

The extent of integrating information technology into accounting education in Libya

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● Received:18/03/2025.

● Accepted: 07/05/2025.

■ Abstract:

The purpose of this study was to investigate the extent to which academic educators use technology applications in accounting education and to find out the possible challenges that might affect accounting educators from integrating technology in accounting education. The study also investigated the extent to which accounting students perceive the importance of technology applications in accounting education.

Data were collected via questionnaires of (78) academic educators and (144) accounting students. The results indicated that the extent to which academic educators use technology in accounting education was low while the importance of integrating technology in accounting education as perceived by accounting students was high. Overall, the results of the study indicated that the extent to which academic educators use technology in accounting education was lower than the level of the importance of integrating technology integration in accounting education as perceived by accounting students. The results of the study also found some possible challenges which could affect the integration of technology in accounting education. On the whole, the results of this study offer a baseline representation of the current state of technology integration in the tertiary accounting education. Moreover, these results should trigger future researchers to investigate other variables in the light of technology integration in accounting education.

● **Key words:** Information Technology (IT), Accounting Education, Accounting Students, Academic Educators, IT applications.

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■ المستخلص:

هدفت هذه الدراسة إلى التحقق من مدى استخدام الأساتذة الأكاديميين لتطبيقات التكنولوجيا في تدريس المحاسبة، وتحديد التحديات المحتملة التي قد تؤثر على الأساتذة من دمج التكنولوجيا في تعليم المحاسبة. كما بحثت الدراسة في مدى إدراك طلاب المحاسبة لأهمية تطبيقات التكنولوجيا في تدريس المحاسبة. جُمعت البيانات من خلال استبيانات شملت (78) أستاذًا أكاديميًا و (144) طالبًا في المحاسبة. أشارت النتائج إلى أن مدى استخدام الأساتذة الأكاديميين للتكنولوجيا في تدريس المحاسبة كان منخفضًا، بينما كانت أهمية دمج التكنولوجيا في تدريس المحاسبة من وجهة نظر طلاب المحاسبة عالية. وبشكل عام، أشارت نتائج الدراسة إلى أن مدى استخدام الأساتذة الأكاديميين للتكنولوجيا في تدريس المحاسبة كان أقل من مستوى أهمية دمج التكنولوجيا في تعليم المحاسبة من وجهة نظر طلاب المحاسبة. كما كشفت نتائج الدراسة عن بعض التحديات المحتملة التي قد تؤثر على دمج التكنولوجيا في تدريس المحاسبة. وبالتالي، تقدم نتائج هذه الدراسة تمثيلًا أساسيًا للحالة الراهنة فيما يخص دمج التكنولوجيا في التعليم العالي. علاوةً على ذلك، ينبغي أن تُحفّز هذه النتائج الباحثين في المستقبل على دراسة متغيرات أخرى في ضوء دمج التكنولوجيا في تدريس المحاسبة.

● الكلمات المفتاحية: تكنولوجيا المعلومات، التعليم المحاسبي، طلاب المحاسبة، الاساتذة الأكاديميون، تطبيقات تكنولوجيا المعلومات.

1. Introduction:

The quality of any educational system depends greatly on its curriculum, along with other factors such as teacher's competence and the educational environment Kerimbayev et al., (2020). In every contemporary educational setting, there is some degree of integration between the classroom curriculum and technology as it enables students to access a wide variety of resources to facilitate the process of learning. However, accounting education systems in most countries put more emphasis on theoretical accounting topics and a deficiency in accounting application (Wyness and Dalton, 2018). The term IT technology in accounting education involves a wide range of applications such as computer hardware and software, electronic media, audio, and video equipment, and other data transmission equipment used to deliver knowledge to students in and out of the formal classroom setting. However, the Libyan higher education system has witnessed many challenges which could be attributed to the language and cultural background of both teachers and students, their attitudes towards learning, the lack of technological infrastructure, the lack of experience in educational development, and the lack of educational equipment for management to support the new learning process (Hamdy,

2007). Moreover, university accounting curricula in less developed countries such as Libya still lag behind. Braun & Jones, (2013) indicated that most Libyan universities, such as Tripoli University, have the basic IT infrastructure (such as computers, internet access, and a local area network). They still use traditional teaching methods and learning styles that are only available for the students while on campus (ibid). This in turn, has raised some concerns about whether educational institutions, such as Libyan universities, would adopt or integrate the technology into their accounting education. Despite the importance of technology to students, teachers, and classrooms, some educational systems have yet to adopt and integrate technology into their classrooms. Therefore, up to the researcher's knowledge, integrating technology into accounting education still seems rare or almost non-existent, even after the Libyan revolution. In this regard, the researcher warns about the future of accounting education that has largely gone unheeded as accounting education in Libya is still offered in the same way today as it was 30 years ago. The argument is that instead of encouraging the adoption of technology in accounting education in order to stay current since the researcher's message is now more urgent than ever. This great concern has motivated the researcher as an academic educator to investigate the extent of integrating the practical side of technology applications in accounting education. Consequently, this quantitative study will provide a reasonable understanding of the research problem and construct questionnaires.

Problem Statement.11 .

In spite of the growing worldwide emphasis on integrating technology into accounting education to enhance student engagement and professional readiness, accounting educators in Libya seem to rarely include technology applications in their teaching practices. The findings from this study will hopefully reveal a significant gap between the perceived importance of technology by accounting students and the actual usage levels by academic educators. Now, accounting students are digital natives who consider most technology tools, such as accounting labs and data analysis software, to be an integral part of their daily lives, academic educators tend to use only basic communication tools like emails, with minimal integration of more advanced educational technologies. Furthermore, academic educators seem

to encounter systemic challenges, including inadequate infrastructure, lack of institutional support, limited technical training, and outdated curricula that neglect the practical side of technology-driven learning.

Therefore, this mismatch between perceived importance and actual implementation of technology in education, coupled with persistent institutional and pedagogical challenges, suggests that the current state of accounting education in Libya is insufficiently consistent with the evolving demands of the accounting profession in the digital era of today. If this matter left unaddressed, these graduates who are ill-prepared for the new world of modern technology will encounter barriers in accounting environments to rely on technological proficiency.

2.1 Research aims & objectives.

This study aims to investigate the extent of use, perceived importance, and challenges associated with the integration of technology applications in accounting education among academic educators and accounting students in Libya, with the aim of identifying the gaps and making recommendation improvements for effective technology adoption in accounting education.

3.1 Significance of the Study.

This study is important as it addresses a significant gap in the integration of technology in accounting education in Libya for preparing accounting students to meet the demands of a digitally driven profession after graduation. By investigating the existing use of technology by academic educators, accounting students' perceptions of the importance, and the challenges hindering the effective integration of technology in accounting education, the study offers several key contributions:

The findings of this study will hopefully provide more insights into the limited adoption of educational technologies among accounting educators and emphasize specific tools that are underutilized in spite of their perceived importance. Moreover, understanding accounting students' perceptions of technological importance can help design and develop educational approaches that match with their expectations and needs. This alignment is necessary for improving student engagement and learning outcomes in accounting programs.

2. Literature Review:

1.2 The Importance of Technology in Accounting Education.

In the 21st century, a lot of information is now available through technology than anyone could ever hope to find. The use of technologies in education provides more creative learning paths, creating more effective methods that aim to enhance access to teaching quality (D'Aquila, Wang & Mattia, 2019). The benefits of integrating IT technological applications into education are of a great value and graduate students are expected to join workplaces that are highly equipped with new IT technologies that require them to have digital literacy skills from their academic educators (Watty, Mckay & Ngo, 2016). In spite of these views that accounting students need to acquire IT skills and technologies at their workplace, most universities tend to focus on accounting education from a theoretical perspective leaving its practical side aside. Worryingly enough, Yu et al. (2013) warned that accounting students are not prepared well to use databases or IT technology skills, nor are they good at problem-solving. He adds, as the world is about to introduce and witness the demands of 4IR, it will be more and more problematic to teach students accounting irrespective of the usage of its detailed computer software and its other forms. Brown, B, G, and W, (2016) stated that over the past few years, there has been a significant change to employ IT in accounting education. The main purpose for this shift is that universities are willing to produce graduate students who can deal with the emerging technologies (Broekman, E, and P, 2002). In this regard, Sabo, R. (2021) pointed out that teachers who have integrated IT technologies in their classes and are aware of the importance technology can help students successfully meet the new realms of knowledge. In similar vein, a study by João, H, and R, (2021) aimed to investigate how students and teachers use communication technologies revealed that technologies and electronic mail are the most adopted communication technologies employed by students and teachers. Hernandez (2020) stated that integrating IT technology into accounting education plays an important role in the success of any modern business institution. Information communication technology has been seen as an instrumental aspect of an effective and efficient accounting system to enhance

the organizational performance. Information communication technology has been used to increase organizational performance and the reliability of accounting information (Ganyam and Ivungu, 2019). Accounting information systems consist of various forms of computer software and hardware which assist in recording accounting information (Knapp, 2019). Since, the majority of businesses now replaced their traditional old methods of accounting with more advanced computerized accounting systems (Phyu and Vongurai, 2020). Studies have also indicated that while interactive whiteboards (IWBs) are more student centered than traditional methods Painter, Whiting & Wolters (2015), in many universities, the number of IWBs is exceedingly low. In a study by Liversidge, G. (2010) in Japan found that most lecturers or teachers, even non-Japanese, have never seen or used one. Another study in Australia by Rai et al. (2010) to identify the importance of some IT skills indicated that spreadsheets, accounting applications, and security management as the most important IT technologies wanted for practicing accountants. Several other studies such as those by Wakefield, T, D, and F (2017) sought to identify any improvements in the performance of accounting students who have made use of digital videos as an important aid to their studies. Undoubtedly, with the rise of digital assets, accounting students will need to understand their accounting and tax implications (Garanina, R, & Dumay, 2022). For instance, a recent study by Anderson et al. (2020), Thottoli (2020) and Lee et al. (2018) discovered that the use of Excel in areas of accounting such as audit, tax, advisory and corporate is considered as important by majority of small organizations. Other recent studies by Do et al., (2020); Blankley et al., (2019) found accounting ERP software, Adobe Acrobat, PowerPoint and the Financial Accounting Standards Board (FASB) Codification were identified as the most employed across various accounting areas and practical knowledge levels. More studies have aimed at identifying IT skills for auditors. One of the studies in this field was carried out by Greenstein and McKee (2004). They identified 36 IT skills, found that auditors indicated the highest knowledge levels in general office and accounting categories. Nonetheless, they asserted that more IT training programs for auditors should be encouraged. A recent study by Morris, B, S, and A (2015) found that students who used IT tools (i.e., an online-based instruction platform)

performed better overall in their accounting courses than students who did not, while Tan and Ferreira (2012) found that the use of accounting software did significantly improve the depth of students' understanding of activity-based costing. Lusher, H, and V (2012) did study to compare student performance in accounting principles courses taught in a "smart" classroom setting to that in a fully computerized setting. The findings revealed that students in the computerized setting performed better on homework and tests, but not on in-class assignments or group projects. Chen, J, and M (2013) conducted a study to examine the effect of course level on the effectiveness of online accounting education as compared to traditional in class delivery. The findings indicated that students in advanced-level courses performed better in a traditional setting, whereas the delivery mode (traditional vs. online) was not essential to introductory level students. Phillips and Johnson (2011) investigated the effects of online homework systems (OHS) on student learning as compared to intelligent tutoring systems (ITS) in the introductory financial accounting course. The results of their study revealed that while both systems provided benefits students obtained more knowledge when employing an ITS than when employing an OHS. Litherland, Cl, and M-Garcia (2013) reported on a pilot test of an e-assessment system (OeLe) was aimed to grade and provide feedback on free-text responses to conceptual accounting questions. The system was used to assess student responses on a test in the undergraduate financial accounting course. The report indicated that use of the e-assessment system was found to provide a more focused overall marking process (than manual marking alone) and upon further development has potential for use in accounting applications.

2.2 Challenges Affecting the Integration of Technology Applications in Accounting Education.

The adoption of IT technology in accounting education varies across institutions and developed and less developed countries. There have been many factors influencing the current state of technology adoption as some educational institutions are more prepared and equipped to embrace IT technology others may lag behind due to resource shortage, policy constraints or bureaucratic hurdles. Moreover, government policies about the integration of

IT technology in accounting education could significantly improve accounting programs resulting in successful accounting graduates. The attitudes of business employers and preferences of students can have a strong impact on technology adoption in accounting education. One possible challenge that might affect the integration of IT technology in accounting education is budget, which may affect a university's capacity to invest in technology infrastructure and resources. As Albring & Elder, (2020) argued that meeting accreditation standards while integrating technology is a complex challenge that many organizations should navigate Among many possible barriers to technology integration is the inadequate support to use both computer assisted hardware and software. These technology-computer assisted programs require a significant financial investment which developing countries may not be able to afford. Mutula (2010) states that due to rapid technological change and learning environments, many universities are not ready to prepare students with the necessary IT skills that will ultimately meet their needs for the market workplace. Online platforms can facilitate global interaction among students and educators, broadening their perspectives (Ali, (2020); Karakose, (2021). Thus, when IT technology is incorporated in education, the value of the lesson becomes priceless, which results in more collaborative interactions between teacher-students and student-materials in an integrated approach. (Miller, G & A 2023). Furthermore, levy, (2022) argues that students' motivation to learn is triggered when technology is incorporated into education resulting in an increase in their academic performance. A more recent study by Ibrahim et al. (2020) on small businesses found that while implementing small business accounting software, they faced many barriers, including non- user-friendly and non-availability of software vendors' support and guidance. Moreover, educators could face many possible challenges preventing them from using technology in many ways. These challenges include a lack of teaching time has always been regarded as hampering the introduction of technology as part of daily lesson plans (L. Harasim, 2010). insufficient use of resources and materials (S. Hennessy, D. Harrison, & L. Wamakote, 2010); lack of funds (B.E. Uwameiye, 2014), lack of leadership (Smerdon et al., 2000); and inadequate training and technical support (Lam, 2000; Smerdon et al., 2000). Other factors that may influence technology use are teachers' attitudes toward

technology, teachers' expertise and teaching experience (Lam, 2000). As a result of this, there still remains big questions which the researcher needs to answer: What prevents us, as academic educators, from not integrating technology into our classrooms: is it because IT technological resources are not existing in our academic educational universities, or is it that we lack the appropriate knowledge, skills and expertise? Therefore, the current study extends these research lines by addressing the following three research questions:

- (1). To what extent do academic educators use technology applications in accounting education?
- (2). To what extent do accounting students perceive the importance of technology application in accounting education?
- (3) What challenges might affect the integration of technology in accounting education?

3. Methodology:

3.1. Collection of Data.

For the purpose of the study, a questionnaire was found to be the most appropriate tool for data collection. The data required for this study were collected through a questionnaire distributed to academic educators and accounting students. The first section of the questionnaire contained questions designed to elicit some demographic information about the academic educators for classification purposes. The second section of the questionnaire included a brief definition of 20 technologies used for accounting education. Both groups of participants were asked to indicate the level of use and the level of importance by choosing one of five possible responses.

3.2. Sampling.

The sampling frame contained (78) academic educators at the faculty of economics of Tripoli university who were expected to make use of technology in their accounting education. The sample also included (144) accounting students in their final semester at the same faculty. The questionnaires were sent to both groups of participants to complete and the data were collected.

The respondents were affirmed that their individual responses would be kept confidential. The questions, in part, were based on the findings and recommendations of the AECC (1990) and Albrecht and Sack (2000) reports, with the specific intent of developing an instrument to evaluate the state of accounting education regarding to technologies integrated into accounting courses.

3.3. Reliability and Validity of the Questionnaire.

To ensure validity and reliability of the questions, the instrument was pre-tested by using a small group of accounting educators and few accounting students at the accounting faculty. As a result of this pre-testing procedure, several questions were added and modified prior to the day of distribution. The pilot tests results led to several changes to the survey's layout, instructions, and questions to improve clarity and to improve the flow of the questions. Reliability Analysis test conducted as follows:

Table (1) Reliability Analysis

Questions	Cronbach's alpha
Q1. The extent to which technology integrated in accounting education.	0.8204
Q2. The importance of technology integration in accounting education.	0.8803
Q3. The challenges might affect the integration of technology into accounting education.	0.8509
Total	0.8505

Table (1) shows the range of Cronbach's alpha which was between 0.8204 and 0.8805, with an overall value of 0.8505. These values indicate very good results since they confirm a strong correlation between the questions.

3.4. Data analysis.

The questionnaire instrument began by eliciting some information from academic educators by asking them to identify the primary course (teaching area) they taught and the number of the teaching experience they had. Next, in the first questionnaire as shown in table (4), academic educators were asked to rate their self-reported use of technology applications in accounting education. Respondents were asked to indicate how often they use each specific type of IT technology in

accounting classes on a 5-point Likert scale (**1 = never to 5 = always**).

Similarly, in the second questionnaire as shown in table (5) accounting students were asked to rate their perceived importance of technology applications in accounting education for each of the 20 specified items on a 5-point Likert scale (**1= unimportant to 5= extremely important**). Respondents were asked to indicate how important each specific type of IT technology is in accounting classes.

In the third questionnaire as shown in table (6), academic educators were asked to rate their opinions about the challenges that hinder them from the integration of technology technology applications in accounting education for each of the 17 specified items on a 5-point Likert scale (**1= Strongly Disagree to 5= Strongly Agree**). Therefore, only the highest and lowest values of means with standard deviations would be considered in the discussion of this study. The data were analyzed using statistical software (SPSS) for carrying out data analysis in order to determine the mean values and standard deviations of the findings in this study.

The data obtained from the questionnaires will be calculated using the Statistical Package for Social Sciences (SPSS). Descriptive statistical analyses will also be employed to interpret the data. The background information of the participants will be computed into means and frequency and displayed in tables. The data of the study will also be collected by questionnaires and will be analyzed statistically. Therefore, the interpretation of the five-point scale in the questionnaire will be as follow:

Tables (2): shows the weighted averages of means, standard deviations, ranks and levels according to the five-point Likert scale:

Points	1	2	3	4	5
Weighted average of the five points Likert scale	1 – 1.79	1.80-2.59	2.60-3.39	3.40-4.19	4.20-5
Level of IT technology use. (Q1)	Never	Rarely	Sometimes	Very often	Always
Level of IT technology importance. (Q2)	Not important	Of little importance	Moderately important	Important	Extremely important
Level of agreement on IT technology usage. (Q3)	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

To calculate the mean and standard deviation for each question, the following formulas were used in order to find out the mean and standard deviation for each question based on the given frequencies:

-Mean: $(\sum fx) / \sum f$

-Standard Deviation: $\sqrt{[(\sum f(x - \mu)^2) / \sum f]}$

Where:

-f = frequency

-x = value (1-5)

- μ = mean

Therefore, the highest percentages and numbers of the participants would be considered to represent their positive agreement about integrating information technology into accounting education.

4. Results:

4.1. Demographic information of academic educators.

Table (3): shows that the findings obtained regarding the demographic information of the academic educators resulted in a total of 78 useable responses. The majority of the academic educators indicated that their primary teaching area is financial accounting (44%), (26%) pointed out that they teach auditing, (11%) teach tax accounting, (9%) teach cost/managerial accounting, and (10%) teach accounting information systems. The data also indicated that the majority of the respondents (42%) indicated they had long teaching experience of more than 20 years in accounting education. Analysis of the results by teaching area shows that applications of computer technology are fairly widespread and not limited to financial accounting courses or auditing courses. However, it was observed from the table that academic educators included were found to teach different accounting areas.

Table (3): Shows the demographic characteristics of academic educators.

Variable	Teaching area	Number	percentage
Teaching area	Financial accounting	35	44%
	Auditing	21	26%
	Tax accounting	9	11%
	Cost/managerial accounting	6	9%
	Accounting information systems	7	10%
Total		78	100%
Working experience	1 to less than 5 years	10	12%
	5 to less than 10 years	16	20%
	10 to less than 20 years	19	24%
	20 years and more	33	42%
Total		78	100%

For the discussion of the study questions, the mean values with standard deviations were calculated for the responses of the study sample and the five-point Likert scale on the questionnaire was used as in table (2).

4.2. Demographic information of accounting students.

Table(4): below shows that the findings obtained regarding the demographic information of the accounting students resulted in a total of 144 useable responses where the majority of students (72%) are between 21–23 years old, indicating that most are in the typical age range for final-year undergraduate accounting students. A smaller percentage (11%) are 24 or older, indicating students who started late, transferred, or returned to education. However, no single student is under 18, which aligns with the fact that all participants are in their fourth academic year. As for the gender, there is a higher representation of male students (60%) compared to female students (40%). Further to that,

all students are in their fourth (final) year who are on the point of graduation. Also, none of the participants have studied accounting at the high school level, which suggests a zero foundational background in their subject. Finally, A majority (68%) of students indicated their level as beginners in English, and none was found as fluent.

Table (4): shows demographic information of accounting students.

Variable	Category	Number	Percentage
Age	Under 18	0	0%
	18–20	22	16%
	21–23	105	72%
	24 or above	17	11%
Gender	Male	86	60%
	Female	58	40%
Current academic year	First year	0	0%
	Second year	0	0%
	Third year	0	0%
	Fourth year	144	100%
Studied accounting in high school?	No	144	0%
	Yes	0	100%
English proficiency	Beginner	98	68%
	Intermediate	31	21%
	Advanced	15	11%
	Fluent	0	0%

Question one: The extent to which academic educators use technology in accounting education.

Academic educators were asked to rate the extent level to which they use technology in accounting education and their responses were as follows in table (5).

Table (5): shows the use of technology applications in accounting education.

How often do you use the following technology applications in accounting education?		Means	SD	Level	Rank
1	Emails: communications with students as well as the use of watsap, telegram.	3.077	0.694	Sometimes	1
2	Non-class activities: e.g, use of online tutorials in accounting principles courses, online homework & assignments, e-assessment system.	2.179	0.747	Rarely	9
3	Distance education services, e.g. the off-campus blackboard system.	2.231	0.831	Rarely	8
4	Spread sheet software (excel) assigned to students.	1.897	0.545	Rarely	12
5	Word processing software (word) assigned to students.	1.897	0.590	Rarely	12
6	Presentation software (power point) assigned to students.	1.744	0.492	Never	15
7	Database software (access, SQL) assigned to students.	1.769	0.697	Never	14
8	Auditing software assigned to students.	1.615	0.702	Never	17
9	Accounting software assigned to students.	1.513	0.500	Never	18
10	Tax software (turbo tax, intuit tax) assigned to students.	1.436	0.496	Never	19
11	Flow charting software assigned to students.	2.538	0.711	Rarely	3

How often do you use the following technology applications in accounting education?		Means	SD	Level	Rank
12	Simulation software assigned to students.	2.128	0.686	Rarely	10
13	Program management software assigned to students.	2.462	0.499	Rarely	5
14	Smart board (interactive white board).	1.231	0.421	Never	20
15	A document camera while lecturing to present course materials.	1.692	0.756	Never	16
16	Multimedia for in-class presentations.	2.026	0.832	Rarely	11
17	Electronic lists for discussions with students	2.359	0.698	Rarely	6
18	Course specific computer tele-conference bulletins.	2.718	0.783	Sometimes	2
19	Accounting lab.	2.538	1.058	Rarely	3
20	Data analysis software such as statistics for SPSS, LINPRO, SAS assigned to students.	2.333	0.887	Rarely	7
Total		2.069	0.681	Rarely	

Table (5): shows that the participants were asked to rate 20 statements regarding the extent to which they use 20 technology applications. Their responses were measured using a five-point Likert scale: 1= (never), 2= (rarely), 3= (sometimes), 4= (very often) and 5= (always). The higher mean scores indicated that the participants' level of use of technology applications in accounting education was high. In other words, a higher score mean indicates a higher use of technology applications. On the contrary, a lower score mean indicates a low level of technology use in accounting education. Descriptive statistics were conducted to analyze the data for this question by calculating the means and standard deviations

of the items.

As shown in Table 5, the overall level of the participants' level of use of technology statements was not high, with a mean of (2.069) and a standard deviation of (0.681), which was within the Rarely level of use, indicating that academic educators were rarely integrating technology into accounting education. The highest ranked technology application academic educators used in accounting education was statement 1, "Emails: communications with students as well as the use of watsap, telegram, with (M= 3.077, SD= 0.694). The least frequently technology application used by academic educators in accounting education was statement 14, "Smart board (interactive white board), with (M= 1.231, SD= 0.421), which was within the never level of use. Table 5 displays the means and standard deviations for the rest of the statements indicating the extent of the technology applications used in accounting education. The results of the study revealed that emails communications with students was found among the top technology applications used by academic educators.

Question two: The extent of the importance of technology in accounting education as perceived by accounting students.

Accounting students were asked to rate the extent of importance of the following technology applications in accounting education and their responses were as follows in table (6).

Table (6): shows the importance of technology applications in accounting education.

How important do you think the following technology applications are in accounting education?		Means	SD	Level	Rank
1	Emails: communications with students as well as the use of watsap, telegram.	3.628	0.786	Important	6
2	Non-class activities: e.g, use of online tutorials in accounting principles courses, online homework & assignments, e-assessment system.	3.551	0.827	Important	8
3	Distance education services, e.g. the off-campus blackboard system.	2.910	0.664	Moderately important	14

How important do you think the following technology applications are in accounting education?		Means	SD	Level	Rank
4	Spread sheet software (excel) assigned to students.	3.962	0.587	Important	4
5	Word processing software (word) assigned to students.	3.667	0.654	Important	5
6	Presentation software (power point) assigned to students.	3.987	0.650	Important	3
7	Database software (access, SQL) assigned to students.	3.538	0.983	Important	9
8	Auditing software assigned to students.	2.872	0.925	Moderately important	16
9	Accounting software assigned to students.	3.462	0.728	Important	11
10	Tax software (turbo tax, intuit tax) assigned to students.	2.603	0.585	Moderately important	18
11	Flow charting software assigned to students.	3.538	0.763	Important	9
12	Simulation software assigned to students	3.628	1.075	Important	6
13	Program management software assigned to students.	2.500	0.615	Of little importance	20
14	Smart board (interactive white board).	3.333	0.547	Moderately important	12
15	A document camera while lecturing to present course materials to students.	2.679	1.171	Moderately important	17
16	Multimedia for in-class presentations	3.218	0.779	Moderately important	13

How important do you think the following technology applications are in accounting education?		Means	SD	Level	Rank
17	Electronic lists for discussions with students	2.551	0.795	Of little importance	19
18	Course specific computer tele-conference bulletins.	2.910	0.644	Moderately important	14
19	Accounting lab.	4.282	0.575	Extremely important	1
20	Data analysis software such as statistics for SPSS, LINPRO, SAS assigned to students.	4.179	0.615	Important	2
Total		3.350	0.748	Important	

Table (6): shows that the participants were asked to rate 20 statements regarding the extent to which they perceive importance of technology applications in accounting education. Their responses were measured using a five-point Likert scale: 1= (Not important), 2= Of little importance, 3= (Moderately important), 4= (Important) and 5= (Extremely important). The higher mean scores indicate the participants' higher level of importance towards technology applications in accounting education. In other words, a higher score mean indicates a higher importance of technology application. On the contrary, a lower score mean indicates a low level of importance to technology applications in accounting education. Descriptive statistics were conducted to analyze the data for this question by calculating the means and standard deviations of the items.

As shown in Table (6), the overall level of importance of technology applications perceived by accounting students was high with a mean of (3.350) and a standard deviation of (0.748), which was within the important level of use indicating that they perceived the importance of integrating IT technology in accounting education. The most important technology application perceived by accounting students in accounting education was item 19, "accounting lab", with (M= 4.282, SD= 0.575), which was within the extremely important level of use.

However, the least important technology application perceived by accounting students in accounting education was statement 13, “Program management software assigned to students”, ($M= 2.500$, $SD= 0.615$), which was within the Never level of importance. Table 6 displays the means and standard deviations for the rest of the statements indicating the extent of importance of technology applications in accounting education as perceived by students.

Question three: The challenges that might affect accounting educators in integrating technology in accounting education.

Academic educators were asked to complete the questionnaire by indicating their views about statements using a five-point Likert scale as follows: 1= SD (Strongly Disagree), 2= D (Disagree), 3= N (Neutral), 4= A (Agree) and 5= SA (Strongly Agree).

Table (7) shows: Challenges might affect accounting educators in integrating IT technology in accounting education.

To what extent do you agree with the following statements about the challenges that might affect the integration of technology applications in accounting education?		Means	SD	Level	Rank
1	There is a wide range of IT technology resources offered by the university.	1.974	0.698	Disagree	10
2	Academic educators use their computer-aided learning tools in accounting education classes.	1.718	0.638	Strongly Disagree	12
3	Accounting students use their laptop computers and mobile phones in accounting classes.	1.487	0.675	Strongly Disagree	13
4	The university provides online education platforms & e- learning services.	1.282	0.450	Strongly Disagree	16
5	The accounting syllabus currently employed neglects the practical side of accounting learning.	3.949	0.597	Agree	1

To what extent do you agree with the following statements about the challenges that might affect the integration of technology applications in accounting education?		Means	SD	Level	Rank
6	There is an internet service in the university and students have the chance to access the internet in and outside university.	2.897	0.778	Neutral	6
7	The integration of technology applications will improve professional accounting education.	3.590	0.492	Agree	2
8	There is enough technical support/advice for information technology integration in our department.	2.077	0.525	Disagree	9
9	University provides accounting simulation labs, computer-assisted programs, software, work stations.	1.179	0.384	Strongly Disagree	17
10	There is a specific budget for information technology in our university.	2.974	0.698	Neutral	5
11	Academic educators have high interest to use technology applications in teaching accounting.	3.179	0.384	Neutral	4
12	University provides online technology services, such, Webs and blackboard.	1.359	0.480	Strongly Disagree	14
13	Accounting classes are well equipped with technology application services, such OHP, interactive white board.	1.359	0.577	Strongly Disagree	15
14	The current accounting education program allows accounting graduates to be eligible for the market.	2.385	0.702	Disagree	8
15	Accounting students have a high motivation to use IT technology applications.	3.538	0.499	Agree	3

To what extent do you agree with the following statements about the challenges that might affect the integration of technology applications in accounting education?		Means	SD	Level	Rank
16	There is sufficient time for academic educators to integrate IT technology applications in accounting education.	2.692	0.685	Neutral	7
17	Academic educators possess the appropriate knowledge, skills and expertise to use technology in accounting education.	1.872	0.515	Disagree	11
Total		2.324	0.575	Disagree	

Table (7): shows that the participants were asked to rate 17 statements regarding the degree of agreement to the challenges that might affect the integration of technology in accounting education. These statements were about “policy and support”, “infrastructure and resources”, “attitudes of faculty members and students about integrating information technology in accounting education” and “preparation and development”.

The higher scores indicate the participants’ positive attitudes towards the statement. In other words, a higher score does not indicate a challenge. On the contrary, a lower score indicates a challenge. Descriptive statistics were conducted to analyze the data for this question by calculating the means and standard deviations of the items.

As shown in Table 7, the overall level of the participants’ agreement to statements was high with a mean of (2.324) and a standard deviation of (0.575), which was within the high level of approval indicating that they were facing the challenges of integrating technology in accounting education. The biggest challenge they encounter in integrating technology in accounting education was item 9, “university provides accounting simulation labs, computer-assisted software’s, work stations”, with a mean of (1.179) and a standard deviation of (0.384) indicating that academic educators strongly disagree with this statement. The minimum challenge they encounter in integrating technology in accounting education was item 5, “The accounting syllabus currently employed neglects the practical side of accounting learning”, with a

mean of (3.949) and a standard deviation of (0.597) indicating that academic educators encounter minimal challenges when employing the accounting syllabus. Table 7 displays the means and standard deviations for the rest of the challenges that might affect the implementation of integrating information technology in accounting education.

5. Discussion:

The findings of this study highlighted a significant gap between the students' perceived importance of technology applications in accounting education and the actual usage of technology applications by academic educators. While academic educators and accounting students recognize the importance of different technological tools, their integration and implementation remain very limited due to a set of challenges.

1 . Low level of technology integration.

Table (5) shows that the overall use of technology applications in accounting education is low ($M = 2.069$, "Rarely"). Most of the applications listed were rarely or never used, including some accounting tools such as spreadsheet software, auditing software, and accounting-specific applications. The most frequently used tools were communication platforms (e.g., email, WhatsApp, Telegram), indicating that technology use is very limited to basic communication purposes rather than pedagogical or practical purposes. This limited integration suggests educators' reliance on traditional teaching methods and an underutilization of digital resources that can improve learning outcomes.

2 . High perceived importance of technology.

In contrast, Table 6 indicates that students perceive technology as highly important in accounting education ($M = 3.350$, "Important"). Applications such as accounting labs ($M = 4.282$) and data analysis software ($M = 4.179$) ranked the highest level of importance, reflecting an awareness of the effectiveness of these tools in preparing students for real-world accounting practices. Recognizing the importance, a wide range of applications indicates that both academic educators and accounting students perceive the value of technology to enhance teaching effectiveness, increase student engagement, and improve skill development.

3. Major Challenges to Integration.

Table 7 indicates that the integration of technology is influenced by significant barriers. The overall mean of 2.324 indicates general disagreement among participants with positive statements about institutional readiness to adopt technology, indicating various challenges. The most major challenges are the lack of simulation labs and accounting software ($M = 1.179$), limited access to online platforms ($M = 1.359$), and inadequately equipped classrooms. These findings indicate critical issues such as insufficient infrastructure, poor institutional support, and limited technical resources. Further to that, a lack of educator training and time constraints ($M = 2.692$ for time availability) also result in the low integration of educational technologies.

4. Misalignment between perception and practice

A striking finding indicates there is misalignment between what academic educators view as important and what is actually being implemented. For instance, while presentation software like PowerPoint is ranked as highly important ($M = 3.987$), it is rarely used ($M = 1.744$). Likewise, accounting labs are perceived as extremely important but are not widely available. This disparity may stem from a lack of university support or insufficient access to resources rather than a lack of willingness on the part of academic educators.

Therefore, the results of the study are consistent with the findings of João Batista, Helena Santos and Rui Pedro Marques (2021) which found that students and teachers most commonly used technologies and electronic mails. The finding also revealed that Smart board (interactive white board) was the least used in technology application among educators. This finding is in line with the finding of Liversidge, G. (2010) who stated that in Japanese universities, the number of IWBs (interactive white boards) is exceedingly low and that most lecturers or teachers, even non-Japanese, have never seen or used one.

Moreover, the findings of this study support the view of Speckler, (2010) who stated that technology tools such as My Accounting Lab will teach students not only the accounting content, but also how to learn. It makes them 'work ready' with the necessary problem solving and communication skills.

The findings of this also study revealed that academic educators encountered real challenges when integrating information technology in accounting education because the university does not provide accounting simulation labs, computer-assisted software, work stations. This finding is consistent with the finding of Braun & Jones (2013) who found that universities, such as Tripoli University, Benghazi University, and Academy of Postgraduate Studies and Economic Research, have the basic IT infrastructure (such as computers, Internet access, and a local area network),

Further to that, the findings of this study indicated that academic educators faced minimal challenges of integrating information technology in accounting education due to the fact that the accounting syllabus employed neglects the practical side of accounting learning. This finding is in line with the finding of Alozie, (2022); Hopper et al (2017) who indicated that the existing accounting curriculum in Nigeria may not fully prepare students for international qualifications. Government policies and regulations can significantly impact on the structure and content of educational programs. He also adds policy decisions regarding curriculum, funding, and technology adoption are significant in shaping accounting education.

In light of these challenges, the current state of the Libyan accounting education needs a substantial overhaul to remain relevant, competitive, and aligned with the dynamic needs of the accounting profession in the 21st century.

5. Conclusion:

This study intended to examine the extent to which accounting academics adopted the use of technology in their academic accounting classes. It also investigated the extent to which accounting students perceived the importance of technology applications in accounting education. It also aimed to find out the challenges that might affect the integration of technology in accounting education. Unexpectedly, the highest ranked technology application used by academic educators in accounting education was Emails: communications with students as well as the use of Watsap, telegram, while the least frequently technology application used by academic educators in accounting education was smart board (interactive white board). Regarding

the importance of technology applications from the accounting students' perspective, the most important applications of information technology perceived by accounting students in accounting education was accounting lab, while the least important technology application perceived by accounting students in accounting education was that Program management software. lastly, as for the possible challenges affecting the integration of technology in accounting education from the academic educators' perspective, the biggest challenge they encountered in integrating technology in accounting education was that university does not provide accounting simulation labs, computer-assisted software's, work stations, while the minimum challenge they encounter in integrating technology in accounting education was that the accounting syllabus currently employed neglects the practical side. While on the whole there seemed to be some similarities among academic educators and accounting students in their perceptions towards IT technology, some differences were evident in their views.

6. Recommendations:

Based on the results of the study with regards to technology use, perceived importance, and integration challenges in accounting education, the following recommendations can be made as follows:

1. Both curriculum designers, material developers and academic educators should revise and develop the existing accounting curriculum employed at the faculty of accounting. Accounting syllabus designers should integrate practical components such as accounting software, data analysis software tools such as (SPSS, Excel), and simulation programs. They should also ensure that the accounting curriculum aligns with current industry standards employed in the country to better prepare graduates for real-world roles. They can also include technology-based assessments and projects to enhance applied learning.
2. Policy makers and decision makers in the higher ministry of education should invest in infrastructure and technology resources and provide essential hardware and software in classrooms, including computers or tablets, accounting and auditing software (e.g., QuickBooks, SAP, ACL), OH projectors, interactive whiteboards, and document cameras.

They should also establish accounting labs equipped with relevant tools for hands-on practice. And expand more opportunities for students access to internet services both on and off-campus.

3. University officials should establish a dedicated IT budget, allocate a specific annual budget for enhancing technology in the accounting department., prioritize acquisition and maintenance of digital tools for teaching and learning., and support licensing of professional accounting and data analysis software.
4. University decision makers should establish professional development for academic educators, offer continuous training and workshops for faculty staff members on integrating technology in teaching, using accounting, tax, and auditing software, online teaching tools (e.g., Blackboard, Moodle) an encourage technology champions within the department to support peers.
- 5 . The ministry of higher education should enhance technical support services,create an IT support unit within the accounting or business department to assist faculty and students and provide on-demand technical assistance during lectures and lab sessions.
6. Academic educators and university decision makers should promote blended and E-Learning platforms, reintroduce or strengthen learning management systems (LMS) like Blackboard or Moodle. develop online modules for core and elective accounting courses, and encourage the use of multimedia and digital content to complement in-person teaching.
7. Academic educators should encourage student use of Technology in class, allow and support the use of laptops, tablets, and mobile apps in accounting courses, and include activities that require the use of technology for assignments, collaboration, and simulations.
8. Academic educators should regularly conduct needs assessments, evaluate the technology needs of students and faculty to guide decision-making and carry out surveys and focus groups to track progress, satisfaction, and areas for improvement.

Finally, in order to bridge the gap between high perceived importance

and low actual usage of technology in accounting education, a multi-faceted and institutional approach is necessary. These recommendations are targeted to build a digitally competent, industry-ready generation of accounting professionals in Libya.

■ References:

- Accounting Education Change Commission (AECC). 1990. Objectives of education for accountants: Position Statement Number One. *Issues in Accounting Education* (Fall): 307-312.
- Albring, S. M., & Elder, R. J. (2020). Research initiatives in accounting education: Managing academic programs. *Issues in Accounting Education*, 35(4), 61-74.
- Ali, W. (2020). Online and remote learning in higher education institutes: A necessity in light of COVID-19 pandemic. *Higher Education Studies*, 10(3), 16-25.
- Alozie, C. (2022). Future of accounting education, comparative review of divergent issues in accounting education: evidence from five focal countries. *Comparative Review of Divergent Issues in Accounting Education: Evidence from Five Focal Countries* (February 27, 2022).
- Anderson, D.R., Sweeney, D.J., Williams, T.A., Camm, J.D. and Cochran, J.J. (2020), *Modern Business Statistics with Microsoft Excel*, Cengage Learning, Boston, MA.
- Batista, J.; Santos, H.; Marques, R.P. (2021). The Use of ICT for Communication between Teachers and Students in the Context of Higher Education Institutions. *Information* 2021, 12(11), 479. MDPI AG.
- Blankley, A., Kerr, D. and Wiggins, C. (2019), "An Examination and analysis of technologies employed by accounting educators", *The Accounting Educators' Journal*, Vol. 28, pp. 75-98.
- Braun, D. G., & Jones, D. A. (2013). *Libya—building the future with youth challenges for education and employability*. Eschborn, Tripoli: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.
- Broekman, I., Enslin, P. & Pendlebury, S. (2002). Distributive justice and information communication technologies in higher education in South Africa. *South African Journal of Higher Education*, 16(1):29-35.
- Brown, C., Bozalek, V., Gachago, D. & Wood, D. (2016). Technology enhanced teaching and learning in South African higher education.
- Chen, C. C., K. T. Jones, and K. A. Moreland. 2013. "Online accounting education versus in-class delivery: does course level matter?" *Issues in Accounting Education* 28(1): 1-16.
- Do, D., Nguyen, T., Ha, S., Tran, M., Nguyen, H. and Truong, D. (2020), "An analysis of

- underlying constructs affecting the choice of accounting as a major”, *Management Science Letters*, Vol. 10 No. 2, pp. 361-368
- Ganyam, A.I. and Ivungu, J.A. (2019), “Effect of accounting information system on financial performance of firms: a review of literature”, *Journal of Business and Management*, Vol. 21 No. 5, pp. 39-49.
- Garanina, T., Ranta, M., & Dumay, J. (2022). Blockchain in accounting research: current trends and emerging topics. *Accounting, Auditing & Accountability Journal*, 35(7), 1507-1533.
- Greenstein, M., & McKee, T.E. (2004). Assurance practitioners’ and educators’ self-perceived IT knowledge level: an empirical assessment. *International Journal of Accounting Information Systems* 5, 213-243.
- Hamdy, A. (2007). ICT in education in Libya. Retrieved from <http://www.infodev.org/en/Document.412.pdf>.
- Hernandez, A.A. (2020), “Exploring the factors to green IT adoption of SMEs in the Philippines”, *StartUps and SMEs: Concepts, Methodologies, Tools, and Applications*, IGI Global, pp. 907-926
- Hopper, T., Lassou, P., & Soobaroyen, T. (2017). Globalisation, accounting and developing countries. *Critical Perspectives on Accounting*, 43, 125-148.
- Ibrahim, F., Ali, D.N.H. and Besar, N.S.A. (2020), “Accounting information systems (AIS) in SMEs: towards an integrated framework”, *International Journal of Asian Business and Information Management (IJABIM)*, Vol. 11 No. 2, pp. 51-67.
- Karakose, T. (2021). The impact of the COVID-19 epidemic on higher education: Opportunities and implications for policy and practice. *Educational Process: International Journal (EDUPIJ)*, 10(1), 7-12.
- Kerimbayev, N., Nurym, N., Akramova, A. and Abdykarimova, S. (2020), “Virtual educational environment: interactive communication using LMS moodle”, *Education and Information Technologies*, Springer, Vol. 25 No. 3, pp. 1965-1982.
- Knapp, K. (2019), U.S. Patent No. 10,304,095, U.S. Patent and Trademark Office, Washington, DC.
- Lam, Y. (2000). Technophilia v. technophobia: A preliminary look at why second language teachers do or do not use technology in their classrooms. *Canadian Modern Language Review*, 56, 389-420.
- Lee, L., Kerler, W., & Ivancevich, D. (2018). Beyond excel: Software tools and the accounting curriculum. *AIS Educator Journal*, 13(1), 44-61.
- Levy, D. (2022). Interactive whiteboard in learning and teaching in two Sheffield schools. A developmental Study. Sheffield department of information studies. University of Sheffield.
- L. Harasim, “Shift happens: Online education as a new paradigm in learning”, *The Internet*

and Higher Education, vol. 2, no. 2, pp. 41–61, 2010.

- Litherland, K., P. Carmichael, and A. Martinez-Garcia. 2013. "Ontology-based e-assessment for accounting: Outcomes of a pilot study and future prospects." *Journal of Accounting Education* 31(2): 162-176.
- Liversidge, G. (2010). E-Teaching and How Interactive Whiteboards Can Enhance the Learning Process. *Kiyo Bunkei*, 42, 25-45. Otsuma Women's University.
- Lusher, A. L., M. M. Huber, and J. M. Valencia. 2012. "Empirical evidence regarding the relationship between the computerized classroom and student performance in introductory accounting." *The Accounting Educator's Journal* (Volume 22): 1-23.
- Miller, D., Glover, D., & Averis, D. (2023). Eexposure the introduction of interactive whiteboard technology to secondary school mathematics teachers in training. Paper presented at CERMEZ. Third conference of the European society for research in mathematics Education Bateria, Italy.
- Morris, M., R. D. Burnett, C. Skousen, and O. Akaaboune. 2015. "Accounting education and reform: A focus on pedagogical intervention and its long-term effects." *The Accounting Educators' Journal* 25: 67-93.
- Mutula, S.M. (2010). Challenges of information illiterate first-year entrants for the University of Botswana. *Information Development*, 26(1):79–86.
- Phyu, K.K. and Vongurai, R. (2020), "Impacts on adaptation intention towards using accounting software in terms of technology advancement at work in Myanmar", *AU-GSB e-Journal*, Vol. 12 No. 2, pp. 98-111.
- R. (2020), "Impacts on adaptation intention towards using accounting software in terms of technology advancement at work in Myanmar", *AU-GSB e-Journal*, Vol. 12 No. 2, pp. 98-111.
- Painter, D.D., Whiting, E., & Wolters, B. (2015). The use of an interactive whiteboard promoting interactive teaching and learning. *VSTE Journal*, 19(2), 31-40.
- Phillips, F., and B. G. Johnson. 2011. "Online homework versus intelligent tutoring systems: Pedagogical support for transaction analysis and recording." *Issues in Accounting Education* 26(1): 87-97.
- Rai, P., Vatanasakdakul, S. and Aoun, C. (2010) "Exploring perception of IT skills among Australian accountants: An alignment between importance and knowledge," *Americas Conference on Information Systems (AMCIS 2010) Proceedings*, Association for Information Systems.
- Sabo, R. How Technology Is Changing How Teachers Communicate with Students. Available online: <https://www.teachthought.com/technology/how-technology-is-changing-how-teachers-communicate-with-students/> (accessed on 29 September 2021).
- Smerdon, B., Cronen, S., Lanahan, L., Anderson, J., Iannotti, N., & Angeles, J.(2000). *Teachers' tools for the 21st century: A report on teachers' use of technology*. Washington, DC: National Center for Education Statistics.

- Speckler, M.D. (2010) "The Power of Practice 2010 My AccountingLab and 21st Century Accounting Instruction," Pearson Education.
- Tan, G. K. R., and A. Ferreira. 2012. "The effects of the use of activity-based costing software in the learning process: An empirical analysis." *Accounting Education: An International Journal* (4):407-429.
- Wakefield, J., Tyler, J., Dyson, L. E., & Frawley, J. K. (2017). Implications of student generated screencasts on final examination performance. *Accounting & Finance*, 59(2), 1415-1446.
- Watty, K., McKay, J., & Ngo, L. (2016). Innovators or inhibitors? Accounting faculty resistance to new educational technologies in higher education. *Journal of Accounting Education*, 36, 1-15.
- Wyness, L. and Dalton, F. (2018), "The value of problem-based learning in learning for sustainability: undergraduate accounting student perspectives", *Journal of Accounting Education*, Elsevier, Vol. 45, pp. 1-19.
- Yu, S., Churyk, N. T., & Chang, A. (2013). Are students ready for their future accounting careers? Insights from observed perception gaps among employers, interns and alumni. *Global Perspectives on Accounting Education*, 10 (7), 1–15.