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An e-program based on Zimmerman's model for developing EFL productive skills of students at faculty of education

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Abstract

This study investigated the effect of an e-program based on Zimmerman's model on developing EFL productive skills (speaking and writing) of second-year university students. The study employed a quasi experimental design (pre – post exp./content design). The study included 60 second-year students selected from the English section at the Faculty of Education at Benha University. The participants were divided: an experimental group (n = 30) who received instruction through an e-program based on Zimmerman's model, and a control group (n= 30) who were taught using the traditional method for developing productive skills (speaking and writing). The instruments were: a checklist for EFL productive skills that encompassed six main skills and 20 sub skills, EFL productive skills pre and posttests and a scoring rubric to assess them. A program was prepared and implemented in the first semester of the year 2023/2024. The study results indicated that the experimental group surpassed the control group in the post EFL productive skills test. The results confirmed the effectiveness of the e-program based on Zimmerman's model for developing second-year students' EFL productive skills.

Keywords: Elearning, Zimmerman's model, Productive skills.

برنامج إلكتروني قائم علي نموذج *Zimmerman* لتنمية المهارات الإنتاجية فى اللغة الإنجليزية كلغة أجنبية لدى طلاب كلية التربية

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ملخص البحث

هدف هذا البحث إلى استخدام برنامج إلكتروني قائم علي نموذج Zimmerman لتنمية المهارات الإنتاجية (التحدث والكتابة) فى اللغة الانجليزية كلغة أجنبية لدى طلاب الفرقة الثانية شعبة اللغة الانجليزية بكلية التربية جامعة بنها.لقد تم استخدام التصميم التجريبي ذو المجموعتين (قبلي بعدي) و لقد بلغت عينة الدراسة ستين طالبا تم اختيارهم عشوائياً من طلاب الفرقة الثانية المقيدين بشعبة اللغة الإنجليزية بكلية التربية ببنها، و تم تقسيمها إلى مجموعة تجريبية (ن=٣٠) تم تدريسها باستخدام البرنامج الإلكتروني القائم على نموذج Zimmerman، ومجموعة ضابطة (ن=٣٠) تم تدريسها باستخدام الطريقة التقليدية في تدريس المهارات الإنتاجية (التحدث والكتابة) باللغة الإنجليزية كلغة أجنبية. شملت أدوات الدراسة: قائمة بالمهارات اللازمة لهؤلاء الطلاب مقسمة إلى ست مستويات رئيسية و ٢٠ مهارة فرعية و اختبار قبلي واختبار بعدي لقياس المهارات الإنتاجية لدي العينة. وتم إعداد برنامج إلكتروني قائم علي نموذج Zimmerman وتطبيقه في الفصل الدراسي الأول من العام ٢٠٢٣/٢٠٢٤. وأظهرت نتائج الدراسة أن المجموعة التجريبية تفوقت على المجموعة الضابطة في الاختبار البعدي للمهارات الإنتاجية فى اللغة الإنجليزية كلغة أجنبية. وأكدت النتائج فعالية البرنامج الإلكتروني القائم على نموذج Zimmerman في تنمية المهارات الإنتاجية فى اللغة الإنجليزية كلغة أجنبية لطلاب الفرقة الثانية المقيدين بشعبة اللغة الإنجليزية بكلية التربية ببنها.

كلمات مفتاحية: التعلم الإلكتروني – نموذج Zimmerman – المهارات الإنتاجية فى اللغة الإنجليزية كلغة أجنبية.

Introduction

Self-regulated learning (SRL) is a proactive and intentional approach where students set their own learning goals and take responsibility for monitoring, adapting, and controlling their motivations, thought processes, and actions in line with their objectives and the specific characteristics of their learning environment (Pintrich, 2000). SRL is a dynamic process, as it involves various cognitive, metacognitive, and emotive processes (Winne, 2018). Seli and Dembo (2020) described SRL within an academic framework, as the proactive effort made by college students to establish optimal learning conditions through managing influential variables and surmounting obstacles that hinder learning progress.

SRL empowers students to independently monitor, control, and evaluate their learning progress, enabling them to make necessary adjustments and modifications to their learning strategies based on their individual needs. By engaging in SRL, students enhance their learning capabilities and develop into self-reliant, autonomous learners (Reinhardt, 2019; Schunk & Zimmerman, 2003; Zimmerman, 2015).

Zimmerman's cyclical phase model falls in forethought, performance, and self-reflection. The first phase commences upon the introduction of a learning assignment to the learner (Zimmerman, 2000). This second phase of SRL, performance, consists of two distinct sub-stages: self-control and self-observation (Zimmerman & Moylan, 2009). The self-reflection phase includes two key processes: self judgments and self reactions (Zimmerman & Tsikalas, 2005).

Forethought phase

In this phase, students analyze the task, set objectives, and strategize their approach. This phase involves task analysis as well as self-motivation beliefs (Cleary, 2018). Task analysis comprises three distinct sub-processes: task definition, goal setting, in addition to strategic planning. Task definition involves the activation of prior content and metacognitive knowledge, serving as a crucial preparatory phase before embarking on a learning task. (Moos & Azevedo, 2006; Pintrich, 2000; Winne, 2001). Throughout the learning process, students may benefit from periodic prompts to plan and activate their existing

knowledge. By engaging in their prior knowledge, students can construct new insights and elaborate on concepts within the hypermedia environment (Azevedo, 2005).

Goal setting and planning require students to comprehend the criteria for assessment and establish their personal benchmarks for success. Through strategic planning, students identify an action plan and the necessary strategies to accomplish a specific task. Additionally, proficient self-regulated learners often develop a structured system of specific, attainable short-term goals that are connected to more challenging long-term goals (Zimmerman, 2000, 2008).

Students' self-motivational beliefs are essential for task completion. Four key variables that influence motivation are self efficacy, out-come expectations, intrinsic interests, and learning goals orientation. Self efficacy refers to the belief in one's ability to perform well, linked to expectations of success. Interest and understanding of a task's learning purpose impact planning. Outcome expectations are the anticipated results of task completion. Intrinsic interest drives engagement in enjoyable activities. Learning goal orientation helps set objectives and achieve desired outcomes. Mastery goals, prioritizing long-term rewards, predict strategic planning for self-regulated learning (Zusho & Edwards, 2011).

Performance phase

In the performance phase, student carries out tasks, monitors progress, and uses techniques to enhance educational experiences (Cleary et al., 2017). This phase includes self- control/strategy use and self- observation. Self – control processes involve using specific techniques to facilitate learning or task completion. Metacognitive processes such as imagery, self - instruction, attention focusing, as well as task strategies are part of self-control. Imagery helps organize information, while self-instruction involves giving oneself task instructions. Atention focusing requires concentrating on key aspects of material, whereas task strategies are specific methods for a given task (Zimmerman, 2002; Cleary & Zimmerman, 2004, Zimmerman & Kitsantas, 2005).

Self-observation includes two key elements: self - recording and self - experimentation. Self- recording includes documenting activities for later evaluation, while self-experimentation entails trying out various

strategies to improve metacognitive monitoring (Zimmerman & Kitsantas, 2005).

While self-control processes guide learning through self-instruction, attention focusing, imagery, and task strategies, self - observation entails monitoring performance to assess progress and make adjustments (Zimmerman, 1989). Effective performance control strategies include organizing materials, collecting information, recording /documenting activities, self- monitoring, practicing, memorizing, along with seeking help when needed (Zimmerman & Martinez-Pons,1986). Other effective strategies include self-questioning, evaluating content, conducting goal-directed searches, taking notes, summarizing information, generating hypotheses, and exerting deliberate control over the learning environment (Azevedo & Cromley, 2004; Azevedo et al., 2004)

Self-reflection phase

The phase of self-reflection monitors the involvement of students in a task and is closely linked to their academic achievements (Labuhn et. al., 2010). Within this phase, students engage in introspection regarding their learning process, assess their responses to performance objectives and results, and contemplate potential adjustments to enhance their performance (Cleary et al., 2017). Self - judgement and self - reaction are components of the self - reflection phase (Cleary & Zimmerman, 2004).

Self- judgment entails self- evaluation and causal attribution. *Self - evaluation* involves learners critically analyzing their own performance against specific criteria using various standards like norms, benchmarks, past achievements, or personal objectives. *Causal attribution* helps students understand the reasons behind their academic successes or failures (Cleary, 2018).

Self-reaction encompasses both self-satisfaction as well as adaptive and defensive decisions. Self-satisfaction involves the cognitive and emotional reactions that arise from self-assessment. Conversely, adaptive decision-making includes the individual's readiness to engage in future tasks and employ effective learning strategies. During the self-reflection phase, various sub-processes of SRL are significantly interconnected (Zimmerman, 2001). There are two key self-reflection

strategies, namely self-evaluating and reviewing records (Zimmerman and Martinez-Pons,1986).

E-learning broadens students' perspectives by utilizing the internet or intranet within the campus, liberating them from temporal and spatial constraints. Additionally, technology empowers students to engage in real-world activities and assignments that enhance their learning, memory, and application of acquired skills regularly (Kim & Kwon, 2012; Yang, 2013).

According to Sangrà et al. (2011), e-learning is the utilization of electronic media and devices to facilitate learning and instruction, thereby enhancing accessibility, promoting progress, and elevating the quality of education and training. On the other hand, Gul (2015) defines e-learning as an educational approach that capitalizes on contemporary communication technologies, including computers and their networks, audiovisual materials, online search platforms, e-books, and websites, which can be utilized in both conventional classroom settings and remote learning environments.

E-learning plays a significant role in supporting SRL among students (Pérez-Álvarez et al., 2018; Singh & Miah, 2020). Learners need motivation and skills to actively engage in reflective practices for successful SRL (Gavriushenko et al., 2017). E-courses in formal and informal education allows learners to acquire essential skills for contemporary society, fueling interest in SRL (John et al., 2015; Zimmerman, 2015; Schwendimann et al., 2016). SRL holds promise for e-learning environments (Hernández-Gantes, 2010). Moreover, SRL is crucial in e-education, particularly for efficient language acquisition. Integrating SRL principles in e-environments empowers learners and enhances their educational experience and outcomes (Kulusakli, 2022).

Students are taught four distinct communication skills: listening, speaking, reading, and writing. These skills can be categorized as either receptive or productive. Receptive skills (reading and listening) involve the intake and comprehension of information, while productive skills (speaking and writing) involve the generation and expression of language.

Golkova and Hubackova (2014) stated that productive skills involve the ability of language users to communicate information through speaking or writing. They also highlighted that while there are shared activities between speaking and writing, there are also distinct

differences in the skills needed for each mode of communication. To Hubackova and Golkova (2014), productive skills, often known as active skills, involve transmitting information by learners through either spoken or written means. From a pragmatic and communicative perspective, these skills are essential for students to participate in real-life situations in the classroom and assess their understanding of the material (Sagoian, 2018).

In order to develop productive skills, it is crucial for students to focus on both speaking and writing. Productive skills encompass various aspects such as fluency, accuracy (vocabulary and grammar), content, organization, pronunciation and mechanics (Ahyak & Indramawan, 2013; Alfaqeh et al. 2022, Brown & Lee, 2015; Hyland, 2007; Goh & Burns, 2012; Nation, 2011; Rizqiningsih & Hadi, 2019).

Fluency is the ability to carry out tasks or activities automatically, swiftly, and accurately (Brand & Brand, 2006), it involves navigating social contexts and engaging in dialogues effectively, while fluency in writing requires translating thoughts into coherent, logically organized, and grammatically accurate sentences using recognized vocabulary (Brown, 2004; Atasoy & Temizkan, 2016).

Vocabulary represents the collective set of words comprising a language, playing a significant role in students' capacity to effectively utilize words within a written or spoken context. The careful selection and appropriate use of vocabulary in sentences are essential for proficient speaking and writing skills (Brown & Lee, 2015; Thornbury, 2005).

Grammar/ syntax enables speakers and writers to comprehend language. This involves organizing words in a sentence correctly, dissecting language structure, and combining linguistic elements to form coherent sentences. Grammar rules are evident in pronunciation and morphology (Brown, 2004; Thornbury, 2005; Richards & Schmidt, 2010).

Organization of a written piece includes how sentences, paragraphs, and chapters are connected to convey meaning through different structures such as order of importance, chronological order, and comparison and contrast. On the other hand, discourse organization involves developing extended discourse in different speech genres while following sociocultural language norms. Effective organization involves

a well-crafted introduction, coherent sequence of ideas, conclusion, and appropriate length (Bratcher & Ryan, 2004; Brown & Lee, 2015; Goh & Burns, 2012).

Content knowledge is crucial for students to effectively discuss or write about a subject, as it involves understanding the ideas and concepts within the topic (Hyland, 2003). Content includes authentic information, interpretations, and concepts that speakers and writers use to express the main idea, provide specific details, and thoroughly explore ideas and events (Bratcher & Ryan, 2004). It also involves the logical progression of ideas, including presenting a thesis statement, developing related ideas, using various types of evidence, using descriptive language, exploring cause and effect relationships, and comparing and contrasting different elements (Brown, 2004; Brown & Lee, 2015).

Pronunciation refers to how sounds and language elements are spoken, including segmental and supra-segmental levels (Goh & Burns, 2012; Richards & Schmidt, 2010). Understanding pronunciation helps students with stress, pitch, and intonation for conveying meaning. Good pronunciation is crucial for effective communication (Brown, 2001; 2004). It includes rhythm, intonation, articulation, stress, and non-verbal elements (Fraser, 2001; Goh & Burns, 2012).

Mechanics/ conventions encompass grammatical correctness in writing, including spelling, punctuation, citation of references, neatness, and appearance. They involve basic accuracy as well as more intricate grammatical and stylistic decisions, such as the appropriate usage of apostrophes, hyphens, capitalization, abbreviations, and numbers (Bratcher & Ryan, 2004; Brown & Lee, 2015; Richards & Schmidt, 2010).

Context of the Problem

Examining National Academic Reference Standards (NARS) (2013) highlighted a particular focus on the essential skills of speaking and writing in English for EFL Teacher Preparation Programs. This revealed the importance of EFL writing and speaking courses for EFL university students.

Based on the researcher's experience for 4 years as a demonstrator and 3 years as an assistant lecturer, a significant number of second-year EFL students at Benha Faculty of Education lack adequate writing skills. Instead of focusing on composing complete essays, the English writing

courses primarily emphasize paragraph writing. The students are only exposed to a limited number of writing genres. The students face challenges in writing English essays due to a lack of clear and structured writing guidance. They struggle to express the main ideas and supporting details of each topic, as well as follow the conventional essay structure of introduction, body, and conclusion. Additionally, the students have difficulties in effectively expressing their thoughts through written language, as shown by their limited vocabulary and incorrect grammar usage. Moreover, the students tend to include irrelevant information in their essays, which detracts them from the main argument and leads to a disorganized and disjointed writing style.

Additionally, they also encounter numerous challenges when it comes to speaking, including difficulties in selecting suitable vocabulary, phrasal verbs, idiomatic expressions, and grammatical structures. Pronunciation issues, lack of confidence in public speaking, inability to respond effectively in different scenarios, and passive participation in speaking exercises are also common issues faced by these students. Moreover, they struggle with utilizing body language, facial expressions, and gestures to effectively communicate their intended message.

A review of the previous studies indicated that EFL university students encounter several difficulties with speaking and writing skills, such as Abdul-Aleim (2023), Abdel Rahman (2021), Eid (2020), Hassan (2021), Hussein (2021). These studies revealed a lack in Faculty of Education students' EFL productive skills.

To document the study problem, the researcher conducted a pilot study to investigate second year students' level in speaking and writing. The participants consisted of (N= 30) second year students at the Faculty of Education at Benha University during the second term of the academic year 2021/2022. The researcher used the EFL writing test and EFL speaking test prepared by Helwa (2013). The writing test comprised four essay questions, while the speaking test included five sections that evaluated phonological, syntactic, and morphological skills, as well as semantic, pragmatic, and interaction skills. The test results showed the low level of second-year students in EFL productive skills.

Finally, this study aimed to investigate the effects of an e-program based on Zimmerman's model on developing for second-year university students' EFL productive skills.

Statement of the Problem

In spite of the importance of the EFL productive skills and the necessity to improve them, second year students at Faculty of Education seem to be lacking these skills. Consequently, the following study sought to examine the effect of e-program based on Zimmerman's model for developing EFL productive skills among these students.

Questions of the Study

1. What are the EFL productive skills required of second year students at the Faculty of Education, Benha University?
2. How can an e-program based on Zimmerman's model be used for developing EFL productive skills of second year students at Benha University Faculty of Education?
3. What is the effect of e-program based on Zimmerman's model in developing EFL productive skills of second year students at the Faculty of Education, Benha University?

Delimitations of the Study

1. Second-year students (n= 60) in English Section at Benha Faculty of Education divided into, control (n= 30) and experimental group (n =30).

2. Six main EFL productive skills (accuracy, pronunciation, content, organization, fluency, and mechanics) and they included twenty sub- skills required of second - year students enrolled at English Section at Benha Faculty of Education.

3. Zimmerman's SRL model.

Method

Design of the study

The present study employed the quasi- experimental method (two groups: pre- post exp.,/content design) to develop EFL productive skills of second-year students enrolled in the English section at the Faculty of Education at Benha University through using an e-program based on Zimmerman' model.

Participants of the study

The participants of this study were 60 second - year students enrolled at the English section, Faculty of Education, Benha University. They were assigned to experimental group (n=30), taught using the e-program based on Zimmerman' model, and a control group (n=30), taught using traditional methods during the first semester of the year 2023/2024.

Instruments and materials of the study

The EFL Productive Skills Checklist

Purpose

The researcher prepared the EFL productive skill checklist to identify the required EFL productive skills of the second-year university students enrolled at the English section at the Faculty of Education.

Description

The EFL productive skills checklist consisted of six main skills.: accuracy (5 sub-skills), pronunciation (4 sub-skills), content (3 sub-skills), organization (3 sub-skills), fluency (3 sub-skills) and mechanics (2 sub- skills). There are a total 20 subskills

Sources

The researchers reviewed related studies, literature, some IELTS books, National Academic Reference Standards (NARS), in addition to Specification of the English Language Teacher Preparation Program to determine the EFL productive skills, main and subskills, required for the participants**.**

The EFL Productive Skills Tests

Purpose

The pre EFL productive skills test was used to identify second-year students' level in the EFL productive skills. The post EFL productive skills test was used to identify the effect of e-program based on Zimmerman's model in developing EFL productive skills.

Description

Each EFL productive skills test comprised a total of six questions, which were further categorized into two primary sections. The first section, speaking, encompassed three questions, while the second section, writing, also included three questions.

Validity

To ensure the validity of the pre and post EFL productive skills tests, the tests were submitted to a panel of jurors specializing curricula and methods of teaching English. The jurors were tasked with assessing the clarity and appropriateness of the tests items for the sample of the study, specifically second-year students in the English Section at Benha Faculty of Education. Additionally, they were asked to determine whether the items effectively measured the intended EFL productive skills. The jury members confirmed that the tests aligned with their main objectives and that the questions were coherent with those objectives. They suggested several modifications, including rephrasing certain items, which the researcher carefully considered to finalize the tests format.

Reliability

To measure the reliability of the EFL productive skills tests, two distinct methods were employed: Alpha Cronbach method and Test re-test method. The Alpha Cronbach method resulted in a correlation coefficient of 0.93, demonstrating a high level of reliability. Similarly, the Test-retest method produced a correlation coefficient of 0.94, further validating the strong reliability of the test.

The E-Program based on Zimmerman' Model for developing EFL Productive Skills

In order to develop EFL productive skills of second-year University students, the researcher incorporated various e-learning applications, tools, and Zimmerman's SRL model strategies. The researcher designed an instructional program that demonstrated the utilization of the e-program based on Zimmerman's model to develop EFL productive skills among the students.

The implementation of the e-program based on Zimmerman's model consisted of fourteen sessions designed by the researcher, uploaded to the course site (https://canvas.instructure.com/courses/2389305), that lasted for seven weeks, consisting of two sessions each week, with each session ranging from 45 to 120 minutes. An orientation session was prepared as the first session and the rest of sessions were for developing and consolidating EFL productive skills.

The researcher used peer, formative and summative evaluation. Students evaluated each other's work. Formative assessments acted as a means to assess participants' progress in EFL productive skills, providing both immediate and delayed feedback. The online quizzes and activities offered valuable insights and information to the researcher into the participants' progress and development EFL productive skills. At the end of the treatment, a summative assessment was carried out using the post EFL productive skills test to evaluate the participants' level of achievement.

Data Collection

The subsequent procedures were implemented in this study.

Pre-testing

Before the e-program based on Zimmerman's model was implemented, the participants were tested using the pre EFL productive skills test to evaluate their levels in EFL productive skills. Their responses were then analyzed and scored.

Treatment

Following the pretesting, the participants (N=60) were divided into control group (N=30) and experimental group (30). The treatment took place over seven weeks, during which participants attended two sessions each week, with each session targeting specific skills to be developed.

Post-testing

The participants of the study were posttested to examine the effect of the e-program based on Zimmerman's model.

Findings and Discussion of the Study

The findings will be examined in relation to the hypotheses of the study.

Findings of the First Hypothesis

The first hypothesis states that "There is a statistically significant difference between the mean scores of participants in the control and

experimental groups in the post application of the overall EFL productive skills test, in favor of the experimental group".

Table (1): Findings of the t-test between the control and experimental groups (n1= 30 & n2= 30) (DF= 58) in overall EFL productive skills post-test

Skills	Full mark	Groups	Mean	Std. Deviation	t-value	A Sig	η^2
EFL Productive Skills	80	Exp.	71.27	3.15	49.66	0.01	0.98
		Control	39.07	1.64			

Table (1) shows the differences between the mean scores of students in the control group and those in the experimental group in the post applications of the overall EFL productive skills test. In addition, there is a statistically significant difference at the level ($\alpha \leq 0.01$) between the mean scores of students in the control and experimental groups in the post application of the overall EFL productive skills test, in favor of the experimental group, which proves the first hypothesis of the study.

Findings of the Second Hypothesis

The second hypothesis states that "There is a statistically significant difference between the mean scores of participants in the control and experimental groups in the post application of the EFL productive skills test on accuracy skills, in favor of the experimental group".

Table (2): Findings of the t-test between the control group and experimental group (n1= 30 & n2= 30) (DF= 58) in accuracy and its sub-skills

Main skills	Sub- skills	Groups	Mean	Std. Deviation	t-value	A Sig	η^2
Gram ma	Use different grammatical	Exp.	3.79	0.28	35.77	0.01	0.94
		Control	2.09	0.15			

	types of phrases and sentences and verb tenses						
	Form a variety of well-structured sentences	Exp.	3.81	0.27	29.26	0.01	0.93
		Control	2.02	0.21			
Grammar		Exp.	7.59	0.52	37.80	0.01	0.95
		Control	4.12	0.27			
Vocabulary	Use the appropriate vocabulary to the topic and setting	Exp.	3.72	0.40	21.74	0.01	0.89
		Control	2.07	0.10			
	Use phrasal verbs and idiomatic expressions	Exp.	3.09	0.19	18.69	0.01	0.92
		Control	1.89	0.14			
	Use the correct forms of words	Exp.	3.68	0.33	22.08	0.01	0.91
		Control	2.06	0.14			
Vocabulary		Exp.	10.49	0.80	26.76	0.01	0.94
		Control	6.02	0.27			
Accuracy		Exp.	18.08	1.21	35.69	0.01	0.95
		Control	10.14	0.40			

Table (2) indicates that there is a statistically significant difference at the level ($\alpha \leq 0.01$) between the mean scores of students in the control and experimental groups in the post applications of the EFL productive skills test on accuracy skills as a whole and in its sub-skills, in favor of the experimental group. The "t" value is (34.07) which is significant at the (0.01). Moreover, η^2 values ranged from moderate to high (0.89 & 0.95), which is larger than (0.14), showing the effect of the use of the e-program based on Zimmerman's model on the accuracy skill as a whole and in its subskills. Thus, this hypothesis was confirmed.

Findings of the Third Hypothesis

The third hypothesis states that "There is a statistically significant difference between the mean scores of participants in the control and

experimental groups in the post application the EFL productive skills test on pronunciation skills, in favor of the experimental group".

Table (3): Findings of the t-test between the control and experimental groups (n1= 30 & n2= 30) (DF= 58) in pronunciation and its sub-skills

Main skills	Subskills	Groups	Mean	Std. Deviation	t-value	A Sig	η^2
Pronunciation	Articulate individual sounds and clustered sounds	Exp.	3.66	0.33	22.66	0.01	0.89
		Control	2.12	0.16			
	Use stress patterns correctly	Exp.	3.42	0.35	15.53	0.01	0.81
		Control	1.99	0.24			
	Use various intonation patterns	Exp.	3.49	0.30	22.24	0.01	0.89
		Control	1.91	0.25			
	Employ aspects of connected speech	Exp.	3.21	0.28	21.71	0.01	0.89
		Control	1.42	0.35			
Pronunciation		Exp.	13.78	0.89	33.06	0.01	0.95
		Control	7.44	0.56			

Table (3) indicates that there is a statistically significant difference at ($\alpha \leq 0.01$) between the mean scores of students in the control and experimental groups in the post applications of the pronunciation skill as a whole and in its subskills, in favor of the experimental group, which fulfills the third hypothesis. The "t" value is (33.06) which is significant at the (0.01). The ($\eta 2$) of the treatment on the pronunciation skill as a whole and in its sub-skills ranged from moderate to high (0.81 & 0.95), which is a large and appropriate value. This indicates that a large proportion of the differences are attributed to the experimental treatment on the pronunciation. This suggests that a significant proportion of the differences can be attributed to the experimental treatment on pronunciation.

Findings of the Fourth Hypothesis

The fourth hypothesis states that "There is a statistically significant difference between the mean scores of participants in the control and experimental groups in the post application the EFL productive skills test on content skills, in favor of the experimental group".

Table (4): Findings of the t-test between the control and experimental groups (n1= 30 & n2= 30) (DF= 58) in content and its sub-skills

Main skills	Sub-skills	Groups	Mean	Std. Deviation	t-value	A Sig	η^2
Content	Produce a topic sentence/ main idea	Exp.	3.79	0.20	40.79	0.01	0.97
		Control	2.06	0.11			
	Develop enough and relevant ideas	Exp.	3.79	0.22	37.23	0.01	0.96
		Control	2.06	0.13			
	Speak or write on a variety of topics or situations	Exp.	3.47	0.12	37.37	0.01	0.96
		Control	1.89	0.20			
Content		Exp.	11.06	0.47	48.57	0.01	0.98
		Control	6.01	0.32			

Table (4) shows that there is a statistically significant difference at the level ($\alpha \leq 0.01$) between the mean scores of students in the control and experimental groups in the post applications of the content skill and in its subskills, in favor of the experimental group. Hence, the fourth hypothesis was verified. The η2 of the experimental treatment on the content skill as a whole and in its sub-skills ranged from moderate to high (0.81 & 0.95), which is a large and appropriate value. This suggests that a significant proportion of the differences are linked to the experimental treatment on the content skill.

Findings of the Fifth Hypothesis

The fifth hypothesis states that "There is a statistically significant difference between the mean scores of participants in the control and

experimental groups in the post application the EFL productive skills test on organization skill, in favor of the experimental group".

Table (5): Findings of the t-test between the control and experimental groups (n1= 30 & n2= 30) (DF= 58) in organization and its sub-skills

Main skills	Sub - skills	Groups	Mean	Std. Deviation	t-value	A Sig	η^2
Organization	Produce logically coherent sentences	Exp.	3.69	0.17	37.57	0.01	0.96
		Control	2.02	0.18			
	Use cohesive devices	Exp.	3.66	0.20	33.36	0.01	0.95
		Control	1.88	0.22			
	Organize the spoken or written topic in an appropriate format	Exp.	3.69	0.18	35.48	0.01	0.96
		Control	1.83	0.22			
Organization		Exp.	11.03	0.52	41.84	0.01	0.97
		Control	5.73	0.46			

Table (5) indicates that there is a statistically significant difference at the level of significance ($\alpha \leq 0.01$) between the mean scores of students in the experimental and control groups in the post-applications of the organization skill as a whole and in its subskills, in favor of the experimental group. Henceforth, the fifth hypothesis was confirmed. The ($\eta 2$) of the experimental treatment on the organization skill as a whole and in its subskills ranged from moderate to high (0.95 & 0.97), which is a large and appropriate value. This shows that a large portion of the differences are ascribed to the experimental treatment on the organization.

Findings of the Sixth Hypothesis

The sixth hypothesis states that "There is a statistically significant difference between the mean scores of participants in the control and experimental groups in the post application the EFL productive skills test on fluency skills, in favor of the experimental group".

Table (6): Findings of the t-test between the control and experimental groups (n1= 30 & n2= 30) (DF= 58) in fluency and its sub-skills

Main skills	Sub-skills	Groups	Mean	Std. Deviation	t-value	A Sig	η^2
Fluency	Produce language spontaneously, easily and smoothly	Exp.	3.11	0.16	20.832	0.01	0.88
		Control	1.63	0.35			
	Use conversational fillers and routines appropriately	Exp.	2.98	0.19	18.905	0.01	0.86
		Control	1.46	0.40			
	Write an essay of an appropriate length within the time allotted	Exp.	3.55	0.23	30.213	0.01	0.94
		Control	2.08	0.14			
Fluency		Exp.	9.63	0.32	41.838	0.01	0.94
		Control	5.17	0.73			

Table (6) shows that there is a statistically significant difference at the level of significance ($\alpha \leq 0.01$) between the mean scores of students in the experimental and control groups in the post-applications of the fluency skill as a whole and in its subskills, in favor of the experimental group. Moreover, the ($\eta 2$) of the treatment on the fluency skill and its sub- skills ranged from moderate to high (0.86 & 0.94), which is a large and appropriate value. This shows that a large proportion of the differences are attributed to the experimental treatment on the fluency skill and its sub-skills. Henceforth, the sixth hypothesis was supported.

Findings of the Seventh Hypothesis

The seventh hypothesis states that "There is a statistically significant difference between the mean scores of participants in the control and experimental groups in the post application the EFL

productive skills test on mechanics skills, in favor of the experimental group".

Table (7): Findings of the t-test between the control group and experimental group (n1= 30 & n2= 30) (DF= 58) in mechanics and its sub-skills

Main skills	Sub-skills	Groups	Mean	Std. Deviation	t-value	A Sig	η^2
Mechanics	Use punctuation and capitalization appropriately	Exp.	3.82	0.23	27.78	0.01	0.93
		Control	2.24	0.21			
	Use spelling correctly	Exp.	3.86	0.23	27.83	0.01	0.93
		Control	2.33	0.20			
Mechanics		Exp.	7.68	0.44	31.67	0.01	0.95
		Control	4.58	0.30			

Table (7) shows that there is a statistically significant difference at the level of significance ($\alpha \leq 0.01$) between the mean scores of students in the experimental and control groups in the post-applications of the mechanics skill and its sub- skills, in favor of the experimental group. Therefore, the seventh hypothesis was supported. Moreover, ($\eta 2$) of the experimental treatment on the mechanics skill as a whole and in its sub-skills ranged from moderate to high (0.93 & 0.95), which is a large and appropriate value. This indicates that a large proportion of the differences are attributed to the experimental treatment on the mechanics skill and its sub-skills.

Discussion

The results of the study revealed that the e-program based on Zimmerman's model is effective in developing EFL productive skills. Hence, it can be stated that the e-program based on Zimmerman's model demonstrated significant statistical and educational value in developing the overall productive skills of the participants.

The improvement could be due to the phases which the e-program based on Zimmerman's model went through three phases: forethought, performance, and self- reflection. Students' opinions about the phases were taken each three sessions.

Forethought phase

Starting each session with a task definition allowed students to activate their prior knowledge, providing them with the specific information needed to complete subsequent tasks and activities. One participant said " *It just like a warm up activity, it provided me with a hint about the following tasks*". In addition, setting goals and planning benefited students in understanding the requirements and outcomes of the EFL productive skills course. This approach provided a clear path and objective, improving their engagement and concentration. Providing assessment rubrics helped them understand the necessary standards for success. A participant expressed " *It is useful, I started to think about what I want to learn*". It helped students create study plans and choose effective learning strategies. A Participant said "*It allows me to tailor my plan to studying on my needs and preferences".*

Performance Phase

Students used the various SRL strategies outlined in the Zimmerman model, demonstrated by either the instructor or the students themselves. The use of these strategies may have contributed to the development of EFL productive skills as they fostered autonomy, efficiency, and ownership of the course process. The participants noted the positive impact of these strategies on their performance.

Participant 1: Organizing and transforming information helped me understand the different types of phrases and sentences.

Participant 2: I found it easier to differentiate between the types of written texts and recall information about them.

Through self-observation, students monitored their progress in EFL productive skills by reviewing recordings and drafts, reflecting on strategies used, and seeking feedback from instructors, peers, or other sources. One participant pointed out that "*at the beginning, I had a difficulty in selecting the appropriate vocabulary and idiomatic expressions*", another indicated that "*through observing my performance, I found out that I had a difficulty in using the appropriate organizational patterns for my speech and writings*". Through self-observation, students became more independent in utilizing feedback and identifying weaknesses or errors in their performance.

Self-reflection/ Self-evaluation Phase

Self-reflection helped students evaluate strategies, identify effective ones, and make adjustments in EFL productive skills tasks through feedback from instructors and peers. One participant shared " *I feel satisfied when presenting my topic successfully*". Another reported "*When I received feedback on connected speech from a peer, I recognized their point of view and tried to convince him/her with my point of view".*

Additionally, numerous factors contributed to the enhancement of participants' EFL productive skills, including the integration of e-learning with Zimmermann's SRL model and the characteristics of the participants themselves. The combination of e- learning methods (e.g., online, blended, and mobile learning, gamification, micro learning, personalized learning, continuous learning, asynchronous, and synchronous modes) with Zimmermann's SRL model offers diverse and valuable learning opportunities.

When combining e-learning with Zimmermann's SRL model strategies, students establish clear objectives for each session, assess their own progress throughout the EFL productive skills course, and receive guidance from both their instructor and peers on how to make necessary adjustments. By employing SRL strategies such as planning and monitoring, students actively engage in discussions on the course's discussion board, reflect on their own performance, and adapt their strategies accordingly. Additionally, through peer learning and the application of SRL strategies, students actively share their resources, materials, and work with their peers, collaborate with one another, and provide valuable feedback to help their peers improve.

The e-program based on Zimmermann's model empowered students to take control of their educational journey by providing tools and resources for active, independent learning. A participant explained " *I really liked that I can access the materials regardless of time and place. I felt more independent*". The e-program catered to individual needs and preferences for a tailored learning experience. It also encouraged feedback and support from instructors and peers, creating a collaborative learning environment. Through tasks, online discussions, and feedback from peers and researcher, students improved their learning experience. Overall, the e-program based on Zimmermann's

model offered an interactive and adaptive learning environment that promoted autonomy and engagement.

Recommendations of the study

The findings of the study recommend that the e-program based on Zimmerman's model should provide timely feedback and assessment on student's performance through automated quizzes, self-assessment tools, and feedback from peers and instructors. This enables students to effectively monitor their progress. Moreover, teachers should incorporate new trends and technologies into their traditional teaching methods in order to motivate students and cater to their needs and interests. Researchers, teachers, and students should receive training on how to effectively utilize new technologies and integrate them with teaching methods and strategies, particularly in the context of English language instruction and acquisition.

It can also be recommended that teachers should encourage students to become more independent and autonomous in order to take advantage of online resources and improve their EFL productive skills. Besides, both online and offline instruction should be utilized in the teaching of students, as each method offers unique benefits and advantages.

Suggestions for further research:

This study suggests that there is a need to investigate the effectiveness of the e-program based on Zimmerman's model for developing ESP at the industrial, commercial, and agricultural education as well as in professional development programs. The results also suggests to identify the effect of artificial intelligence with Zimmerman's model for developing receptive and productive skills of different stages. In addition, the study suggests that there is a need to Investigate the effect of integrating mobile learning with Zimmerman's model for developing receptive and productive skills of different stages.

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