تأثير الفصول المدعمة بأنترنت الأشياء في تطوير مهارات تعلم اللغة الانجليزية كلغة أجنبية على طلاب التعليم العالي في ليبيا(دراسة تجريبية)

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الملخص باللغة العربية:

يُعدّ التعليم والتعلم عبر الإنترنت أسلوبًا تعليميًا جديدًا ومتطورًا. ويتطلب إنجازه معلمين مدربين تدريبًا جيدًا وقادرين على تقديم الدرس بطريقة مثالية. وتتطلب عملية التعليم والتعلم الافتراضي العديد من الأدوات المتطورة وتكاليف مناسبة لأنظمة تعليمية فعّالة.

يُعد إنترنت الأشياء نهجًا جديدا في بعض الدول مثل ليبيا. وتتطلب هذه الوسيلة الحديثة للتعليم والتعلم عملاً معقدا ومتسلسلا بدءًا من الطالب وحتى وزارة التعليم في ليبيا لتحقيق هدف هذا المجال (أي التعليم). ويخدم استخدام إنترنت الأشياء لهذا الغرض ويلعب هذا النمط الجديد للتعليم, العديد من الأدوارالايجابية، مثل مساعدة الطلاب ذوي الإعاقات المختلفة والاحتياجات الخاصة، والطلاب الذين يشعرون بالرهبة والخوف من التعلم وكذلك دمج الطلاب من أماكن مختلفة في توقيت موحد والطلاب الذين يشعرون بالملل والكسل، والمتعلمين ذوي الفروق الفردية. كما يساعد إنترنت الأشياء المعلمين ذوي الخبرة المحدودة في عملية التعليم والتعلم.

توفر أدوات إنترنت الأشياء بيئة مريحة للأشخاص الذين لديهم القدرة على إرسال المعلومات أو أولئك الذين يتلقونها. بالإضافة إلى ذلك، فإن نجاح العملية التعليمية مع إنترنت الأشياء مضمون، لأنه يمكن أن يخدم العديد من الأغراض داخل العملية التعليمية. كما أن الطلاب في هذا العصر متعودون على استخدام أي نوع أو تطبيق مثبت باستخدام التكنولوجيا، ويمكنهم من قبول أي معلومة مقدمة من خلال تلك التطبيقات أو أي نوع من وسائل التواصل الاجتماعي.

وأخيرًا، تتكون هذه الدراسة من خمسة أقسام. في القسم الأول؛ يوجد الجزء الخاص بالمقدمة، حيث يتم ذكر أسباب الدراسة، وبيان المشكلة، وأسئلة الدراسة، وفرضية الدراسة، وأهداف هذه الدراسة وقيمتها. يستعرض القسم الثاني الدراسات السابقة

المتعلقة بهذا الموضوع. القسم الذي يليه يحتوي على الأدوات التي تم استعمالها في الدراسة و تتضمن طرق جمع البيانات و عينات الدراسة و تحليل البيانات التي تم تجميعها, بالإضافة إلى حدود الدراسة, و يقدم القسم الرابع المناقشات ونتائج هذه الدراسة. و يلخص القسم الخامس الاستنتاجات والتوصيات لهذه الدراسة و تنتهي الدراسة باستعراض المراجع المستخدمة في هذا البحث.

الكلمات المفتاحية : المباني المدعمة بإنترنت الأشياء ،البيئة الذكية ،البيانات الذكية، الأجهزة الرقمية، مشاركة المتعلمين وتسجيل حضورهم داخل القاعات الدراسية، تجارب المعلمين ،تطبيقات إنترنت الأشياء و وسائل التواصل الاجتماعي

The Impact of IOT (Internet of Things) Based Classrooms in Developing EFL Skills on the Libyan Higher Education Sector (An Empirical Study in Libya)

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ABSTRACT

Online teaching and learning is a new and evolving educational approach. Its implementation requires well-trained teachers and professional facilitators. The virtual teaching and learning process requires many advanced tools and reasonable costs for effective educational systems.

The Internet of Things is a new approach in some countries, such as Libya. This modern means of teaching and learning requires complex and supported work across the educational chain, from the level of students to the level of the Libyan Ministry of Education, to achieve the system's goal (i.e., education).The use of the Internet of Things serves and plays many roles, such as helping students with various disabilities, anxious students, students from diverse backgrounds, bored and lazy students, and learners with individual differences. The Internet of Things also assists teachers with limited experience in the teaching and learning process. IOT tools provide a comfortable environment for those who have the ability to send or receive information. In addition to, the success of the educational process with the Internet of Things is guaranteed, as it can serve a variety of purposes within the educational process. Furthermore, students of this age are mostly fond of using any type or application installed using technology and are willing to accept any information provided through these applications or any type of social media. Finally, this study consists of five sections. In the first section; there is a an introduction part, in which the causes of the study are

mentioned, statement of the problem, the questions of the study, the hypothesis of the study, the goals of this study. In addition to, the value of the study. The second section reviews the literature and previous studies related to this study. The next section, reports the methodology, sample of the study and the instruments used for collecting and analyzing the data and also it includes the restrictions of the study. The fourth section gives discussions and results of this study. The last section summarizes the conclusion and the recommendations of this study.

Key Words: IOT Enriched Buildings, Smart Environment, Smart Data, Digital Devices, Learners Engagements and Attendances, Teachers' Experiences, IOT Apps and Social Media.

1: INTRODUCTION

1.1 Background to the Study

Digital learning is a decision made by a teacher to establish his goals by applying it on a real platform, and it is a modern step to introduce his syllabus in a developed and an interesting style. This choice became necessary nowadays, because of the continuous development of educational technology tools and means, and also because of the progress of learning process needs.

A teacher is the only one who can either deliver his lessons conventionally, i.e., by using traditional means, such as white boards and markers, using the modern ways of technology in teaching or mixing the two systems together to achieve the goals of his job.

The researcher's interest in this topic stemmed from her own practical experience and collective observations of some of her students' negative reactions to lectures delivered through traditional classroom models. These negative responses produced from the students prompted the researcher to urge students to use virtual learning alongside face-to-face learning which can help them to understand and achieve good academic performance. Smart environments also encourage the students' interactions, students' regular attendance, and the use of smart data available within smart institutions and libraries.

1.2The Statement of the Problem

The researcher observed that students in many Libyan colleges and universities have negative attitudes towards understanding some written assignments in English, low levels of motivation, and negative reactions to the lessons taught by their teachers. These negative attitudes prompted the researcher to investigate the reasons behind these students' reactions.

1.3 Research Questions

1- What difficulties do Libyan university students face in understanding and performing English writing skills through information-sharing and feedback systems?
2- Why do these Libyan students struggle to understand bar coded e-books and e-textbooks when they enter their classrooms for English language classes?
3- What type of learning environment do these students prefer for understanding English language lectures: a conventional or virtual environment?
4- What difficulties do Libyan university students face in using Telegram and YouTube channels?
5- Do all students understand and comprehend English well in digital classrooms? Or some of them? If so, what are the reasons behind their poor performance?
6- Are all teachers familiar with how to use virtual learning tools, deliver lessons, and assess students, or are not all of them capable of doing so?

1.4 Study Hypotheses

1. Based on the researcher's observations, practical experience, and direct communication with students, she proposed conducting a survey about the difficulties her students face in interacting with English language classes. Some students do not know how to use the attendance tracking devices and smart face tracking devices included in their smart classrooms.
2- Many students face difficulties in using wireless and electronic devices used to facilitate educational processes.
3- Some Libyan teachers may need practical training courses on using digital classrooms to teach their students the necessary knowledge and information in English.
4- Some Libyan universities lack policies and plans for using the Internet of Things (IOT) in teaching and learning systems.

1.5. Study Objectives

The objectives of this study are multiple. Some of the objectives relate to the teachers themselves, others to the students, and others to the policies of Libyan universities.
*Teachers must know how to deliver their lessons in digital classrooms by participating and enrolling in virtual teaching courses.
*Students do not know how to use educational technology for learning, but rather how to use it to communicate with others.
*Some Libyan universities do not realize the importance of using e-learning platforms in classrooms.

*It is important for teachers to use e-assessment, combining e-assessment with traditional assessment.

1.6. Value of the Study

Given the researcher's observation that some teachers continue to use traditional teaching methods and tools, she decided to highlight the importance of using digital learning through modern means and explain the methods used to deliver lessons through these means.

This experience has encouraged many teachers to deliver their lectures via virtual and modern means, and it has also helped students achieve the highest levels of learning motivation, resulting in them becoming effective and outstanding students in their classrooms.

This work is also an instrumental system in the teaching plans recently approved by the Ministry of Higher Education for the education system, in terms of promoting digital learning and using it as a tool to facilitate teachers' work and increase student motivation to take their lessons.

2. LITERATURE REVIEW

2.1. IOT Tools Used in Higher Education Platforms

IOT tools are devices which can work with sensors, controllers, and smart movements from human hands and fingers. Also IOT devices, are the devices which can work by answering a signal received from smart phones or any smart devices. A web-based attendance system by using NFC technology can be used in android smart phones. The students just tap the card to this NFC supported android smart phone for attendance, and it saves it on the server spontaneously. Muhammad Saeed &Ansar Munir Shah & Khalid Mahmood & Mahmood Hassan& Jahangir Khan, &Babar Nawaz,(2021).

Internet of Things tools are not limited; they are constantly evolving. A new application and device are discovered and published every day. However, the most common ones are:

1- Controlled microphones containing alarms, lights, and other sounds.
2- Answering machines required in buildings, especially classrooms.
3- Wireless locks for doors and windows.
4- Smart desks and smart school bags.
5- Touch screens, whether using fingers, hard pens, or other sensitive devices.
6- Wearable 3D glasses.
7. Sensitive cameras and data loggers.
8. Sensitive lighting and sound systems with control systems.
9. Wireless classroom temperature controllers and power systems.

10. Bar coded e-books and e-books.
11. Smart student ID cards.
12. Smart tracking devices for facial cameras.
13. Information sharing and feedback systems..

2.2.Digital Classrooms, Digital Laboratories, and Smart Libraries:

This is the first and most important part of the smart learning process, as it provides an environment conduction to stimulating learning. Smart classrooms include smart boards, wireless door locks, attendance tracking devices and cameras, and smart study tables. Smart labs include numerous smart devices, such as touchable screens, 3D glasses, microphones and cameras, and laboratory halls equipped with lighting and temperature sensors. Smart classroom management systems are also essential tools.

We also need to develop further understanding as to which platforms are more effective in supporting what kind of learning through what type of content and activities so that we can develop policies and strategies that inform the reforms reflecting the required in structural and organizational changes in HE (Higher Education),Abdullah Saykili,(2019).

The modern-day IOT-enabled library comprises sensing technologies for object connectivity. The data collected from the objects reveals previously undetectable patterns in a conventional library system. DelaliK Wasi Dake& Godwin Kudjo Bada& Abraham Ekow Dadzie, (2023).

According to the definition of smart classrooms given by Saini and Goel, (2019), as cited in DelaliK Wasi Dake& Godwin Kudjo Bada& Abraham Ekow Dadzie, (2023) as a technology-assisted closed environment that fosters classroom interaction with an intelligent physical engagement between the learner and the teacher. As an extra perfect attendance measure, modern IOT based attendance trackers use cameras installed in the classroom to detect images of learners and simultaneously match their faces against a class database El Mrabet &Ait Moussa, (2020)&Turkane et al, (2019), as cited in DelaliK wasiDake& Godwin Kudjo Bada, and Abraham Ekow Dadzie,(2023).

Classrooms are equipped with smart boards that accept digital markers, pens, and erasers, while providing a real-time interactive environment. This use of classrooms and laboratories provides a platform for communication and interaction between learners and teachers, as well as among learners within individual classrooms or digital laboratories.

The use of the students' attendance systems, whether through attendance recording systems in classrooms and laboratories, or through touch-screen tracking devices to identify students, is a critical step in achieving the goal

of the teaching and learning process. Smart classrooms are managed using all visual and audio means to ensure that students are engaged with lessons throughout the lecture.

2.3. Teachers and Instructional Designs

A well-trained teacher has an extensive experience in embedding digital data and materials on devices via the Internet of Things. The teachers are the pivotal element in a smart teaching and learning system and the only ones who are capable of encouraging their students to join the digital learning environment via the Internet of Things. IOT tools serve as educational tools for the teachers.

Smart teachers are well aware of the importance of using IOT tools depending on the type and purpose of each lecture and lesson. They can record and save students' performance and progress using sensor-enabled attendance cards. Smart student chairs can also record and interact with learners' behavior, facial expressions, and body movements during lectures.

Teachers also have the ability to use students' attendance; ID cards and all smart attendance systems used for this purpose, to distinguish between present and absent students. IOT tools also inform parents of their children's behavior through receiving the lessons, so teachers can report on the attitudes and performance of all students in the classrooms.

> "The role of the instructor in the educational landscape is changing. The past decades when the instructor was the sole information and knowledge provider is making way for an age in which information and knowledge is distributed across digital networks accessible anytime and anywhere wherever connections are possible. This means learners now have the opportunity to access information and knowledge not only at schools from the instructors or at libraries from printed books, but also from digital repositories, web sites, social media and online learning communities and networks", Abdullah Saykili,(2019).

2.4. Technology Generation:

Teachers teach students how to use Internet of Things devices within their classrooms. Students can use wireless door locks, ID tracking devices, smart lighting, and temperature monitoring through sensors and answering machines.

Smart bags equipped with sensor bases and alarms to detect lost books or any necessary documents. Most importantly, students know how to interact with their teachers through lectures and immediate assignments.

These new innovations enable learners to extend learning outside the boundaries of traditional learning institutions through informal and enriched learning experiences using online communities on new platforms such as social media and other social platforms, Abdullah Saykili,(2019).

Perfetto (2019) , as cited in Florence Martin and Doris U. Bolliger, (2022) conducted a systematic review of literature to gain insights into best practices in registered program. More and more individuals prefer to go back schooling after graduation for reasons such as professional and personal development needs since the qualities acquired at school years are not sufficient to tackle the problems faced in professional life in the 21st century, Abdullah Saykili,(2019)

2.5. Digital Curricula and Tangible Materials

The Internet of Things (IOT) has a powerful impact on the teaching and learning process, both inside and outside the classroom. This can be demonstrated in the following ways:

1. Motivating and engaging learning
2. Learner satisfaction
3. Improving knowledge. Self-efficacy.

The most challenging responsibility of instructors is to keep students motivated and curious about relevant subjects of the specific course in terms of learning. Enthusiastically smart attitudes toward students, innovative teaching approaches, and effective handling of E-Learning elements are the important attributes of the instructions to enhance students' motivation, Fernando et al, (2019), as cited in Syed Madni, Javed Ali, Hafiz Husnain, Maidul Masum, Saad Mustafa, Junaid Shuja, Mohammed Maray, and Samira Hosseini,(2022).

2.6. Electronic Assessment and Data Results

Electronic assessment is a tool used by teachers to assess the two aspects which are: the first is to evaluate students' performance and understanding of the lectures delivered by the teachers themselves. The second is to guide teachers to any weaknesses in their classroom behavior without distracting them from the teaching process.

Teachers can use e-assessment tools to accomplish the aforementioned task, and learners can use them through the self-assessment process before submitting their work to their teachers for evaluation. Teachers, in turn, can collect all students' works completed via virtual assessments and begin correcting errors and addressing their weaknesses.

2.7.Challenges and Difficulties of Using the Internet of Things in Universities and Institutions

2.7.1. Limited Teachers' Experiences

Taking attendance in the class is a time-consuming job that can manage with IOT technology. RFID tags card is attached to the student ID cards. A Classroom Roll Caller System (SCRCS) is set up in every classroom to easily read students' identity cards. This record is available online for the academic office as well, Muhammad Saeed& Ansar Munir Shah & Khalid Mahmood& Mahmood Hassan & Jahangir Khan, & Babar Nawaz,(2021). Curriculum assessment and evaluation in an IOT-based environment enables remote tracking of failed instructor policies, with recommendations automatically channeled to appropriate authorities.

2.7.2. Financial Challenges

The overall cost of IT technologies is increasing every year because of content and application stacks increase. Most of the institutions have no strategies for sharing the cost of overall IOT infrastructure. They have budget constraints as well. Therefore, the higher education sector must emerge with new finance, IT infrastructure, and services .Muhammad Saeed& Ansar Munir Shah & Khalid Mahmood& Mahmood Hassan& Jahangir Khan, &Babar Nawaz,(2021).

2.7.3. Internet Connection Strength and Speed

According to Samuel &Sipes, (2019), as cited in DelaliK wasi Dake& Godwin Kudjo Bada& Abraham Ekow Dadzie, (2023), 24% of users find connectivity issues the utmost challenge in global IOT deployment. With IOT implementation in education, it is a requirement for various institutions to have a robust communication network to gather data in harsh conditions and transfer it back for analysis at the data center. However, the signal quality collected by sensors to transmit over to the networks greatly depends on the routers, Samuel &Sipes, (2019), as cited in DelaliK wasi Dake& Godwin Kudjo Bada& Abraham Ekow Dadzie,(2023).

2.7.4. Policies of Administrations and Decision Makers

Therefore, administrators and policy makers involved in the HEIs need to increase their understanding into how learning technologies shape learning in the 21st century and how these technologies impact on the interactions between learners, instructors and learning resources. Abdullah Saykili, (2019).

2.7.5. Electricity, Privacy and Security of Data Challenges

Electricity is a big challenge in Libya, especially in using IOT devices which need full batteries all the time of using those devices and direct electrical connections. In an educational environment where real-time analytics is vital for successful learning outcomes and learner security, IOT

sensors going off due to low battery and power fluctuations is a major challenge, DelaliK wasi, Winneba, Godwin, Winnebaand Abraham Ekow Dadzie,(2023).All teaching and learning devices, machines and tools need a continuous found electricity.

Although some work is done in IOT infrastructure and its security still, no strategy is defined to identify business risks related to data breaches, Muhammad Saeed & Ansar Munir Shah & Khalid Mahmood& Mahmood Hassan& Jahangir Khan, &Babar Nawaz,(2021).This structured and unstructured data is generated from diverse aspects of the educational ecosystem, with complexity usually analyzed with machine learning algorithms, Athmaja et al.,(2018), as cited in- DelaliK wasi, Winneba, Godwin, Winnebaand Abraham Ekow Dadzie,(2023).

3. Methodology of the Study

This study examines the difficulties, some Libyan university teachers and students may face in teaching and learning English language skills in digital classrooms and receiving necessary information online. Some teachers face significant difficulties in using good virtual learning platforms to perform their duties effectively. This study is an experimental, an instrumental and a qualitative, focusing on the modern tools needed for this educational level and the challenges faced by teachers and students in the Libyan education system.

3.1. Sample of the Study

The study sample consists of a number of university students enrolled in English language departments at Libyan universities, aged between 20 and 24 years. The sample is a mixture of male and female students regarding to the gender and was randomly collected from several colleges and institutions within Libya.

The students' native language is Arabic. The number of the students is 250 male and female students. These students have been studying English for many years and were able to provide comprehensive answers and positive feedback to the researcher's observation and questions during the study.

The researcher selected this group of students because she is a lecturer specializing in English language and has an extensive experience in this field. She followed up on these students at various Libyan colleges. The students' professors were also briefed on direct interviews to verify the data and results obtained through this task. 15 teachers and instructors joined this interview.

3.2. Tools of This Work

3.2.1. Data Collection Tools

As O'Melly and Chatmont, (1990) reported that making use of different types of data collection methods may lead to different results since every assessment method has its own advantages. Data was collected on the students' attitudes towards the difficulties they face through their reactions to several lectures delivered by the researcher herself using Google Meet App, YouTube TV and Instagram Channels through doing her work normally and her teaching experience. The data has been collected through a questionnaire given to the students, and the aims of choosing this method is to examine the following information:

1-The students' comprehension of the importance of learning English via IOT.

2- Learning process supported with the virtual environment.

3- The learners' attitudes towards using digital syllabus instead of the traditional ones

4- The influence of using digital materials on increasing the learning motivation and the desire to learn.

Here, the researcher gave the students many choices of answers to her questions, either to choose: agree, disagree, strongly agree or strongly disagree to distinguish the reactions levels of the students to the researcher's questions.

Data results collected from learners for the study, as well as teachers' problems in using instructional designs through interviews. In addition, the researcher's observations of both students and teachers were taken into account.

***The following questions are included in the oral interview delivered with the teachers:**

1- What do you know about IOT tools which are used in higher education platforms?

2- What are the important roles of using digital classrooms and digital laboratories?

3- Do you have any ideas about designing lessons, exercises and examinations questions online and digitally? If yes, did you receive any training courses in this field previously?

4 – In which way your students prefer to learn your lessons, traditionally or digitally or in a mixture of both?

5- Are you interested in teaching your lectures via e-books or the papered books?

6- Which way you as a teacher prefer to use in assessing your students online assessment, self assessment by using checklists or the traditional assessment by using a paper and a pen?
7- What are the challenges you face as a teacher in using IOT tools through the teaching process? Specially, in Internet connection speed, strength and costs?

3.2.2. Data Analysis

The data were analyzed using tables, pie charts, and graphs to represent the results obtained from the students' reactions and responses, while the teachers' interviews analyzed by using the Statistical Package of Social Sciences (SPSS) Software to analyze the percentages for the final results were discussed in details.

3.2.3.Limitations of the Study

This study is limited to the reactions of the university students who learn English as a foreign language towards using IOT as means controlled by the teachers in delivering their lectures and also it is limited to the teachers' personal backgrounds towards using IOT in the teaching process.

3.2.4. Validity and Reliability of the Data Collection Tools

The questions included in the questionnaire given to the teachers and the attitudes of the students who are enrolled in this work towards the use of Internet of Things were recognized by many experts in this field.

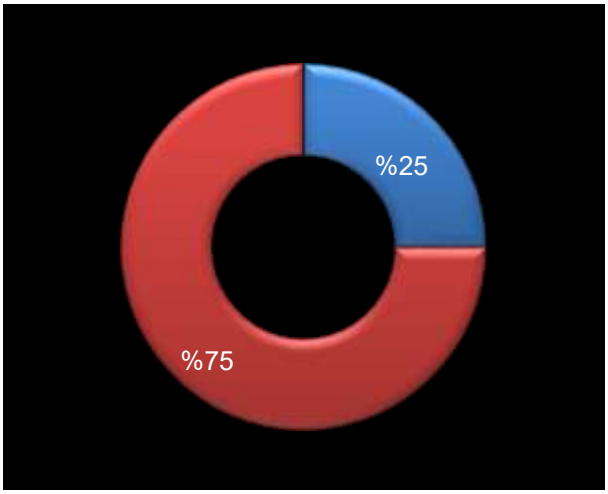
4. RESULTS AND DISCUSSIONS

4.1. Students' Data Analysis

***Statistical Description of the Questionnaire**

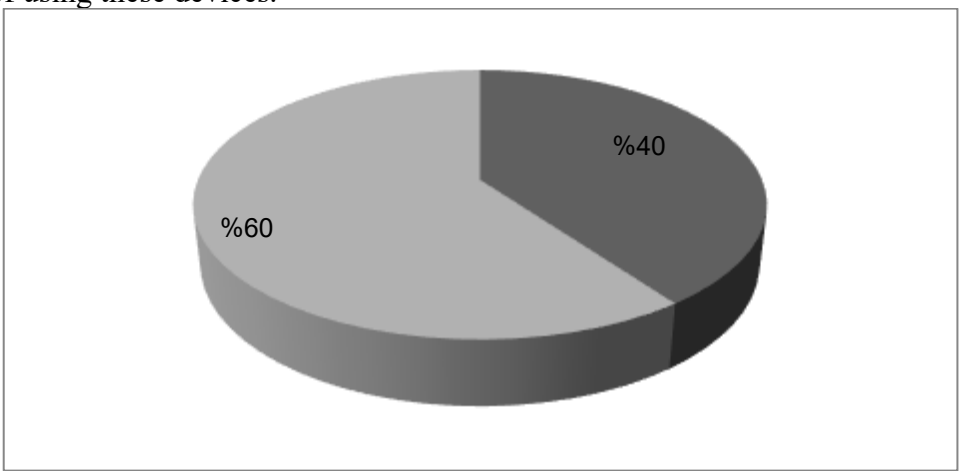
4.1.1. Figure 1: Background to IOT Use

At the beginning of this study, the researcher assumed that a large number of Libyan university students do not realize the importance of learning language skills. English language skills via the Internet of Things (IOT) are evident from the percentages included in this study. As shown in the figure summarizing the number of students who can use the IOT, it is very small, representing 25% of the sample (in the blue color).While the red color of the sample represents 75%, which is a mixture of students who cannot use the Internet of Things and those who do not realize the benefits of the Internet of Things in learning English at the university level.



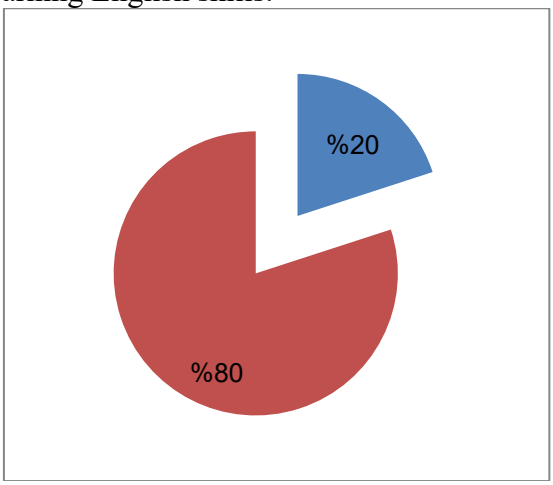
4.1.2.Figure.2: Educational Process Enriched with Virtual Environment

Here is the figure which refers to the tools of IOT as a means of learning English inside digital classes and smart labs, the percentages of students who are able to deal with tools and equipment included in virtual environments, such as Wireless doors and windows locks, smart chairs and smart studying bags, touchable screens either by fingers, solid pens or any other sensitive devices, wearable 3D glasses and online evaluation or online examinations. This graph reports the number of students who are able to use the smart devices to gain the suitable knowledge given by teachers via IOT devices. It represents 40% of the students with dark grey who know how to deal with smart devices and 60% with light grey who do not have any idea of using these devices.



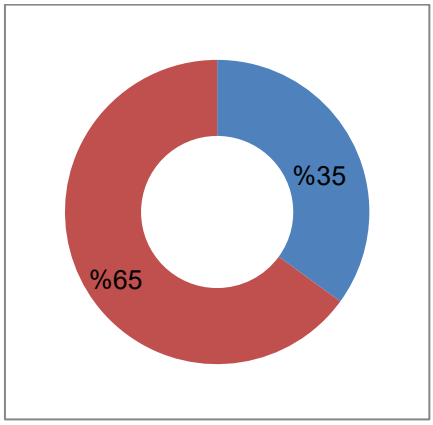
4.1.3.Figure.3: Digital Curriculum and Touchable Materials

The biggest number of learners who feel anxious and not interested in using digital materials can be found in this side. The following graph shows 20% of the learners who can deal with smart touchable studying materials. While 80% who cannot do that, and this refers to that, there is no enough knowledge of the role of theses digital curriculum in arising the learning enthusiasm of learning English skills.



4.1.4.Figure.4: Impact of IOT on the Level of Motivation and Satisfaction of Higher Education Platform

Here is, the impact of IOT has been examined in learning satisfaction and motivation, knowing if the idea of using IOT increase the levels of learning motivation and respond to the learners' needs.35% of the students believe that the effect of IOT in acquiring English language is strong and can activate the teaching and learning process, and 65% of the students their opinions are clear from their answers that they do not have any idea of the IOT influence on teaching and learning process.



4.2. Analysis of the Data Related to Teachers' Interviews

The following table summarizes the results obtained from the interview done between the researcher and some teachers. Teachers are interviewed by the researcher about their use of IOT during their teaching process. And also during their delivering their lectures to their learners. They answered the researcher's questions and reported that: there are many challenges faced them during their teaching periods and these challenges sometimes prevent them to continue using IOT and delivering their lessons. These challenges such as the expensive costs of Internet devices, Lack and poor experience of some teachers in mixing their lectures with IOT devices, electricity problems and sometimes the internet connections are not speed enough to achieve the teachers' goals in delivering the lessons and information neither in helping them to assess their learners virtually through online exams.

***Statistical Description of the Interview**

- 85% of the teachers lack the knowledge and experience in delivering their lessons via IOT. While 15% of them reported that they can use IOT through delivering their lessons to the learners.
- 40% of teachers suffer from the Internet speed, while 60% of them don't have any problems regarding the Internet speed.
- 08% of the teachers are able to design their syllabus via IOT, but 92% don't have any ideas about this task.
- 70% of the teachers consider that using IOT inside classrooms needs high costs, and 30% think that the costs of using IOT inside classrooms are good costs.

4.2.1.Table.1: Teachers' Answers to the Questions Included in the Oral Interview.

1. Teachers' Lack and Experience in using IOT Digital Classrooms	2.Financial Costs	3.Internet Speed and Strength	4.Teachers Knowledge in Instructional Design
85% Lack Knowledge in using IOT Digital Classrooms	70% High Costs	40% suffer from weak Internet signal	08% can design virtual lectures and evaluation
15% don't need Knowledge in using IOT Digital Classrooms	30% Good Costs	60% don't suffer from Internet Speed	92% cannot design virtual lectures and evaluation

5. Conclusion and Recommendations

This study reviews the points of agreement and disagreement among researchers and adds a distinctive touch to the educational process in Libya. It consists of the tools designed for this work, including data collection tools and data analysis tools as well.

As the researcher noted and hypothesized at the beginning of this study, most teachers, and even many students, are unaware of the use of the Internet of Things as a teaching or learning tool. Both of them require training and courses in using digital classrooms supported by IOT tools, namely:

Sensitive cameras and data loggers, sensitive lights and sounds with control systems, wireless classroom temperature controllers and power systems, e-books with barcodes and e-books, smart student ID cards, smart tracking devices for face cameras, controlled microphones with alarms, lights and other sounds, answering machines are essential in buildings, especially in classrooms, wireless door and window locks, smart chairs and smart school bags, touch screens either with fingers, hard pens or other sensitive devices, Wearable 3D glasses, information sharing and feedback systems. Therefore, the researcher proposed several recommendations that would develop and

assist both students and teachers in achieving the goals of the teaching and learning process within universities and educational institutions.

1. The researcher recommends that the Libyan education system should focus specifically on integrating the Internet of Things (IOT) into the educational process to keep pace with the ongoing development of the educational system within schools, institutions, and universities.
2. The Ministry of Higher Education has the greatest role in developing this system in Libya, and it must, in turn, make decisions that consider the Internet of Things as a basic knowledge that lecturers must possess and train on.
3. IT (Information Technology) departments and entities bear the primary responsibility for providing affordable prices and reliable internet signals to help teachers prepare and deliver their lessons optimally.
4. Libyan universities should also develop specific policies regarding the use of the Internet of Things, to encourage and train teachers to integrate their classrooms with digital devices and internet connections.
5. Teachers and students can also join courses and training sessions to gain sufficient knowledge in handling digital equipment inside and outside classrooms and also studying halls.
6. The need to pay attention to some policies and specificities in primary, preparatory, secondary, and postgraduate schools, from the government side for highlighting the importance of electricity, data security and privacy in using the latest technological means in teaching and learning systems within Libya.

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