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Exploring the Feasibility of Implementing Online Learning at the Faculty of Science: A Case Study

Amina Shtewi [ID]

Department of Computer Science, Faculty of Science, Gharyan University, Gharyan, Libya

ARTICLE INFO	ABSTRACT
   	Background and aims. *In recent years, the education sector in Libya have been affected by wars and political fluctuations, impacting the quality and availability of education. There have been challenges in providing the necessary educational resources, as well as in training and qualifying teachers. E-learning, it can be an effective tool in improving education under difficult circumstances. Online education can provide opportunities for students to access educational resources easily, and can contribute to enhancing communication between teachers and students. E-learning can also play a role in developing students' technology skills, which is important in our modern era. In 2019, the Faculty of Science at the University of Gharyan partially implemented online learning as a response to COVID-19 pandemic, and this program continued for two academic terms. Therefore, the paper aims to highlights both the advantages and limitations of E-learning within the environment of university education in Libya. **Methods**. Student data from the science college was collected over six academic terms from 2019 to 2022 will be analyzed. **Results**. Overall, it is observed that in the academic year 2019-2020, which implemented distance learning, recorded the highest number of students, approximately 1800, while in the two subsequent years where traditional classroom seats were used. A decrease in the number of students was noted. **Conclusion**. E-learning can be effective and suitable for students in Gharyan University, particularly in subjects that do not require practical experiments or direct interaction, despite, its quality may be influenced by various factors.*

INTRODUCTION

The development of E-learning is linked to development in technology, technical improvements, and increased affordability of computers. Already in the late eighties and the nineties of the last century the first form of electronic education-Computer-Based Training (CBT) was born. This is considered as the cornerstone of today´s E-learning[1]. The CBT system requires connection of personal computer to some other multimedia, for example CD-ROM. While the system represented

significant progress, its content was not extensively developed, and it lacked certain features that would later become characteristic of E-learning, such as the absence of constraints related to time or place [2]. Another new Web-Based Training (WBT) was designed not only to teach, but also to allow the interaction between the teacher and the student. This programs were well-described by Buriak [3]. This new system already matched the current one, but it was officially named only in 1999 [4]. The WBT system rapidly spreading and improving, along with the associated programs like the pedagogical approach, which started in 2002 to be more and more enforced, with good management skills and multiple learning approaches, E-learning offers benefits and can be efficiently utilized not only for remote but also for in-person education [5]. Flexibility is another feature of E-learning, affording learners the opportunity to access lessons from anywhere and at any time [6]. Moreover, E-learning caters to diverse learning approaches by incorporating abundant interactive content available on the internet [7]. For instance, Khan Academy stands out as a notable example, providing high-quality education globally at no cost. The organization offers thousands of educational lessons covering mathematics, science, and the humanities, catering to students of all age groups [8]. Nevertheless, it's crucial to acknowledge that each student possesses a unique learning style and understanding level, which can vary significantly. While some students may excel in a particular subject, others may require detailed, step-by-step assistance [9]. Additionally, E-learning enhances financial affordability, signifying its cost effectiveness for students who utilize it, enabling them to engage in other beneficial activities during their free time[10]. The trend towards E-learning presents a global opportunity for students to enroll in any university encouraging full student engagement through various learning tools like texts, videos, audio, collaborative participation, and interactive graphics [11]. For instance, its effect on educational learning are noted in facilitating equal access to the information irrespective of the users' locations, Their diverse ethnic backgrounds, racial identities, and varying ages [12]. This trend has the potential to elevate the quality of teaching and learning, signal the need for higher institutions to maintain a competitive edge, and provide access to education and training in the global market for students [13]. Despite the countless benefits of online education, some drawbacks must not be overlooked. Since the E-learning approach involves online assessments, there is a minimized potential for unauthorized activities such as cheating and plagiarism [10]. The most significant drawback of E-learning is the absence of vital personal interactions, impacting not only interactions among fellow learners but also the relationship between instructors and learners [14]. This can lead to challenges related to self-discipline for reading and a misunderstanding of task instructions. The sense of community is lacking, as the majority of students preferring to work independently to avoid the necessity of interacting with their peers [15]. Additionally, the use of the computer for unrelated activities, such as Facebook, can be a significant source of distraction [16]. Also, the presence of cultural barriers, such as individualism and collectivism, has a major impact on both organizational and personal effects[17]. The study emphasizes the challenges that students face in in utilizing E-learning, which are presented as drawbacks.

METHODS

Study flow
The data used in the study was obtained from the registration department, and the examinations department at the Faculty of Science, University of Gharyan. Student's data from the science college was collected over six academic terms from 2019 to 2022. The college consists of nine departments. The number of students in these departments will be compared to analyze changes in student enrollment during the study period.

Study approval statement
The study was approved by the research committee at the Faculty of Science, University of Gharyan.

Statistical analysis
In this study, the data were analyzed using statistical visualization, with the utilization of Microsoft Office Excel Professional Plus 2013.

RESULTS
Figure 1 illustrates the number of students in various scientific departments during two academic semesters for the year 2019-2020, which was the year of remote learning It is noteworthy that most departments, including zoology, computer

science, chemistry, and environmental science and resources, recorded the highest number of students, with approximately 400 and 300, respectively, while other departments like mathematics, physics, and statistics reported lower numbers.
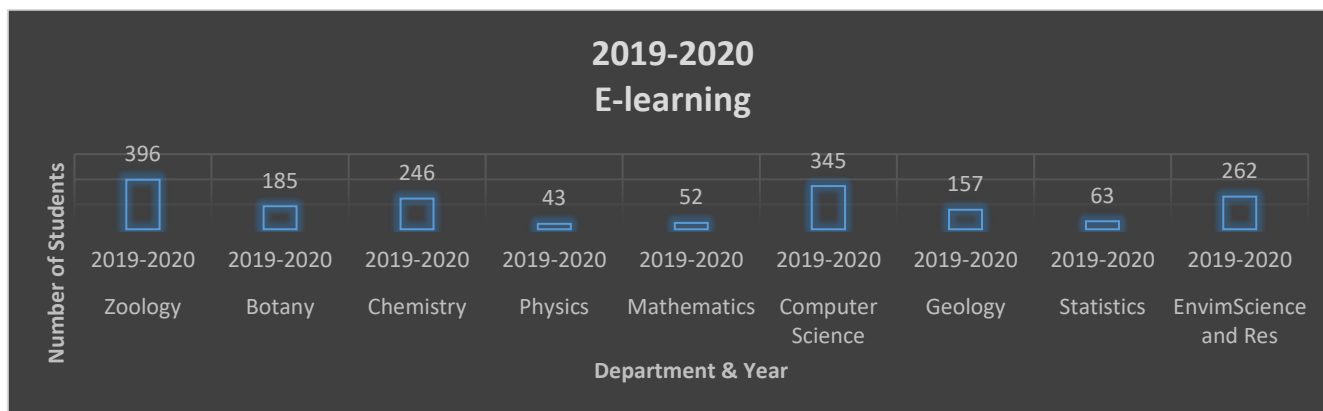

Figure 1. The number of students in each department during the two academic semesters of the year 2019-2020.

Figures 2 and 3 illustrate the student enrollments in scientific departments for the academic year from 2020 to 2022 over four semesters. During these years, the courses took place in traditional classroom. It is noticeable that there is a decrease in the number of students in departments that had the highest enrollment during the online learning period, such as botany, geology, computer science, and environmental science and resources. On the other hand, there is a significant increase in student numbers for departments that had lower enrollments during the remote learning period, such as physics and mathematics.
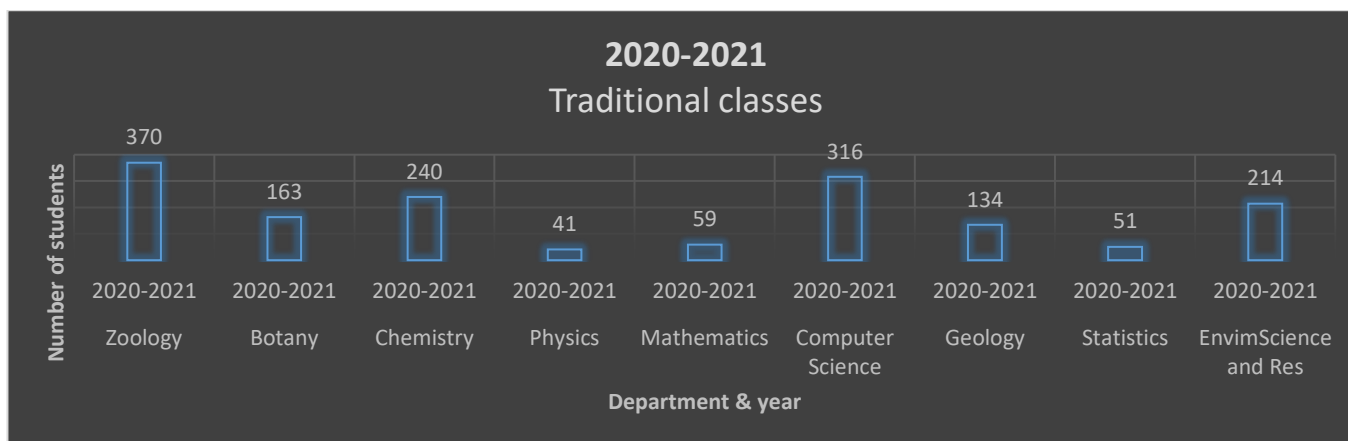

Figure 2. The number of students in each department during the two academic semesters of the year 2020-2021.
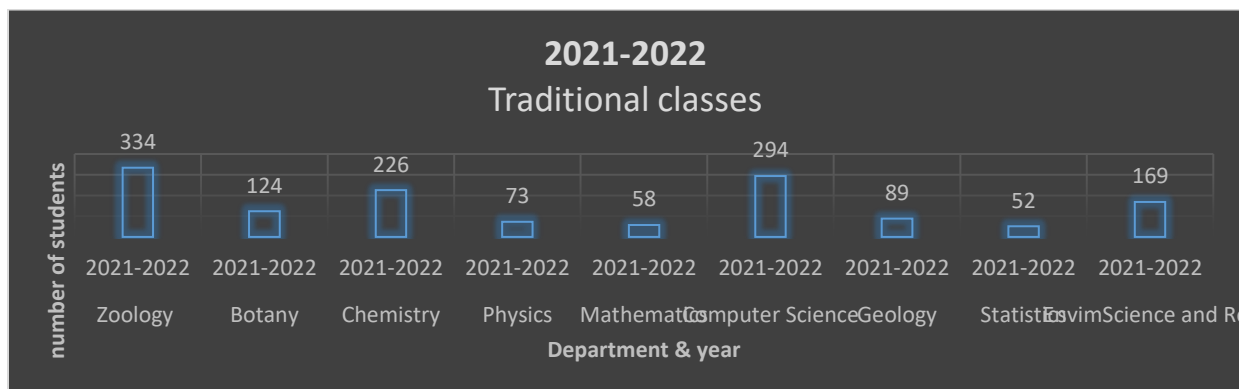
Figure 3. The number of students in each department during the two academic semesters of the year 2021-2022.

In general, it is observed that in the academic year 2019-2020, which implemented E-learning, recorded the highest number of students, approximately 1800, while in the two subsequent years where traditional classroom seats were used, a decrease in the number of students was noted, as seen in figure 4.
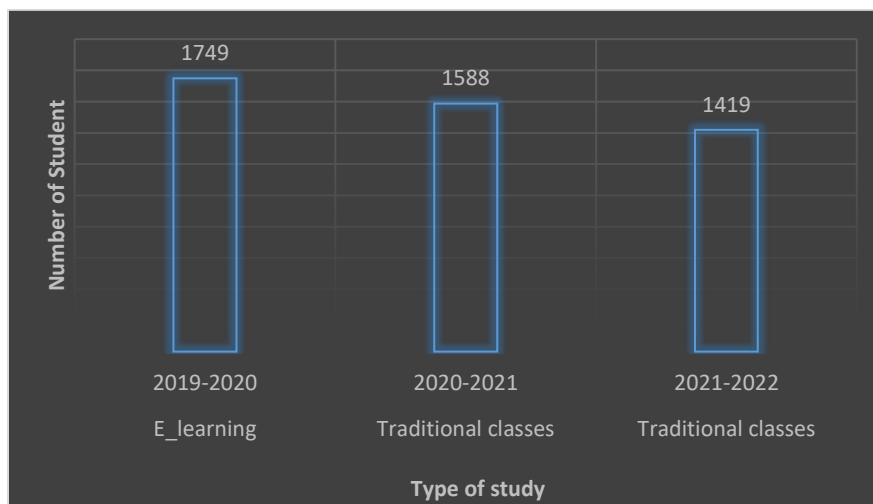

Figure 4. The number of students over the study period 2019-2020.

Overall, E-learning can be suitable even for subjects that require direct interaction or practical experiments, such as computer science and zoology, leading to increased interest in these areas. Conversely, it indicates a decline in the number of students opting for traditional education in this context. On the other hand, subjects that necessitate direct interaction and practical experiences, such as physics and mathematics, show a decrease in student numbers when adopting the E-learning mode. This decline may be attributed to challenges in providing effective experiences and interaction in the learning environment.

DISCUSSION

In the present era, online learning has become a global reality, seamlessly integrated into the education systems of most countries. Guided by this principle, numerous universities worldwide have implemented and adopted online learning programs, due to the advantages it offers both students and institutions, in terms of time and effort [18]. According to Alvarez, the internet is considered a perfect tool for learning, providing flexibility and convenience to learners, while simultaneously offering endless opportunities for innovative teaching [6]. This aligns with the findings of the present study, which observed an increase in student numbers during the Covid-19 pandemic when E-learning was in progress. Other researchers have pointed out that some reasons for the success of E-learning include its potential to enhance student learning

and increase engagement levels [19]. The study indicates that, in 2020-2021, courses were conducted in traditional classrooms. It is evident that there has been a decline in the enrollment numbers for departments that historically had the highest student participation during the online learning period, such as zoology, geology, and computer science.

From a different perspective, E-learning can surpass face-to-face learning, particularly in terms of the quality of interaction and the provision of timely feedback. Moreover, studies have suggested that online instruction represents a significant advancement in education, facilitating the exchange of information and expertise and creating opportunities for diverse learners, including those in distant or disadvantaged locations [20]. The study shows that E-learning can be suitable even for subjects that require direct interaction or practical experiments, such as geology, chemistry, and zoology, leading to increased interest in these areas. These findings align with the results of many studies that argue certain topics, particularly those demanding hands-on or practical involvement, might pose challenges when exclusively taught and learned through E-learning methods. Disciplines like laboratory sciences, performing arts, or specific vocational training may necessitate a physical presence for effective education [6].

Electronic learning is known as E-learning, presents numerous advantages, contributing to its growing popularity in both educational and training. The main advantages of online learning are: E-learning has revolutionized education by offering an unparalleled level of adaptability and convenience to learners. With E-learning, individuals can access educational materials and participate in courses on their own terms, regardless of their schedules, learning preferences, or even students with disabilities. Furthermore, E-learning empowers learners to choose their own pace of learning and offers a wide range of resources and tools to cater to different learning styles [21,22]. E-learning can enhance financial efficiency as it often reduces the need for physical materials and costs associated with traditional education, such as commuting, printed materials, and facility maintenance. It can also lower expenses for institutions offering courses online [23]. Immediate updates which, mean digital content can be easily updated, ensuring that learners have access to the latest information and resources. This is particularly crucial in fields where knowledge evolves rapidly [24]. E-learning offers international collaboration, breaking down geographical barriers and facilitating collaboration among learners from different parts of the world [25].

Despite the several advantages of E-learning, it also has certain limitations. This is some common limitations associated with e-learning: technical issues can affect e-learning, which is heavily dependent on technology, as access to it requires a reliable internet connection and access to appropriate devices. These technical issues, such as poor connectivity, technical failures, and system crashes, can disrupt the learning experience [26]. E-learning might cause isolation and a lack of social interaction, as it often involves independent study. The absence of face-to-face interactions with instructors and peers may limit opportunities for social learning [27]. Hands-on subjects, requiring practical training, may be challenging to teach and learn through E-learning alone due to limited hands-on learning opportunities[6]. Motivation can be a challenge in E-learning, as it may expose learners to various distractions such as social media, email, or other online activities[16]. Some learners may struggle with self-discipline and motivation in an online learning environment. The lack of providing immediate feedback from instructors can be a drawback, as Learners may experience delays in obtaining answers to their questions or clarification[28]. Quality of content the efficiency of E-learning relies on the quality of the content[29]. Poorly designed courses or materials can impact the overall learning experience.

CONCLUSION

In conclusion, E-learning can be effective and suitable for students in Gharyan University, particularly in subjects that do not require practical experiments or direct interaction.it may be successful and bring numerous benefits to both the teachers and the students. Among these advantages are financial savings, providing an opportunity for all students to enroll in their studies, and developing students' computer skills. However, its quality may be influenced by various factors, including the quality of content, learner engagement, limited hands-on learning opportunities, and technical issues. Moreover, challenges such as the need for self-discipline and the absence of social interaction can be experienced by students. It is important to work on improving the quality of distance education in Gharyan universities and to study and understand its potential impact on Libyan education.

Conflict of Interest

There are no financial, personal, or professional conflicts of interest to declare.

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استكشاف إمكانية تنفيذ التعلم عبر الإنترنت في كلية العلوم: دراسة حالة

آمنة رمضان الشتيوي

قسم الحاسب الالي، كلية العلوم، جامعة غريان، ليبيا

الملخص

الخلفية والأهداف. في السنوات الأخيرة، تأثرت قطاع التعليم في ليبيا بالحروب والتقلبات السياسية، مما أثر على جودة وتوفر التعليم. كانت هناك تحديات في توفير الموارد التعليمية اللازمة، وكذلك في تدريب وتأهيل المعلمين. يمكن أن يكون التعليم الإلكتروني أداة فعالة في تحسين التعليم في ظروف صعبة. يمكن للتعليم عبر الإنترنت أن يوفر فرصًا للطلاب للوصول بسهولة إلى الموارد التعليمية، ويمكن أن يسهم في تعزيز التواصل بين المعلمين والطلاب. يمكن أيضًا للتعليم الإلكتروني أن يلعب دورًا في تطوير مهارات التكنولوجيا لدى الطلاب، وهو أمر مهم في عصرنا الحديث. في عام 2019، قامت كلية العلوم في جامعة غريان بتنفيذ التعلم عبر الإنترنت جزئيًا كاستجابة لجائحة كوفيد-19، واستمر هذا البرنامج لمدة فصلين دراسيين. لذا، تهدف الورقة البحثيه إلى إبراز مزايا وتحديات التعليم الإلكتروني داخل بيئة التعليم الجامعي في ليبيا. **طرق الدراسة.** تم جمع بيانات الطلاب من كلية العلوم على مدى ستة فصول دراسية من عام 2019 إلى عام 2022 وسيتم تحليلها. **النتائج.** بشكل عام، يُلاحظ أنه في السنة الأكاديمية 2019-2020، التي تم فيها تنفيذ التعليم عن بُعد، سُجل أعلى عدد من الطلاب، بحوالي 1800 طالب، بينما في السنتين التاليتين حيث تم استخدام التعليم التقليدي، لوحظ انخفاض في عدد الطلاب. **الخاتمة.** يمكن أن يكون التعليم الإلكتروني فعالًا ومناسبًا لطلاب جامعة الغريان، خاصة في المواد التي لا تتطلب تجارب عملية أو تفاعلًا مباشرًا، على الرغم من أن جودته قد تتأثر بعدة عوامل متنوعة.

الكلمات الدالة : التعليم الالكتروني، التعليم التقليدي، جامعه غريان، جائحة كورونا، كلية العلوم