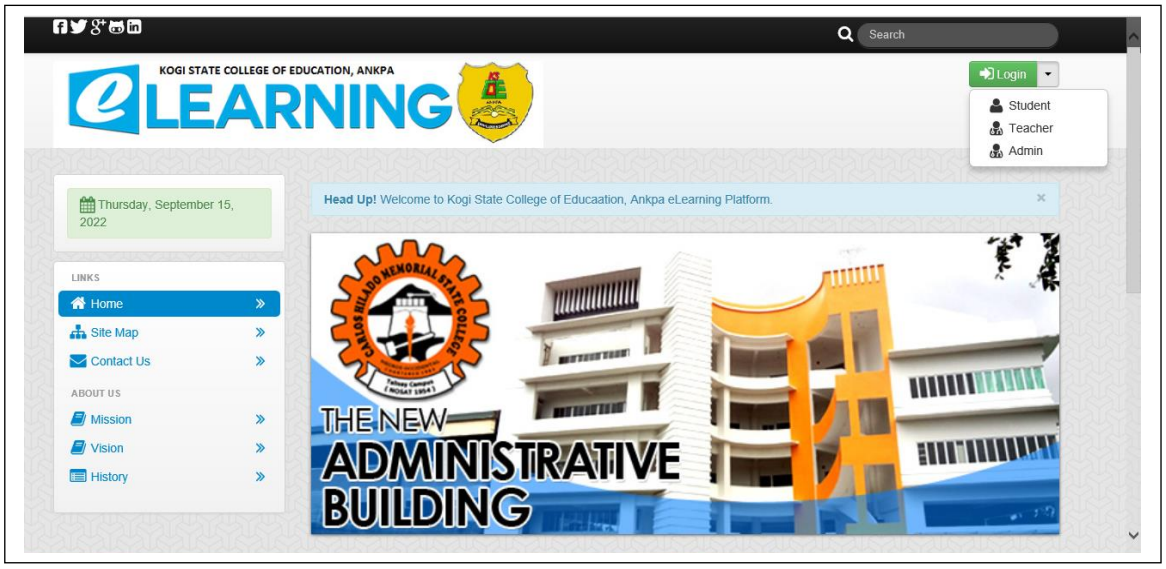

Figure 5: Prototype system setup and installation interface.

In Figure 5, the prototype system installation enables the creation of the database (elearningdb) and related tables such as student, user, teacher, contact, course, user_log and subject. These database elements are available on the localhost server for the proper functioning of the prototype system.

4.2 Teacher Operations

The teacher serves as the system administrator, who is the most important user on system. The main functions performed include: file management, entry management (department management, course management, subject management), teacher list management, student list management, and user list management.

The users of the system are categorized into two because of distinct functionalities or roles performed in the system (Teacher and Student). The user account registration page is illustrated in Figure 6.

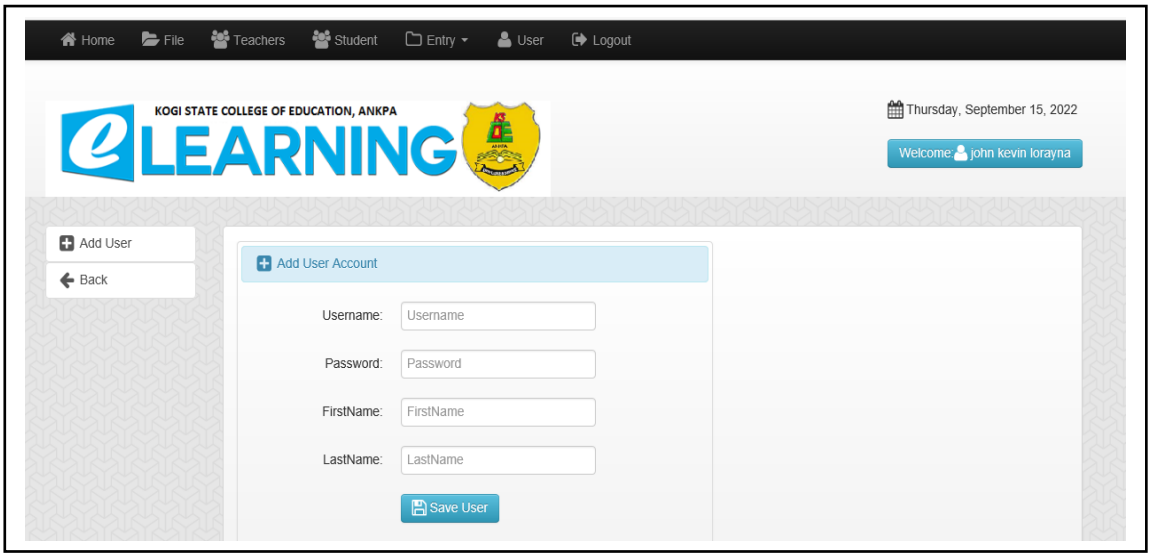

Figure 6: The new user account creation form.

In Figure 6, the two roles are created for the system which include username, password, firstname and lastname. The system administrator is responsible for generating user accounts for the purpose of manipulating the entire system functionalities. Similarly, the administrator can create the student accounts as shown in Figure 7.

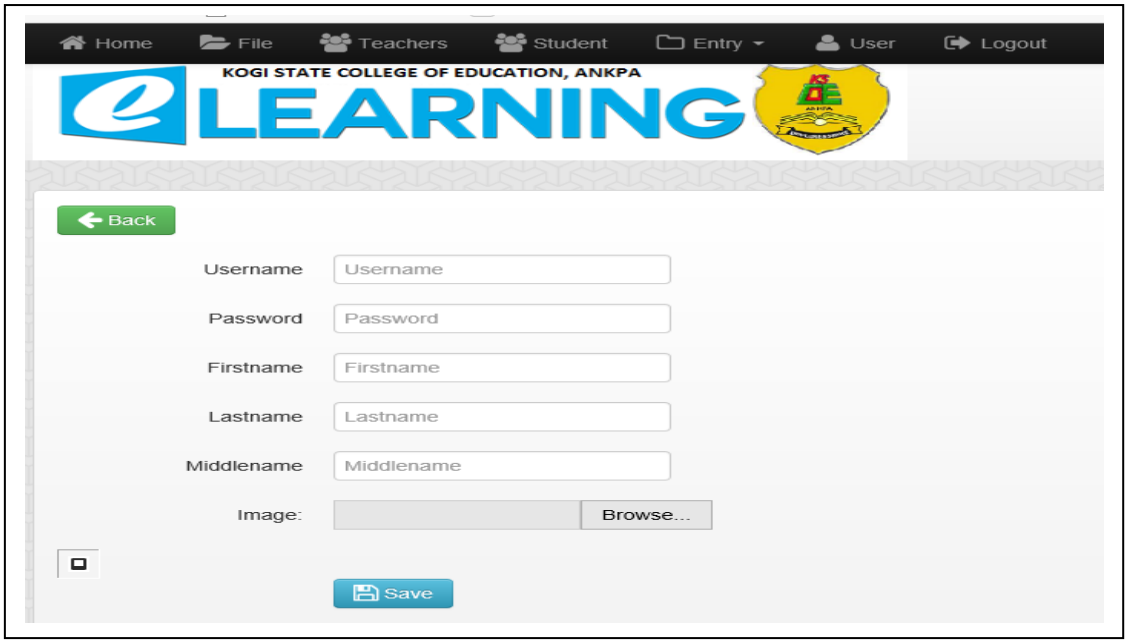

Figure 7: Student account creation page.

From Figure 7, the new student account is created by the Admin through filling out of the form including username, password, firstname, lastname, middlename, and image and save button to complete. More so, the teacher account is created similar to the student account creation by suppling the following information. These include: username, password, firstname, lastname, middlename, and image. The admin is responsible for creating the course lists, subject lists and the department lists as shown in Figure 8.

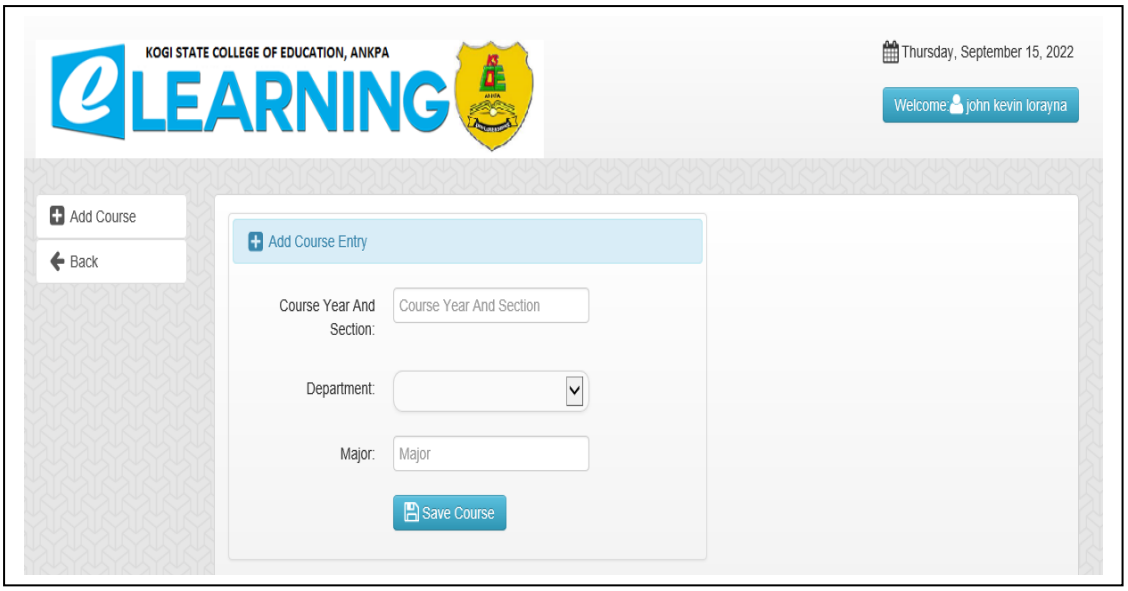

Figure 8: Course creation page.

From Figure 8, the admin creates new course on the system by filling the year and section, department and nature of course (Major), then the save button is used to commit the add course entry. In this way, the admin generates the files, and manages all the accounts, teachers, students, department, subjects, and course on the system.

4.3 Student operations

The student logs in to the system using the account credentials that is username and password available on the index page's login dropdown button. Upon successful authentication of student, the student dashboard is displayed in Figure 9.

Figure 9: Student dashboard and functionalities.

From Figure 9, the student dashboard indicates the fullname, photo, home and class links. The student enters the online classroom registered by the Admin, and performs course views and download of coursewares, class list, subject files list, and download files shown in Figure 10.

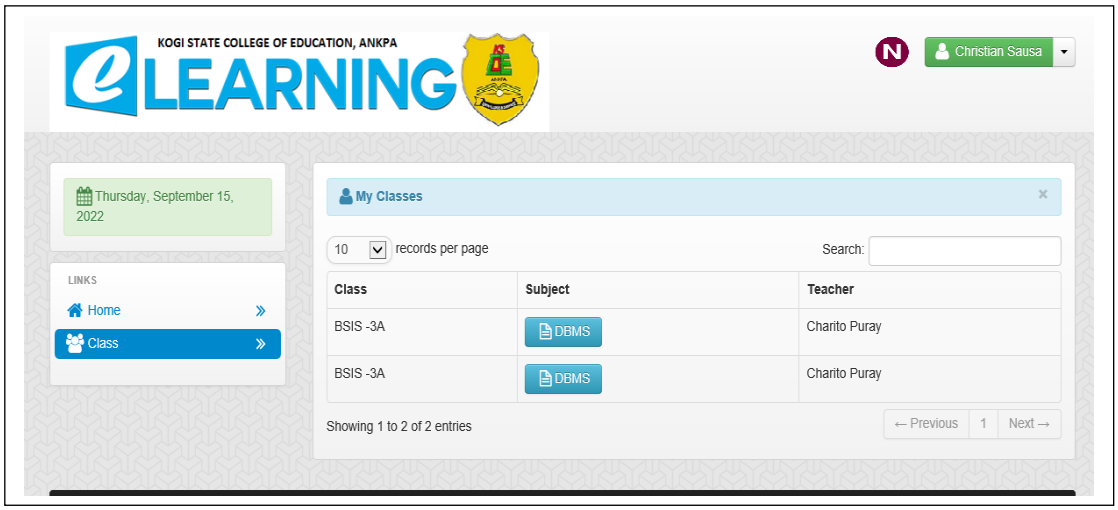

Figure 10: Student dashboard and functionalities.

Figure 10, the student's class menu provides list of classes, subjects and associated teachers. The student can download the course material by simply clicking on the download button attached to the class name.

4.5 Discussion of Results

In the developed e-learning system, it is possible to add students in a class, upload files, add courses, departments and subject. It also has a form validator and a Responsive Design compatible with mobile phone and Tablet. It has a great graphical user interface for you to interact well. The e-learning system has three types of users; the Admin, Teacher/Faculty, and the student. The admin user is in charge of managing the system data such as the entry list which are the departments, courses, and subjects. The admin also manages the list of users, teachers, students, and uploaded files. The teachers can provide files and documents to their class and the students can download the uploaded files of their teachers.

From the simulation of the protype system, the system generated and disseminated diverse educational contents for the use of teachers and learners in an adult literacy programme. Furthermore, the system aided in the attainment of learning objectives without the need for a face-to-face or physical classroom meeting. However, the success of the proposed adult literacy learning platform depends heavily on the teachers and the learners. The system addressed the three domains of the Bloom's Taxonomy of education through the use of video recorded lessons, live video sessions, digital slides among others. Evaluation was achieved using randomized practice questions and exercises submitted to the instructors online. This helped the lecturers to review and improve learning outcomes.

Technology continues to play an essential role in education and education management. Technology has provided education sectors with necessary tools and platforms to facilitate different curriculums (Nicolaou & Kalliris, 2020). The web-based learning platform is an

excellent way of deploying technology effectively to fulfill learners' needs. It ensures the best learning environment for adult students and their teachers more efficiently.

5.0 Conclusion

To sum up, web-based programs for adult literacy have the capability to grant educational access to those who may not have had it otherwise. Even though there is a shortage of research on effective literacy instruction for adults, insights from research with younger populations can help shape the development of such programs. Web-based learning environments offer a wider range of educational opportunities and can offer high-quality instruction. Nevertheless, it is vital to consider the prerequisites of online learning, such as internet connectivity and digital skills. Establishing a literacy-rich environment that focuses on speaking, reading, and writing can also aid adult learners in their educational goals. All in all, web-based adult literacy programs have the potential to significantly enhance adult literacy rates and broaden access to education.

The proposed system will improve the creation, gathering, and efficient administration of learning materials and students. The proposed e-learning system strongly encourages the process of producing reports regarding learners' performances, curriculum development, courseware, feedback reviews, and learning activities. This raises the standard of educational services provided by the College and enables fast remote monitoring of student learning progress and instructor performance. Furthermore, it will promote the use of technology in the College's operations and activities, particularly in the instruction and learning of students enrolled in adult education.

5.1 Recommendations

This paper recommends the following:

i. The National Commission for Colleges of Education (NCCE) should provide an enabling policy to support the adoption of web-based learning platforms in Colleges of Education in Nigeria by setting up relevant committees.
ii. The NCCE and managements of the colleges of education in Nigeria should organize standardized trainings for staff and other users on the new system, its benefits and prospects; thereby improving teaching and learning situation in the College community.
iii. The managements of the colleges of education should periodically improve on the system by adding more features such as virtual classrooms. This can be achieved through sustained system updates. There need to improve on the new system design and learning amenities to promote other personalized services such as virtual classrooms.
iv. The government should improve on electricity supply to educational institutions to aid in the effective utilization of computer systems, through investments in alternative sources of electricity in order to power the computer systems and accessories.

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