
**Using a Mobile-Based Learning Management System (M-LMS) for
Developing English Technical Report Writing Skills of Computers
and Artificial Intelligence Students**

DR. Haggag Mohamed Haggag

Assistant professor of curricula and methods of teaching English, Faculty
of Education in Hurghada, South Valley University

Abstract : Utilizing a Mobile Learning Management System (M-LMS) in the field of Foreign Language Education and job-oriented class practices is a revolutionary development. This study aimed to investigate the effect of using M-LMS (Canvas) on developing technical report writing skills of freshmen students at Hurghada Faculty of Computers and Artificial Intelligence. Using the one-group quasi-experimental design, a group of (35) students was selected to study a technical report writing module based on Canvas application. The study utilized a questionnaire for technical report writing skills, a test, a rubric, a reflection journal, and a module based on M-LMS. Results of the pre-post testing showed that there were significant mean differences between the scores of the participants' in the sections of layout and content, technical content writing, and the overall score of the test. The reflection Journal qualitatively showed that the participants were satisfied with the module of the study as it helped them to communicate, interact, upload, download, write, edit, and receive feedback functionalities. The study recommended using M-LMS in the field of informatics and other career-oriented English courses. It also recommended integrating M-LMSs as hybrid or online platforms due to their effective features.

Keywords MLMS- Writing- Report

استخدام نظام لإدارة التعلم قائم علي الهاتف النقال لتنمية مهارات كتابة التقرير التقني
باللغة الإنجليزية لدى طلاب الحاسبات والذكاء الاصطناعي

المستخلص:

تعد نظم إدارة التعلم القائمة علي الهواتف النقال تطورا جذريا في أدبيات تعليم اللغات الأجنبية وكذا الممارسات التربوية المختلفة الموجهة نحو العمل، هدفت الدراسة إلي التحقق من فاعلية استخدام نظام لإدارة التعلم قائم علي الهاتف النقال لتنمية مهارات كتابة التقرير التقني باللغة الإنجليزية لدى طلاب المستوي الأول بكلية الحاسبات والذكاء الاصطناعي بالگردقة. واتبعت الدراسة التصميم شبه التجريبي ذي المجموعة الواحدة حيث تكونت مجموعة الدراسة من (٣٥) طالبا للتحقق من فاعلية تطبيق وحدة تعليمية قائمة علي تطبيق (Canvas) لإدارة التعليم، شملت الدراسة (٥) أدوات ومواد هي استبيان مهارات كتابة التقرير، واختبار مهارات كتابة التقرير، وبطاقة تقييم الكتابة، وبطاقة تأمل ذاتي ، ووحدة تعليمية قائمة علي نظام لإدارة التعلم. توصلت نتائج الدراسة إلي وجود فروق ذات دلالة إحصائية بين متوسطات درجات المشاركين بالدراسة في أبعاد نسق التقرير الفني، محتوى التقرير الفني، والدرجة الكلية للاختبار. وأشارت النتائج الكيفية لبطاقة التأمل إلي رضا المشاركين حول مديول الدراسة القائم علي نظام إدارة التعلم النقال والذي ساعدهم علي التواصل، التفاعل، تحميل المهام، تصدير التكاليفات، وتلقي أنواع من التغذية الراجعة. كما أوصت الدراسة باستخدام نظم إدارة التعلم في مجالات المعلوماتية وغيرها من مقررات اللغة الإنجليزية لأغراض العمل. كما أوصت بتضمين نظم إدارة التعلم كمنصات تعلم أونلاين أو هجينة وذلك لما لها من مزايا.

الكلمات المفتاحية:

إدارة التعلم - الكتابة - التقرير

Introduction

Writing is pivotal for both study and career development in a challenging digital age. It is a key skill to develop during university as well as the whole educational cycle. Career-wise, it is a need for professional job-oriented communication. Thus, students in the computer engineering field should master (Aladl, 2017) a type of technical writing that is essential for both their academic and professional disciplines.

Technical writing is a writing genre that entails technical features devoted to workplace and job-related communication. According to DuPuis (2021), it is characterized by the quality of specialized topics related to distinctive fields as in case of the informatics, computers, artificial intelligence, online and offline digital technologies. Similarly, Pringle & O'keefe (2009) expressed the view, that clarity is one of its distinctive features that is devoted to discussing complicated concepts and job-related concepts supported by visuals and technical layout. It is characterized by four features that include planning, drafting, revising, and publishing.

Mobile Technology Enhanced Language Learning (M-ELL) is a revolutionary field in Foreign Language Learning. It stimulates a metamorphosis in the area of integrating mobile technology in foreign language teaching; a comprehensive platform for e-learning through learning management and its systems. Thus, it is a pursuit to

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incorporate various advancements in the different tiers of Foreign Language Learning methodology.

The concept of Mobile Learning Management Systems (M-LMS) is an evolving development of learning management systems that utilize handheld devices and mobile technologies to manage students' learning (Ferreira et al., 2013; Han & Shin, 2016). It is a move from traditional website and PC-based learning to more mobile-based functions. M-LMSs have various advantages that incorporate both the merits of mobile learning and LMS function. In this view, Shin & Kang (2015) stated that a mobile LMS has the advantage over a traditional LMS in that students access their courses anytime and anywhere by taking advantage of the distinctive features of mobile devices.

Canvas Learning Management System is a free-use platform and application that is mobile-based. According to (Canvas, 2020), it is a platform that can be used in different types and sizes of educational contexts. It has various features that include customized learning, monitoring, evaluation, learning engagement and student-teacher interactivity. Abdel Haq, et al. (2021) explained that it simultaneously grades, assesses, sends feedback, and features real-time module progress.

Using Mobile Learning Management Systems in technical report writing classes may lead to the development of different job-oriented and learning developments (Ahn, 2017; Ryamova, 2015; Ghafor,

2015). The literature discussed the significant impact of LMS on the achievement, attitudes and language proficiency of both in-service participants in different EFL disciplines. There is a scarcity of studies that investigated the use of M-LMS in pre-service IT students to develop their job-oriented skills.

Therefore, there is a need to design a module based on M-LMS to develop technical report writing skills of freshmen students in the faculty of Computers and Artificial Intelligence.

Context of the Study Problem

English for Computers and Artificial Intelligence (AI) purposes is a growing field of study in foreign language education. Guided by a national vision (Egypt's Vision 2030) to expand the study of Informatics and AI field, there is a need to prepare students at these faculties with courses, modules, and instruction techniques that help foster their language development. Based on the researchers' experience in teaching English I, English II, and Technical Writing courses at Hurghada Faculty of Computers and AI, he observed the challenges that the students face in writing technical reports. These challenges include structuring the report, writing its content, and editing their reports.

To verify the problem, a pilot study was run at the beginning of the course (first week of October 2023) over the participants (41 freshmen) at the first level in Hurghada Faculty of Computers and AI. They were asked to respond to a technical writing quiz that included

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key content information about report writing and a descriptive question about figure description. Analyzing students' answers showed that most of them were not aware of the elements of technical reports; figures description; they face challenges in editing and revising their writing. They were also unable to recognize the layout and structure of a technical report.

Further, reviewing literature in the areas of technical report writing (e.g. Duin & Tham, 2020; Aladl, 2017; Saine & West, 2017; El Maghreby, 2012) and M-LMS use in the field of computers and AI (e.g. Fathi, et al., 2023; Albalawi, 2022; Abdel Haq, et al. 2021), showed a lack in the studies that dealt with integrating these two variables. Literature also showed a gap in the studies that utilized Mobile Learning for job-related technical writing at the pre-service level. Although some literature investigated the effect of LMSs on pre-university students and in-service engineers and IT specialists (e.g. Furqon, et al., 2023; Ajijola, 2021) there is research scarcity in identifying the reflection and feedback aspect of research over pre-service university students. It was obvious that there is a need to conduct a study to investigate the use of M-LMS for technical report writing skills' development at the pre-service level within EFL context.

Statement of the problem

Many students at Hurghada Faculty of Computers and Artificial Intelligence lack the basic skills of writing technical reports, as revealed by the pilot study. These skills included the use of discipline-

oriented technical language, appropriate technical report layout and structure, as well as utilizing proper editing and revising techniques. Therefore, there was a need to design a digital mobile-based module to develop their technical report writing skills.

Objectives of the study

The study aimed at the following:

1. Identifying the technical report writing skills that are needed for Computers and AI students.
2. Designing a module based on Canvas-LMS for developing English technical writing skills of the participants.
3. Identifying the effect of using the mobile-based module on participants' English technical report writing skills.

Significance of the study

The current study is thought to be significant for the following:

1. Students at the Faculties of Computers and AI can make use of the designed module as a training reference or study guide for their report writing projects.
 2. Instructors in the field of Computers and AI can use, adapt, or implement the designed module in the courses of English, technical writing, report writing, and other relevant courses.
 3. The study integrated between an EFL course design, technology component (LMS), and the growing field of Computers and AI, therefore, the outcomes may enrich the interdisciplinarity of EFL theory and practice.
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4. Developing English technical writing skills is distinctive interdisciplinary fields that can benefit both stakeholders such as education, arts, computers & AI, and other relevant fields.

Questions of the study

The study attempted to answer the following questions:

1. What are the technical report writing skills required for Computers and AI students?
2. What are the layout and the features mobile-based LMS module for developing freshmen English technical report writing at the faculty of Computers & AI?
3. What is the effect of using M-LMS module for developing English technical report writing skills of the participants?
4. What is the effect of using M-LMS module for developing English technical report writing content and layout cognition participants?
5. What is the effect of using M-LMS module for developing technical content report writing skills of the participants?

Hypotheses of the Study:

1. There would be statistically significant mean differences at level (0.05) between the scores of the participants in the pre and post-testing of their technical report writing skills, favoring the post testing.

This main hypothesis is sub-divided into three hypotheses:

- 5.1. There would be statistically significant mean differences at level (0.05) between the scores of the participants in the pre and post-

testing of their technical report structure & layout oriented skills, favoring the post testing.

5.2. There would be statistically significant mean differences at level (0.05) between the scores of the participants in the pre and post-testing of their technical content writing skills, favoring the post testing.

Definition of Terms:

Some terms were repeatedly used in the study. The definition of these is presented below:

Mobile-Learning Management System (M-LMS)

M-LMS is defined as a branch of traditional LMS application that is utilized as a mobile-based learning tool with no regard to time or location (Ferreira et al., 2013). Similarly, Han & Shin, (2016) viewed M-LMS as similar to those of the traditional, PC-based LMS with the extra functions of mobility provided by smartphones and other handheld devices. In this study, M-LMS is viewed as the use of Canvas application as a Learning Management System LMS to design, instruct and assess technical report writing courses for the students of Computers and Artificial Intelligence.

Technical Report Writing

The technical report is a formal report that aims to deliver technical data or technical information at different levels for different readers (Tarunpatel, 2007). Technical report writing as viewed by El Maghreby (2012) to mean the process of writing a document that

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describes the process, progress, or the technical results of a certain problem; this type of writing is characterized by its technicality in an easily accessible format. In this study, technical report writing was used to mean the process that integrates cognitive and skill-oriented steps to describe data related to the field of informatics and artificial intelligence.

Method

Design

The study followed the one-group quasi-experiential design with its pre and post-testing procedure. The research design identified the effect of the independent variable (the module based on M-LMS) over the dependent variable (technical report writing skills).

Delimitations of the study:

1. Place: Hurghada Faculty of Computers and AI, South Valley University, Hurghada Branch.
2. Academic Variables: the independent variable was LMS-based module (Canvas application) for technical writing. The dependent variable is the technical report writing skills (content and layout cognition – technical content writing).
3. Duration of treatment: the study was run during the Fall Semester of the academic year 2023-2024 as a compulsory part of the course (English 1) for freshmen (first level) students at Hurghada Faculty of Computers and AI.

Participants:

Participants of the study were (41) Freshmen at Hurghada faculty of Computers and Artificial Intelligence who study English 1 course at the academic year 2023-2024. They were purposefully enrolled in one experimental group. Only (35) participants were included in the treatment as (6) participants could not complete the whole parts of the test due to absence, or gained outlier scores that were less than the cut score (15/ 30) in the pre-test.

Instruments and Materials

The study utilized the following instruments and materials which were designed by the researcher (see appendix) and were validated in terms of content validity and reliability:

1. Technical report writing skills checklist; it aimed to identify the writing skills that are essential for Faculty of Computers and AI freshmen (first level). The checklist was submitted to a jury of EFL and IT experts to validate its content and layout (appendix 5). They suggested modifying some of the items and areas to include two main areas: cognition and layout (10 items) and technical content skills (15 items).
2. A mobile-based LMS module on Canvas application (see Appendix 1). The module was also validated by a jury of TEFL experts and they also suggested some modifications in terms of structure, layout, and number of lessons and units. The final format of the module included eight themes (Introduction about Canvas LMS, technical report writing

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process, technical reports in the IT field, practice report writing, drafting, editing, and revising, describing figures, and tables, appendices and referencing, introduction about Canvas LMS).

3. Technical report writing test; it aimed to identify the technical report writing skills of freshmen at the Faculty of Computers and Artificial Intelligence (see Appendix 2). Content of the test was validated by the jury who suggested dividing the test into two main parts (layout and content), grammar and vocabulary modifications, item structure, and changes in its direction. The test was piloted by (15) students from the first level at Hurghada Faculty of Computers and AI. Reliability of the test was statistically calculated through Split-half method. The reliability value was ($r= .91$), which showed its high reliability.

4. Technical Writing Rubric for assessing participants' writing (see appendix 4). The rubric was also validated by the jury who recommended including the areas of organization, mechanics, paragraphing, describing figures, information amount, and information quality in the rubric. The final rubric included 6 areas and 4-scale performance indicators.

5. Reflection Journal for providing feedback and reflection on content (See Appendix 3). The reflection journal was also validated by the jury who recommended changes in its layout to be fully online and to be submitted on the LMS of the courses. Participants had to respond to the journal online describing their motivation, attitudes, and satisfaction levels about the module.

Literature Review and Related Studies

The following review discusses the key research theory and pertinent studies to technical report writing, Mobile Learning Management Systems, and the linkage between M-LMS use and Technical report writing instruction in the EFL context. It also discusses the key studies that incorporated these three areas.

A. Technical Report Writing

Technical writing is a distinctive sequential writing genre devoted to professions and work-related purposes. Technical writing has four stages that represent its sequential features. According to DuPuis (2021), the four stages of technical writing are planning, drafting, revising, and publishing. Planning refers to marking the main ideas and brainstorming, connecting ideas to be written, and removing the outliers that should not be included in the document or the report. Drafting is an initial writing that integrates an introduction, body, and a conclusion. Revising is a process of organization, checking writing conventions, and reviewing. As to publishing, it refers to final adaptations and necessary feedback and discussion phases for the technical document. Pfeiffer & Boogerd (2007) indicated that these four steps of technical writing should be integrated during the writing process. Technical writing is a process-based approach to the technical document.

Effective technical report writing should entail various characteristics and features. According to Pfeiffer & Boogerd, 2007 &

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Tebeaux & Dragga, 2015, technical writing should be characterized by clarity, comprehensiveness, and correctness. Further, technical writing is challenging for most native speakers, thus, it is more challenging for EFL and ESL speakers. These challenges are due to the technical nature of this writing genre which requires the production and use of coherent, fluent, and highly technical language. A significant role of EFL instructors at the university level is moving to more job-related skill development for the students including the type of technical writing they use for their future professions.

Technical report writing in the field of Computers and Artificial Intelligence is vital to preparing professional engineers. In their study, Selwyn & Renaud-Assemat (2019) pointed out the importance of developing technical report writing skills of pre-service engineers. In their study (300) participants from the first and second years were taught using lab method, and were asked to write (800 words) report and to reflect on their writing. This improved writing skills (as measured by marks awarded and by questionnaires completed by students before and after the activity). The study highlighted the value of developing different technical writing skills in this growing field of study.

Assessing students' technical report writing is challenging due to its performative and technical features. Assessing the two skills of speaking and writing is more challenging than listening and reading due to the ease of using answer sheets for the latter skills. In this view,

Wright et al. (2022) investigated the nature of technical writing assessment and its instruments to be included in assessing engineering students. Wright expressed the view that "evaluation tools can play an important role, with rubrics serving as the primary assessment tools for technical writing. A rubric can be defined as a scoring guide that presents the criteria of importance as assessment decisions are made." (p.122). He further identified four formats: Checklists; Rating Scales; Descriptive Rubrics; and Holistic Rating Scales. Wright viewed checklists as a simple list of things the evaluator is looking for in the written document. Rubrics are effective tools for assessing the technical reports of the students.

Technical reports in the field of computers & AI include mainly two types of reports: workplace communication problems report and process reports (Fechter, 2020). The first type is a description of glitches, issues, problems, shortcomings, or IT-oriented problems. The second is a process report that describes products, processes, functions, systems or any IT-oriented processes. Different studies confirmed that confirmed the value and importance of process technical writing reports in the field of IT (e.g. Abul El-Mad, 2022; Pfeiffer & Boogerd, 2007 & Tebeaux & Dragga, 2015). These types of technical report writing are essential to the IT field.

In his book, Joshi (2006) identified the types and characteristics of technical report writing skills as distinctive features of this writing genre. These types include technical background reports, instructions,

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feasibility and recommendations, primary research reports, specifications, feasibility, business prospectus, and editorializing. Further, the characteristics include factual detail, graphics, information sources, documentation, realistic audience and situation, headings and lists, special format, production, length, and technical content. Technical reports entail varied skills and types devoted to different disciplines.

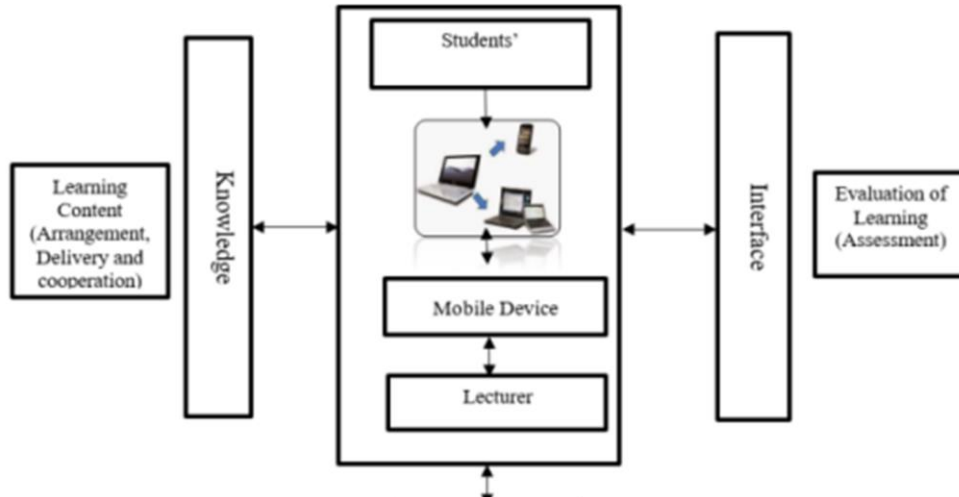
B. Mobile Learning Management Systems (M-LMS)

Mobile Learning (ML) refers to “any learning that happens when the learner is not in a fixed place” (Driscoll & Barneveld, 2015, p.1). ML definition is related to the different stages it passes in its history. In this view, Naeem (2021) described these stages as in an early stage; the focus of ML was on the technology itself and compiling content via PDAs and smartphones. A subsequent phase directed the focus on the mobility of learning itself and its boundaries. It is the integration of portable smart devices and digital technology in teaching and learning. A recent development of ML is the evolving Learning Management Systems LMSs.

Designing M-LMS environment in an EFL context requires key features and processes in this virtual environment. This entails the arrangement of the learning process and the key knowledge to be integrated and re-assessed in a mobile-based environment. This environment can be tailored in an online module based on a mobile application, learning platform, or Moodle (interface). The present study

adopted a model of M-LMS by Rizal et al. (2021) which integrated learning content, knowledge, processing, interface, and evaluation as the following figure (1) illustrates.

Figure (1) Framework of M-LMS (Rizal et al., 2021)



The above figure (1) shows that M-LMS LMS framework consists of key elements that integrate learning content, learning evaluation and assessment, the M-LMS users (including students and instructors), web and mobile devices (e.g. laptop, smartphone, and PDA). In this study, Canvas was used as a Mobile Learning Management System that integrates, data collection instruments, teaching modules and assessment tools as well.

Canvas is a Mobile Learning Management System that "serves to manage the learning process online. Canvas was launched in 2011, and the user of the Canvas network was established in 2012" (Wicksono, et al. (2021, 2). Canvas as a Mobile Learning Management

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System has different features and merits. These merits include the ease of use, accessibility, feedback, reliability, cloud-native features, interactivity, and providing both quantitative as well as qualitative forms of assessments.

A study by Ruslan et al. (2021) investigated optimizing LMS Canvas for interactive online learning as perceived by students. It involved 77 students as experimental group participants and utilized both a questionnaire and a semi-structured interview to collect data. Using both quantitative and qualitative analysis, results showed that students accessed Canvas ranging from less than one hour to more than two hours a week. Their purposes for accessing Canvas were carried: mostly to join some learning activities, read a module, or join a discussion. Students also reported the ease of accessing the module and its effectiveness in their learning and motivation to learn.

Learning Management Systems have been discussed in different studies that dealt with the impact of M- LMS in Foreign Language development (e.g. Altinpulluk & Kesim, 2021; Haggag, 2018, Krалеva, et al., 2019; Naeem, 2021; Turnbull, Chugh & Luck, 2021). For instance, Turnbull et al. (2021) conducted a comparative analysis of research methodologies, approaches, and data collection techniques followed in contemporary research in China and Australia. In their study, they discussed different literature and various articles related to the use of LMS to identify the similarities and differences in this research. Apart from the various techniques followed in LMS literature, the vast studies

that were analyzed concluded the significance of LMS in Foreign Language Learning.

A study by Furqon et al. (2023) discussed the various studies related to M-LMS in language education in three main areas: researchers, assessment, attitudes, and achievement, and students' language development. The first category discussed the use of LMS by institutions or researchers for research use or for commercial purposes that developed a certain LMS such as Edusoft or Canvas (e.g. Ojeda-Castro, et al. 2017; Kite, et al. 2020). The present study is part of this type of research as utilizes Canvas for learning. The second type dealt with LMS as a means for assessment and language development tool (see Alenezi, 2018; Zainuddin, & Perera, 2018). The third category discusses the views and attitudes about LMS as viewed by teachers and students (e.g. Emmamoge, et al. 2020; Naidu, 2017). These studies assure the different merits of LMS in the field of language teaching and research.

Attitudes of both the teachers and the students towards Mobile Learning Management Systems M-LMS were investigated by various studies (see Canal & Al-Rawashdeh, 2019; Holmes & Rodrigues, 2018; Ushakov, 2017). The key results of these studies assured the positive impacts of learning management systems on students' attitudes and satisfaction. For instance, a study by Saroia & Gao (2019) investigated the students' intention to use an m-LMS (i.e., Mobile Blackboard) in higher education in Sweden. A research model based on existing technology acceptance theories was developed and nine

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research hypotheses were proposed. The model was empirically examined using a survey of over 130 university students in Sweden. The results also confirmed the positive attitudes and satisfaction of the participants with the use of M-LMS in their fields of study at the university level.

C. Integrating M-LMS in Technical Report Writing

Albalawi (2022) explored the advantages of using the Learning Management System (LMS) in writing instruction for adult English classes in Saudi Arabia. The study utilized a descriptive approach to reach conclusions about the merits of integrating LMSs in language education. These merits depend on students' motivation, teachers' knowledge, instruction time and type of class instruction. These results were guided by similar studies (e.g. Alrashidi, & Phan, 2015; Mohammad & Hazarika, 2016) that reported different similar conditions for utilizing an effective LMS. The use of an effective M-LMS is bound by student motivation, class conditions, facilities, and instructor's skills.

A study by Bappah & Yarima (2015) examined the level of proficiency in technical report writing skills among the bachelor of Engineering and Bachelor of Technology streams. The study utilized standardized technical writing tests and data collection instruments to obtain the results from the technology and engineering students in LMS context. Results concluded that there is a need to develop the technical report writing skills of the participants for better future job

practices. It also highlighted the necessity to look for ways of enhancing the writing skills of engineering graduates.

Results of the study

Results of the study are tackled and discussed in the light of the hypotheses and questions of the study. The obtained results were generated from both quantitative input (technical writing test) and qualitative input (the reflective journal).

The first main hypothesis predicted that there would be no statistically significant mean differences at level (0.05) between the participants' scores in the pre and post-tests of their English technical writing overall score. To test the hypothesis, the following descriptive statistics procedure was run:

Table (1): Descriptive statistics of testing technical report writing

Var.	N	Minimum	Maximum	Mean	Std. Deviation
pre_test	35	11	23	15.80	2.998
post_test	35	18	26	22.23	2.001
Valid N (listwise)	35				

The above table (1) shows the number of participants (35), the minimum and maximum scores in the pre and posttest's overall score, means, and standard deviation. The table preliminarily shows a high mean (22.23) in the post-testing compared to the pre-testing (15.80). To test identify the differences in the participants' means, the following statistical procedure was run as the following Table (2) shows.

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Table (2): t-test results for technical report writing overall score

Pair	Paired Differences					t	df	Sig
	Mean	Std.	Std.	95% Confidence Interval of the Difference				
				Lower	Upper			
Pre-test Post-test	-6.429	2.535	.429	-7.300	-5.558	-15.00	34	.000

The above table (2) shows that there were differences in the mean scores of the participants (.000) in the pre and post-testing of their technical report writing skills, in favor of the post-testing. The difference was statistically significant (t= -15.00), p. <0.05). The following table (3) shows the Eta Squared value (η^2) that explains the effect size of the independent variable over the dependent one.

Table (3): Eta Squared Effect Size of the overall score

Source	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	153.835 ^a	8	19.229	3.294	.010	.503
Intercept	5982.274	1	5982.274	1.025E3	.000	.975
post_test	153.835	8	19.229	3.294	.010	.503
Error	151.765	26	5.837			
Total	9043.000	35				
Corrected Total	305.600	34				

According to the above table (3), Eta Squared value (η^2) was used to calculate the effect size of the M-LMS on the participants' technical report writing skills, as (η^2) is (.503), this shows a (large) effect for the module based on M-LMS.

The second hypothesis stated there would be statistically significant mean differences between the scores of the participants in the pre and post-testing of their technical report structure & layout-oriented skills favoring the post testing. To test this hypothesis, the following statistical treatment was run to identify the means differences of the participants' scores in the first part of the test (technical report content knowledge and layout).

Table (4): t-test results for layout and technical layout part

Variable	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair layout_pre 1 - layout_post	-3.314	3.225	.545	-4.422	-2.207	-6.081	34	.000

The above table (4) shows the mean differences between the participants (.000) in the pre and post-testing of the content knowledge and layout section. This shows that the participants had cognition and skills related to the layout and content of the technical report writing

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due to the training module. The following hypothesis discusses the second part of the test.

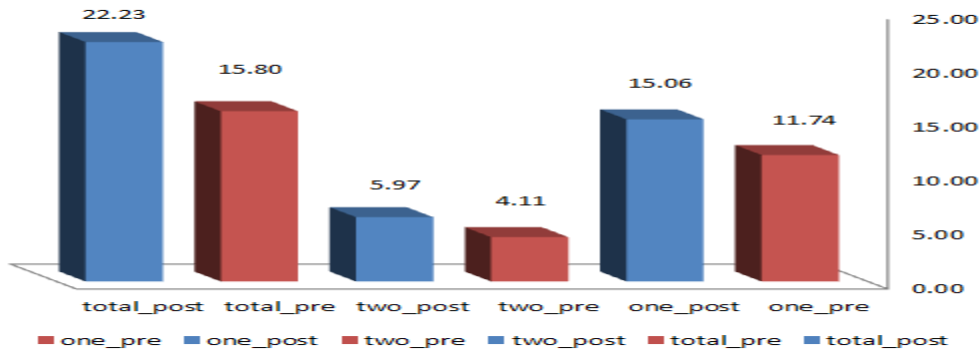
The third hypothesis predicted that there would be statistically significant mean differences between the scores of the participants in the pre and post-testing of their technical report content writing skills favoring the post-testing. The following table (5) shows the means differences treatment for the pre and post-testing of this part in the test.

Table (5): t-test results for content writing part

Variable	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 content_pre - content_post	1.800	1.052	.178	-2.161	-1.439	10.126	34	.000

The above table (5) shows the mean differences (.000) in the pre and post-testing of the participants' content writing skills. The obtained values show that these differences are significant as ($t = -10.125$), $p < 0.05$). The following figure (2) visualizes the developments that happened in each variable and the total score.

Figure (2) Pre-post analysis figure



The figure shows the development that happened in the content layout and cognition (part one), technical content writing (part two), and the total score of both the pre and post-testing procedures. Summing up, the obtained quantitative data from the test show mean differences in the pre and post-testing of the technical report writing skills of the participants in the structure and layout part, content writing part, and in the overall score of the test.

Discussion

The obtained results from the quantitative (the test) and qualitative (the journal) inputs of the study showed positive impacts on the participants' technical report writing skills. The results showed that there were statistically significant mean differences (.000) in the participants' scores of content and layout cognition, technical content writing, and the overall score on the test. This shows that using M-LMS is effective in developing the participants' technical report writing skills.

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The obtained results are consistent with other studies that called for using LMS and M-LMS in Foreign Language Education (e.g. Riza, et. al, 2023; Holmes & Prieto-Rodriguez, 2018; Han, & Shin, 2016). The results are also consistent with different studies that called for the use of Canvas in Foreign Language Instruction (see Fathi, et al., 2023; Albalawi, 2022; Abdel Haq, et al. 2021). In this view, a study by Ellis (2009) summed the various functions and merits that are added by LMSs in centralizing automated administration, self-guidance, learning consolidation, portability, and personalization. These merits were supported by the obtained results from the test and the reflective journal.

The obtained results are also consistent with various studies in the literature that concluded the positive impact of LMS in language development and positive attitudes towards e-learning (e.g. Altinpulluk & Kesim, 2021; Haggag, 2018; Han, & Shin, 2016; Krалеva, et al., 2019; Naeem, 2021; Turnbull, Chugh & Luck, 2021).

Due to the different features of the M-LMS, the participants could procedurally develop their report writing skills. In the pre-writing stage, they could share ideas in *Discussion* icon, share their thoughts, include comments, and brainstorm their ideas about the prompts. The Upload area could help the students to publish various versions of their pieces of writing in different formats "e.g. Pdf, doc, rtf". For editing, they could use *Comments, Assignment, Quiz, and Feedback* buttons as well. The participants could use various features

in the management system to respond and interact during the activities of the module both in class and at home, thus, using both synchronous and asynchronous learning opportunities.

Results showed the advances in the participants' technical report skills related to layout, structure and content writing. The significant values of the posttest (6.081) for the layout and (10.126) for content writing show the value of the module based on M-LMS. These results are consistent with the studies related to LMS & ML use in this area of research (i.e. Saine & West, 2017; Duin & Tham, 2020). For instance, Saine and West (2017) stated that virtual interactions between content area teachers contributed to the self-efficacy beliefs of teaching writing. The use of the present study's module enhanced the key technical report writing skills of the participants and could scaffold their learning.

Qualitatively, using the reflective journal on the LMS, students had to respond to a reflection journal about their views, feedback, and satisfaction with Canvas as a learning platform. They reported that it was accessible, easy to use, and enriched their IT use for learning. It also helped them to scaffold their technical report writing skills Student (A) for instance, stated that "*In sum, it is a good overall app, it makes learning and communication easier and helpful as in Canvas you could make an account and take quizzes on it*". This positive impact is consistent with similar studies that reported the positive impact of LMS

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in providing feedback (i.e. Laflen & Smith, 2017; Duin & Tham, 2020).

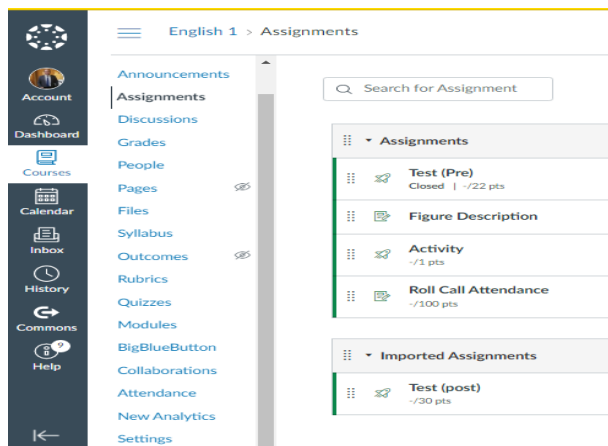
Another reflection by student (B) stated *"As a new platform that I deal with it was mysterious before trying, but after the first assignment I've had the basics to use Canvas platform ... Menus and bars are very simple you can reach all you want in a simple way. You can depend on Canvas as an integrated education environment"*. The obtained positive feedback from the students highlighted the ease and flexibility of using Canvas as a mobile-managed learning platform. It was useful for shy, low and mid levels' students to respond online to tasks of the module.

The different positive reflections generated from students' reflections are consistent with different studies in literature that assured the positive use of M-LMSs in language education over different university and in-service participants (e.g. Furqon, et al., 2023; Ajijola, 2021). These merits include taking control over learning, usefulness and ease, improving academic achievement, enabling easier material sharing and download, Understanding what LMS is and therefore being competent in ICT use for learning, and practicality of assessment types and instruments using LMS and online quizzes. These merits were also stated by the present study's participants in the reflection journal.

Effective use of Canvas features is consistent with the type of tasks, assignments and discussion types followed in the module. The

study implemented various types of instruction techniques, teaching methods, assessment types, and online groupings as provided by Canvas. The following figure shows the various features that were employed in the study and were used in the stages of planning, instruction, and assessment.

Figure (3) Canvas featured Elements.



- a. Providing Announcements.
- b. Uploading Assignments.
- c. Discussion Forums
- d. Grades
- e. List of Attendants
- f. Different Pages
- g. Files Drive
- h. Syllabus
- i. Outcomes
- j. Rubrics
- k. Quizzes
- l. Modules
- m. Attendance
- N. Analysis of Performance

Challenges faced by the participants during the experiment included time frame, technical issues, and technical writing issues. As to the time frame, it was because of the course load they had during the semester (18 ECTS per semester). Students had to submit various assignments for different courses. Another challenge was the connectivity during the lecture due to poor connectivity sometimes, to solve this problem, participants were asked to download materials at home and work offline on the materials in some sessions. Providing

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them with connectivity solutions in the labs could also help them interact easily.

Other challenges included acquainting the students with their report writing correction procedure and the use of the rubrics. Students had to know about the rubric used for correction and its different elements and this was done in the beginning of the course. A final challenge was the power failure in some sessions, thus, students were asked to recharge their tablets, laptops, or mobiles beforehand. Cooperating with the students and providing them with an easy pace and timing for writing submissions, downloading the modules and discussing of their writing could gain positive results during the sessions.

Implications of the Study

This interdisciplinary study can be utilized for different purposes and for different stakeholders. Informatics and AI specialists can make use of the module based on Canvas to design similar modules for different specialized courses devoted to this field. EFL instructors and teachers can also make use of the designed module for similar or different participants by adopting or adapting its content and materials. For course designers, designing a module based on M-LMS is a practical development in course design in the field of English for Occupational Purposes (EOP). For students, the module may help them to study, edit, or revise their technical reports. The study adds to

the theory and practice of both the field of language education technology and English for Occupational Purposes as well.

Conclusion

Utilizing Mobile Learning Technology as a Learning Management System is a revolutionary field in Foreign Language education. Devoting M-LMS for career-oriented professions is a demanding virtue for effective class technology use. This study investigated the effect of using M-LMS (Canvas) based module in English technical report writing on Computers and AI freshmen students' writing skills. The obtained results from the quantitative and qualitative results showed the following:

- M-LMS was effective in developing the participants' technical report writing skills in terms of layout and content cognition.
- M-LMS was effective in developing the participants' technical content writing skills.
- Participants were satisfied with the use of M-LMS in their writing class, they agreed that using this technology was easy and effective to use.

Limitations, recommendations, and suggestions for further research

Throughout this study, several areas for future improvement were identified. The study was limited to short reports type, thus, further long report modules are recommended to be conducted over the

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same or different participants. Due to the tight schedule of the participants, fewer submissions for the tasks were identified. Therefore, increasing the number of submitted reports would increase the consistency and quality of students' technical report writing skills development.

In light of the obtained results, researchers may further put into consideration the following suggestions to explore Mobile Based Learning Management Systems and their applications in enhancing learners' writing fluency, types, or conventions:

- Integrating technical writing to other presentation or fluency-oriented skills in EFL settings.
- Integrating M-LMS into oral fluency and communication-oriented skills in different EFL contexts.
- Utilizing Canvas application for essay-writing purposes.
- Utilizing M-LMS for performance-based assessment practices by EFL instructors.
- Moving the use of M-LMS from the adult and university context to EFL classes in primary, prep, and secondary stages.

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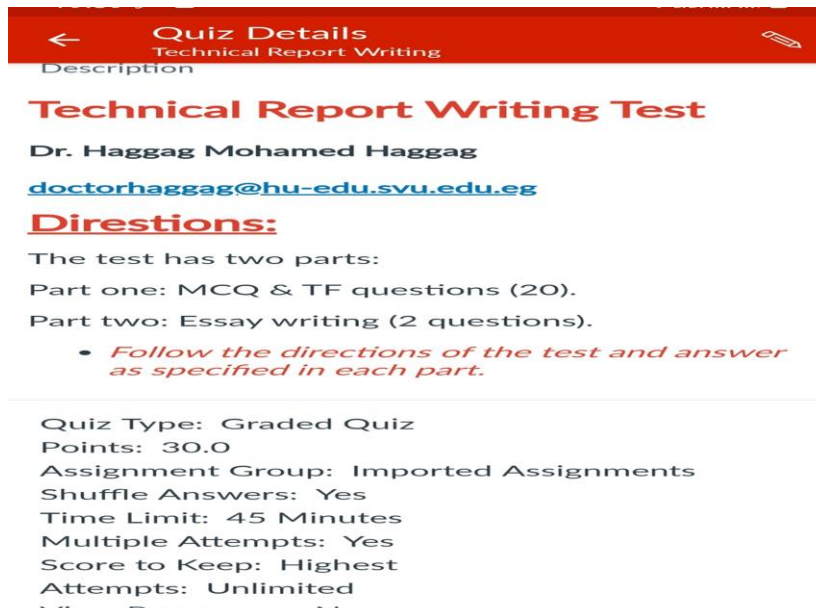
Appendix (1)

Canvas-LMS app link and main icons from mobile screen:



Test Link on Canvas platform and test mobile screen:

<https://canvas.instructure.com/courses/7898924>



Re

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← Discussion Details
English 1 IT

Reflection Journal
● Published

 Dr. Haggag Mohamed

How using CANVAS Moodle can be helpful or challenging? Did you learn easily using the Moodle ? what do you think of using it in other related courses in the university? Is it easy or difficult to use? does it provide feedback?

Reply

Replies

 polasamy81311518@gmail.com

Canvas Moodle serves as a versatile online learning platform, offering a range of benefits and presenting some challenges.

In my personal experience, once understood, provides a user-friendly space for accessing resources, participating in discussions, and submitting assignments, and I would use it with other courses as it's both so helpful and easy to

Appendix (4)

Technical Writing Rubric: App Screen

Technical Writing Rubric					
Criteria	Ratings				Pts
Organization	4 to >3.0 pts 4 Information is very organized with well-constructed paragraphs and subheadings.	3 to >2.0 pts 3 Information is organized with well-constructed paragraphs.	2 pts 1 Information is organized, but paragraphs are not well-constructed.	2 to >0 pts 2 The information appears to be disorganized.	4 pts
Mechanics	4 to >3.0 pts 4 No grammatical, spelling or punctuation errors.	3 to >2.0 pts 3 Almost no grammatical, spelling or punctuation errors	2 pts 1 Many grammatical, spelling, or punctuation errors.	2 to >0 pts 2 A few grammatical spelling, or punctuation errors.	4 pts
Paragraphing	4 to >3.0 pts 4 All paragraphs include introductory sentence, explanations or details, and concluding sentence.	3 to >2.0 pts 3 Most paragraphs include introductory sentence, explanations or details, and concluding sentence.	2 pts 1 Paragraphing structure was not clear and sentences were not typically related within the paragraphs.	2 to >0 pts 2 Paragraphs included related information but were typically not constructed well.	4 pts
Describing Diagrams & Figures	4 to >3.0 pts 4 Diagrams and illustrations are	3 to >2.0 pts 3 Diagrams and illustrations are	2 pts 1 Diagrams and illustrations are	2 to >0 pts 2 Diagrams and illustrations are	4 pts

