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PIONEERING EDUCATION: SMART LEARNING AND DIGITAL SKILLS FOR STUDENT SUCCESS

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Article Info

Keywords: online education, distance education, e-learning platforms, smart learning, digital transformation, information and communication technology, blockchain, higher education, educational resources, student-teacher interaction.

Abstract

Online education has emerged as a method that combines self-education and distance education by leveraging the Internet to provide educational resources and facilitate interaction among students. The role of teachers in online education goes beyond simply delivering information, as they become educational designers and facilitators, aiming to increase student participation, motivation, and learning. While distance education has a long history, it has recently gained momentum due to advancements in technology. Over time, distance learning has become an alternative to traditional education, offering benefits and flexibility. Various e-learning platforms have been developed to enhance educational experiences, such as the Lima e-learning platform, which focuses on information and communication technology (ICT) topics. Additionally, platforms like COMSON and MODMAT.net have been designed to manage online information and facilitate collaborative research and training. Distributed e-learning platforms have also emerged, offering new e-educational services and innovative testing algorithms. In recent years, blockchain-based e-learning platforms have been developed to improve transparency in assessments and customize curricula. These platforms have the potential to increase trust in online education providers and enhance the credibility of education history and credentials. With the digital age, higher education institutions face the challenge of meeting students' expectations, which include the integration of information and communication technology, flexibility in learning schedules, and practical applicability of coursework. This necessitates the introduction of new processes and resources while requiring teachers to adapt their teaching methods. The rapid development of technology, including the Internet of Things, artificial intelligence, and big data analysis, has paved the way for smart learning practices. Through the integration of smart devices and technologies, smart learning offers innovative ways to enhance

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and extend the learning experience. This paper explores the concept of e-learning, discusses the evolution of online education platforms, and highlights the challenges and opportunities presented by smart learning practices.

1 Introduction

Online education is an educational method that combines self-education and distance education as a result of providing educational resources on the Internet and allowing students to use them and working to create interaction between students by facilitating the sharing of that information and educational resources among them without the restrictions of time and place that apply in classroom studies [1–4]. In this type of education, in distance education, it is the most basic duty of teachers to increase students' participation in the lesson, motivate their learning and increase their motivation. The teacher takes on new roles, more than just a distributor and reader of information, to become an educational designer and preparer [5–7]. This is done through the teacher preparing and designing the curriculum and methods that should be used to provide educational materials and then facilitating educational activities, developing their skills, and managing communication between students to encourage online education [8]. Although the concept of distance education is broad and its roots extend back to more than a century and a half, some view the phenomenon of distance education as a modern revolution helped by the technological developments taking place [9, 10]. In 1892, the University of Chicago began searching for a way to deliver educational lessons to all students and found in postal letters an appropriate way to provide knowledge to a wide range of those wishing to learn. Over time, distance learning has become a primary method for some who have found benefits instead of traditional education. In 2003, the Lima e-learning platform was introduced by [11]. It is an online training platform that deals with the three Course topics "Virtual EMC Lab", "Advanced RF Design Center" and "Mixed-signal Simulation Center, based on VHDL-AMS". It is essential in these areas of interest for the latest designs in information and communication technology (ICT) for providing excellent educational materials. The online training platform can be used for graduate students as well as designers in the industry to obtain and maintain highly qualified knowledge. In 2006, the authors gave a brief description of COMSON (Coupled Multiscale Simulation and Optimization in Nanoelectronics) and summarized the characteristics and functions of MODMAT.net, which is a prototype of an e-learning platform that has been realized for managing online information and help [12, 13]. Use this platform as a starting point for developing an e-learning platform with high levels of portability and reusability. Also in 2008, [14, 15] described an information system architecture created to provide partners with a strong collaboration and development research environment. This architecture provides a framework with three main objectives: information exchange, research collaboration, and training. This system also provides users with easy access to, update, and interact with information and with other researchers at all stages of the project. In 2014, they described some new e-educational services, provided by distributed e-learning platforms (dispel) [16]. The testing examination is facilitated through algorithms to generate unique tests with minimum pre-defined testing questions. These services were successfully used in the master's program "business software technologies" at the Faculty of Mathematics and Informatics of the University of Plovdiv "paisiihilendarsky". In 2020, a proofof-concept-based e-learning platform on the blockchain was developed to increase transparency in assessments and facilitate curriculum customization in the context of higher education. They designed it to be pedagogically neutral and content-neutral to showcase the benefits of the blockchain backend to end-users such as students and faculty [17, 18]. An assessment indicates that the platform they designed can increase trust in online education providers, assessment procedures, education history, and credentials. In this paper, the term e-learning is used to represent open learning through the use of

one of the e-learning tools such as Moodle as an e-learning platform to help students and teachers present course contents simply and effectively to facilitate online collaboration between student and teacher. The requirements of a typical higher education student, in the digital age, include the use of information and communication technology in teaching methods, flexibility in time and space for completion of the study, and the applicability of coursework in real life. These requirements put pressure on universities and other institutions of higher education to introduce new processes and resources and use skills, while teachers are expected to modify teaching methods in the absence of any additional training. Ensuring that digital skills keep pace with the advancement of technology is extremely difficult given the dynamic nature of information and communication technology, which is reflected in the rapid development of networks, service delivery methods, and speed rates of technology and devices. Today, multiple services are provided through smart devices using converged networks to obtain smart education and learning [19–21]. So, via the digital transformation, ushered in by the Internet of Things, artificial intelligence and big data analysis, has begun to bring innovation to learning methodologies and tools through "smart learning" practices, which the integration of smart devices and smart technologies provides a powerful way to enhance and extend the learning experience [22].

2 Digital skills

Being familiar with information and communication technology and having the skills to use this technology are important, as success in the digital world requires a wide range of digital skills [23]. Digital skills are the individual's possession of skills, knowledge, scientific ability, and self-direction when using modern technologies, which require his possession (information culture, media culture, information, and communication technology culture) that reflects the active and positive use of digital technologies [24]. These digital skills are an essential part of an inclusive education framework and there is always a need to think about how to enhance students' ability to excel in the digital and educational fields. They are a set of skills that achieve the ability to understand and use information in multiple forms from a wide range of computer-delivered sources [25–27]. Digital skills have the ability of a particular person in the process of using content, using it skillfully, and then sharing it, which usually depends on a lot of sufficient competence in digital devices and computer information, to reach the high experience in digital. Today's student expects to be able to learn and learn anything anywhere, anytime, and to ask universities and teachers to think carefully about and adapt to these new needs. It is well understood that universities and other teaching and learning organizations have to adapt to take into account the student and the requirements of the market in general at present, and the role of the teacher at length in the digital world.

3 Smart learning

Intelligent learning can be defined as the intelligent use of emerging technologies to achieve learning efficiently and effectively. A review of the literature has revealed that intelligent learning is a subject of active research and debate. The International Smart Learning Environment Association (SLE) defines smart learning as an environment characterized by the use of innovative technologies and elements that allow greater flexibility, effectiveness, adaptability, participation, motivation, and feedback. In [28], they said, "The goal of intelligent education is to improve the quality of learning for lifelong learners. It focuses on seamless, personalized contextual learning to enhance learners' intelligence, thinking and skills and facilitate their ability to solve problems". [29] adds that smart learning is based on two different types of technology: smart devices and smart technologies.

4 Moodle for e-learning

Moodle stands for Modular Dynamic Object-Oriented Learning Environment, and it is an open-source e-learning platform designed to help teachers create high-quality online classes. Moodle provides a platform for resources and communication tools. After installing Moodle on the main server, the system administrator configures the settings to enable access to it by usernames and passwords. The platform is accessed by the user via the Internet because it is web-based and does not need to install anything locally. The Moodle system has updates installed from time to time so it is constantly modified and improved. A feature of the Moodle system is the possibility of downloading educational materials on the site in various electronic formats (flv, dox, pdf, ppt) and links to sites related to the course content. Due to the presence of several powers as a system administrator, teacher, student, and guest, it is not possible to enter the system without obtaining the user name and password. The system also provides the ability to exchange and send files and assignments between users. In addition, there is a feature that enables the student to know the level of his academic achievement [30].

5 Implementation of moodle platform and results

This paper provides a platform for teaching using Moodle to help teachers deliver educational materials online. After installing Moodle, the administrator or system administrator account and its password will be obtained. Through this account, classes are created, users are added to the system, and other system functions are managed. The Moodle system consists of three levels of access to it: system administrator, teacher, and student (the user can be given any of these roles).

1-System administrator: It is responsible for managing the system, and therefore he can control and create classrooms or assign the role of the teacher to others, and he can also assign the role of administrator to others, (this means that the system administrator has complete control over the classes). After entering the platform with the sysadmin account as in Figure 1, the interface for the system administrator and its tools will open, which is to add users, create classes, and other system functions as in Figure 2.

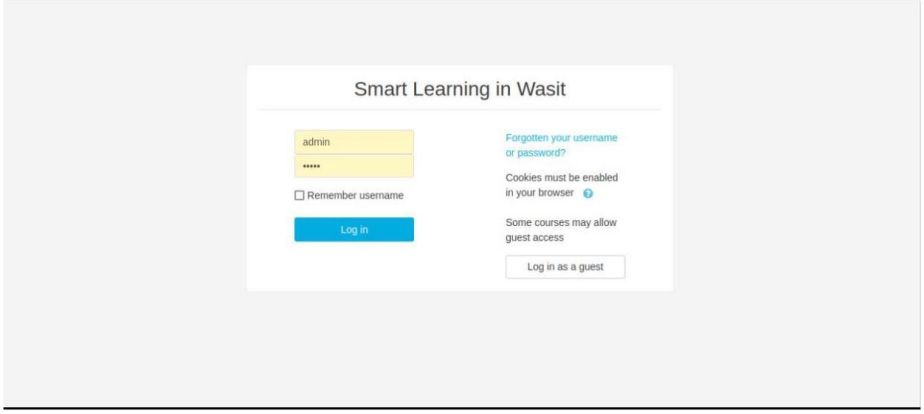

Fig. 1. Log in to the system

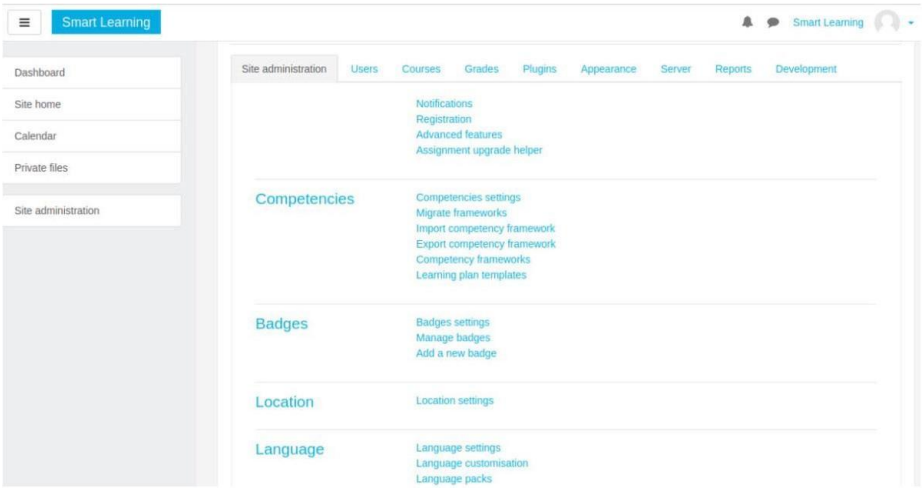

Fig. 2. System administrator interface

2-Teacher: The teacher is responsible for the classroom, which means they can add educational materials to students using the courses and tools available to them by the system administrator. Figure 3 shows the teacher's interface, which differs from the system administrator's interface, as a teacher, as we said earlier, is responsible for creating classrooms using the tools available to him. Through the "Create a new course" (as in Figure 4), the options are provided to the teacher who manages the class, as in Figure 5.

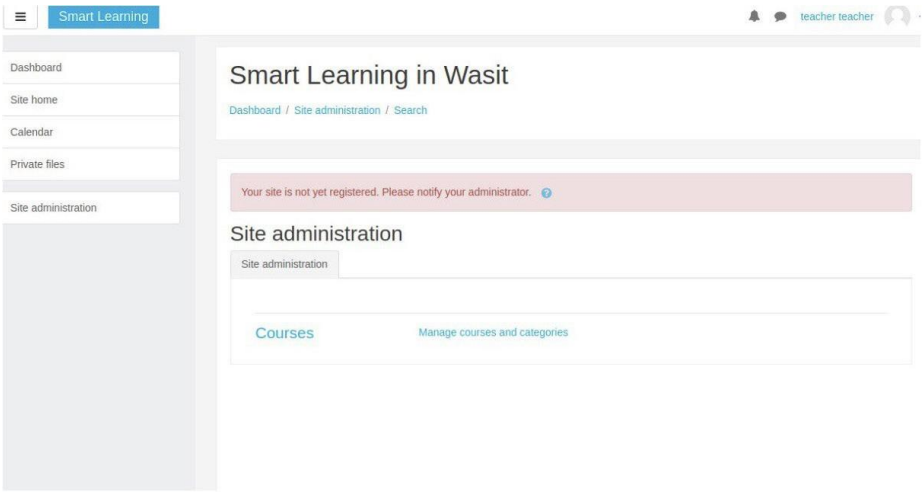

Fig. 3. Teacher's interface

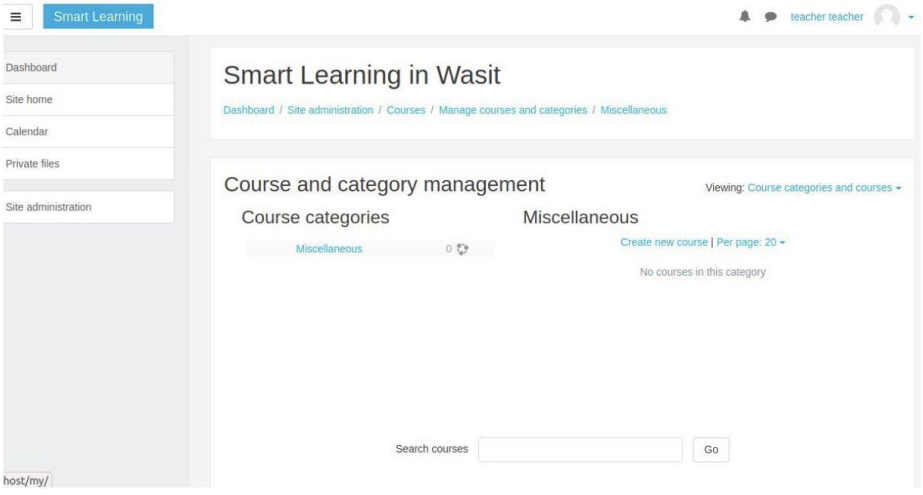

Fig. 4. Create new course

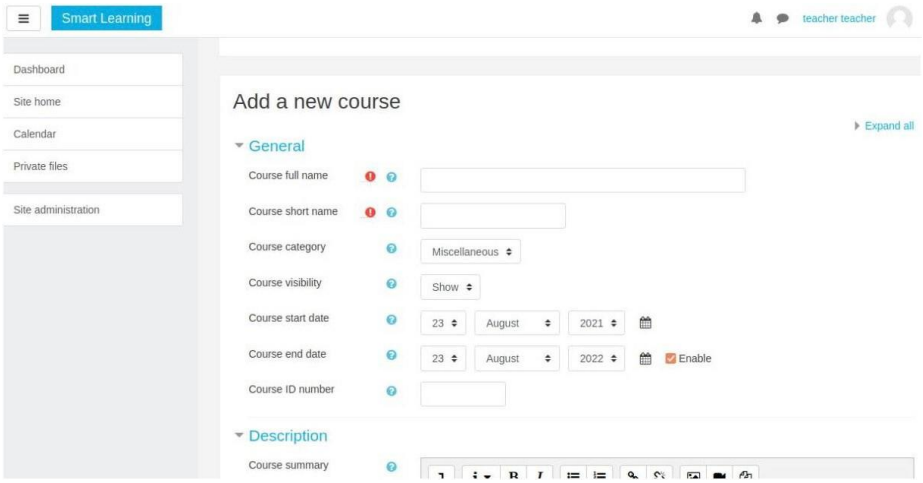

Fig. 5. Add a new course

Figure 5 shows the options available to the teacher for coordinating classroom content or scheduling the class. Content, educational materials, or lessons may be pdf files, ppt files, videos, etc. Also, a Quiz can be created by the teacher and provided to students to do it on time for their evaluation as in Figure 6.

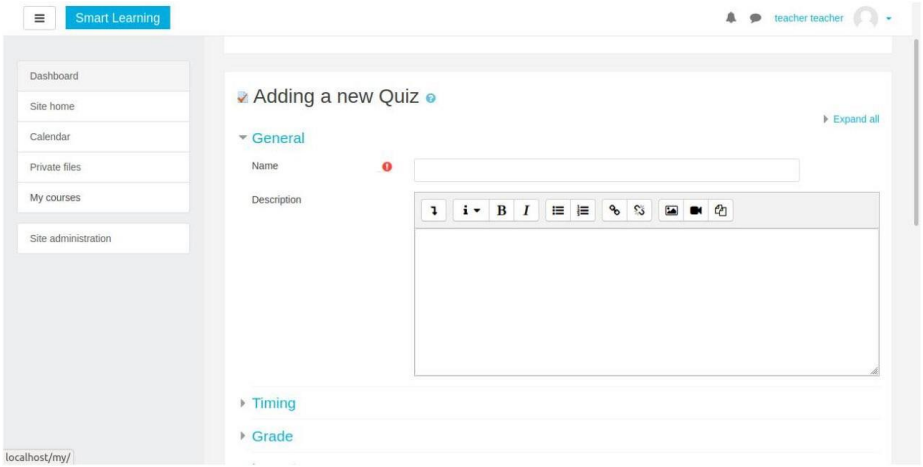

Fig. 6. Adding a new quiz

3-Student: The student can use the program to learn only. Figure 7 shows the student interface.

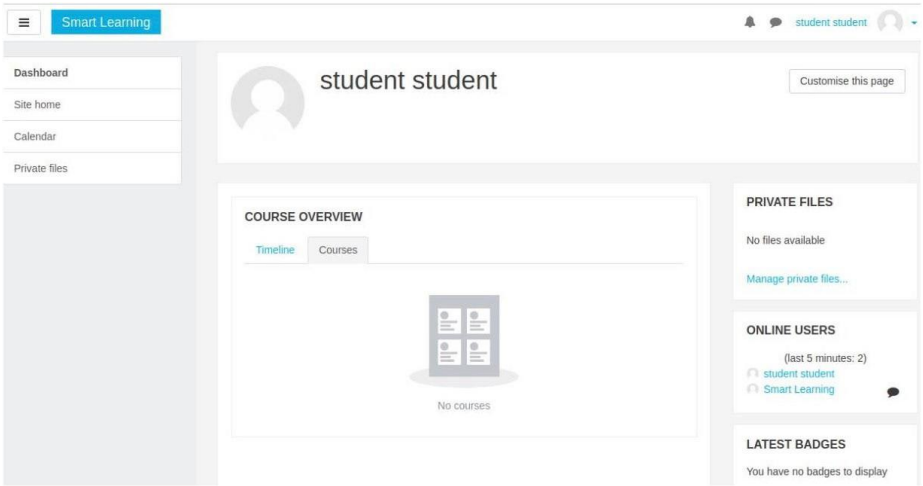

Fig. 7. Student interface

The mechanisms provided by the Moodle platform for the student to enter the semester are, first allow any user to join the class and do not require any authentication. The second is the entry of the student or user as a guest to the class and this means that he cannot participate in any activity. As for the third, the student is registered by the teacher, so the teacher can add or remove students. Students must use the registration key set by the teacher to enter the classroom (the key can be changed by the teacher after all students have joined).

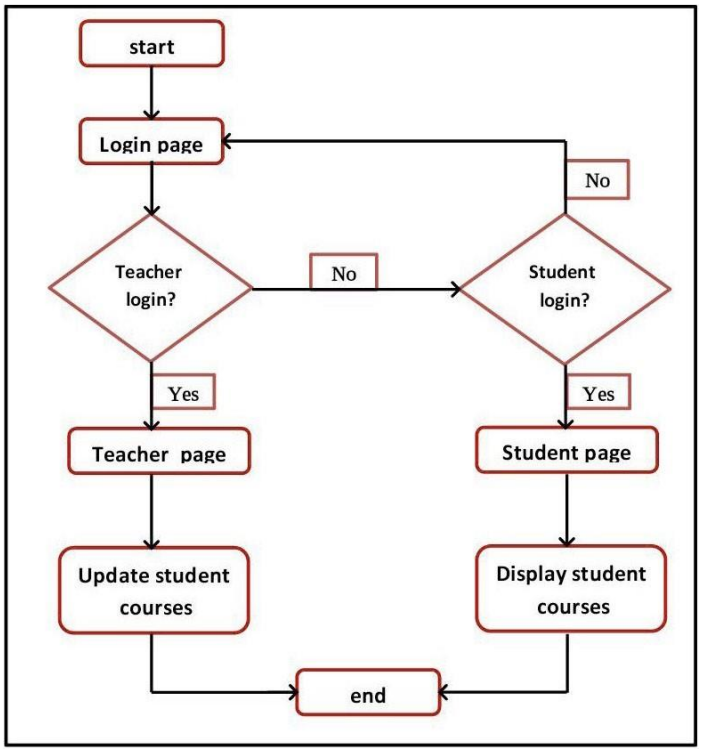

Fig. 8. The flowchart of how the proposed platform would work

The notecard for digital skills was prepared through knowing the purpose of the notecard, ie; observing students' performance in digital skills when using the platform. The elements of the card, that is, the formulation of its elements so that it included (30) numerical skills, and their formulation in simple sentences that is easy to measure. The estimation method used, i.e., is the estimation list, and the quantitative estimation method was used in degrees so that the level in each skill can be identified objectively if the performance is correct, two degrees are calculated, and if it is average, one degree is calculated, but if the skill is not performed or performed incorrectly, it is calculated as zero. Thus, the total score of the card is 60 degrees.

Notecard instructions are worded to include the purpose of the card, the number of card elements, and the grading method used. Modified by calculating the stability and validity of the notecard. After ensuring the stability and authenticity of the card, it became valid to monitor the performance of digital skills by the sample students before and after using the platform.

Table 1. The results of the statistical processing of students' scores in the notecard

No.	Application	Theoretical Average	St. dev.	Calculated T-test Value	Statistical Significance
30	Pre-test	14.86	5.360	37.04	0.05
30	Post-test	35.83	6.988		

It is clear from the above that the value of "t" is equal to 37.04; this value is significant at the level of (0.05), which indicates that there is a difference in favor of the post-application of the observation card for digital skills due to the effectiveness of the platform in developing the student's skills. This result demonstrates the effectiveness of the platform in developing students' digital skills because they possess simple digital skills, knowledge, and scientific ability technological information and that can be developed during their school years through good attention to academic preparation programs for students related to digital education; to achieve their scientific ambitions that reflect the effective and positive use of digital technologies.

6 Conclusion

The use of the Internet in the educational process, including e-learning, has given rise to the so-called educational platforms. These platforms play a role in providing learners with informational skills and making the learner more in control of the educational process and time management. Moodle was used in this paper to design an open-source educational platform that facilitates teaching and learning by providing educational information and resources to students. The application of this system also attracts students who cannot study in the traditional educational program, as it allows them to study according to their capabilities and at the time they prefer. It also creates easy educational opportunities for those who missed attendance in the present education in addition, it helps fill the shortage in the teaching staff. When designing effective distance learning programs, interacting with learners and receiving their feedback is critical. Open source solutions are effective in achieving teaching goals. So must train university students in all scientific disciplines to acquire technological and digital skills, the development of these skills among teachers and students also for creating a smart learning environment.

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