Using an ADDIE Model- Based Program Integrating Multi-Media Principles for Developing EFL Graduate Students' Creation of Learning Assets and Professional Teaching Competencies

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Abstract

The present study was conducted to investigate the impact of using an ADDIE model-based program integrating multi-media principles for developing EFL graduate students' creation of learning assets and professional teaching competencies. The study utilized the quasi-experimental research method (pretest-posttest non-treatment group design). Forty participants enrolled in the general diploma at the Faculty of Education, Minia University were randomly assigned to two intact groups: a treatment group (n=20) and a non-treatment group (n=20). The participants in the treatment group were trained and instructed using an ADDIE model-based program that integrated multi-media principles designed by the researcher whereas their counterparts in the non-treatment group did not receive such training as they received regular instruction. Instruments of the study included a needs-analysis survey of learning gaps, a video script template, video script scoring checklist and an inventory of professional teaching competencies. The findings revealed that the participants in the treatment group significantly surpassed their counterparts in the non-treatment group in the post-performance on the video script scoring checklist and the inventory of professional teaching competencies. Suggestions for further research and recommendations were also presented.

***Keywords*:** ADDIE model, multimedia principles, instructional course design, learning assets, professional teaching competencies.

Introduction

Teaching does not merely involve a simple transfer of knowledge from one to another. Instead, it is a complex process that facilitates and influences the process of learning as the quality of teaching is estimated on how much the students learn. Teaching is a complicated endeavor, so being the best teacher consistently can be a hard task. With dozens of strategies, methods, activities, assessment techniques, teachers become overwhelmed with information, and fragmented in their efforts. The classrooms should not be used as a learning place for acquiring teaching skills, however. So, all teaching skills should be acquired through more structured and systematic training techniques. The solution to this challenge lies in utilizing an instructional framework or more specifically, instructional design modals.

Instructional design models organize and visualize learning theories and principles to guide instructional designers through a learning development process. Instructional design models serve as guiding maps to help create or revise course materials and connect learning goals with course content and assessment methods. These models consist of sets of integrated elements that interact together through specific procedures for developing education and training curricula. They introduce cohesive structures of specific components, but they are adaptable in relation to working with varying teaching styles, content areas, and student needs while preserving the main structures of the adapted framework or instructional design model ("Instructional Framework 101",2019).

Back to traditional instructional design, Branch and Merrill (2012: 9) pointed out that traditional instructional design models were represented as rectilinear rows of boxes connected by one-way arrows, though they noted that the actual practice of instructional design might be better represented through curvilinear flow design. They added that curvilinear representation of instructional design models would be connected by two ways arrows and tend

to communicate more iterations that represent the actual practice of instructional design models.

Teaching and design models

The era of teaching and design offers a wealth of models to guide the creation and development of effective learning experiences. By employing a framework, educators learn to anticipate potential challenges and address the underlying causes of academic failure that some students may encounter. These causes often include insufficient prior knowledge, skills, vocabulary, and experiences necessary for acquiring new knowledge and skills. This framework equips teachers with the necessary tools and structure to design and deliver instruction that ensures all students are engaged in high-level learning, receiving the necessary support to demonstrate learning according to standards and assessments. Furthermore, students benefit from increased learning in schools with an instructional framework which creates suitable environment for effective professional learning where their teachers will be learning together, supporting each other, and providing consistent learning experiences across the school.

These models provide structured frameworks for educators and designers to analyze, design, develop, implement, and evaluate their materials. These models are categorized into two groups:

1- Instructional design models which outline the cyclic process of the different steps involved in creating effective learning content (e.g. ADDIE, Merrill's Principles of instruction, Bloom's Taxonomy, Kirkpatrick model, Dick, and Carey Model, etc.).

2- Teaching models address specific teaching strategies and approaches, emphasizing learner engagement and knowledge construction (e.g. Flipped classroom, Social learning theory, Vygotsky's zone of proximal development, etc.) (Awajan, 2022:2; Branch and Merrill, 2012:9& Christiansen, 2009:23).

Teaching English with Design Models

The integration between teaching English and design models presents exciting possibilities for creating engaging and effective learning experiences. Through incorporating design principles into English instruction, teacher educators can satisfy diverse learning styles, foster active participation, and promote long-term knowledge retention.

Benefits of Using Design Models for Teaching English

- Personalized learning: Address individual needs and all learning styles.
- Increased engagement: foster motivation and active participation.
- Improved knowledge retention: Enhance understanding and memory recall.
- Development of 21st-century skills: Boost critical thinking, collaboration, and problem solving.
- Accessibility and inclusivity: present various learning pathways for all (Spatioti; Kazanidis & Pange, 2022; Branch and Merrill, 2012 & Christiansen, 2009).

ADDIE MODEL

An example of an instructional design model that employs some curvilinear elements is the ADDIE model. In the last two decades there were various proposed educational models, such as ASSURE, Dick and Carey, and Gagne, Morrison, Ross, and Kemp model, many of which were based on ADDIE. ADDIE model represents a flexible guideline for building effective training and instructional materials whether digital or traditional. Moreover, it has been claimed that the effectiveness and efficiency of the instructional design process can be enhanced by following the steps outlined in the ADDIE model in order (Christiansen, 2009:22).

The ADDIE model was considered to have originated when Florida State University researchers worked to develop a model

for the U.S. Army, Navy, Air Force and Marine Corps in the 1970s. It appeared as a five-letter acronym that depicted the five basic interrelated steps of this model where it was known as ADDIC (Analysis, Design, Development, Implementation, Control). However, the name changed when the instructional design model was introduced to civilian teachers for the design and development of the learning experience as follows: Analysis, Design, Development, Implementation, and Evaluation (Awajan, 2022; Branch and Merrill, 2012:9& Christiansen, 2009:23).

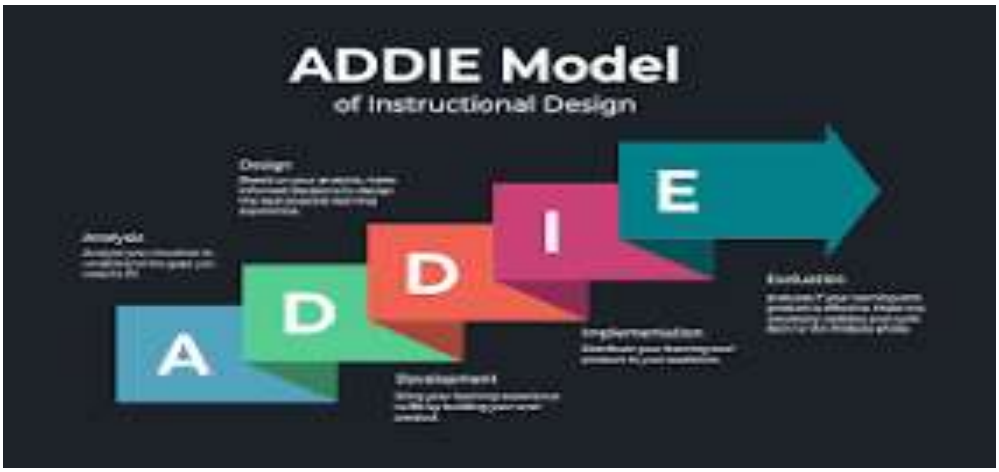
These are the five steps that guide the instructional design process from identifying the learning needs and goals, to designing and developing the learning materials, to delivering and evaluating the learning outcomes. The sequence of ADDIE activities is not completed in a strict linear step-by-step manner, as instructional designers conduct their work, they often move back and forth among the various phases of the design process. Thus, the iterative and self-correcting nature of the instructional design process emerges as one of its greatest strengths (Spatioti; Kazanidis & Pange, 2022 and Branch & Merrill, 2012).

The systematic and procedural flawing across this model appears as the ending output from one step can be used as input for the step that is next. For example, using performance objectives created in the Analyze phase during the Design and Development phases. Moreover, each phase of the ADDIE model has specific tasks to be accomplished. In the Analyze phase, instructional designers analyze the scope and sequence of the project in addition to the needed assets to successfully complete it. This information is then taken into the Design phase to create the blueprint of the instruction. The Development phase involves construction of the project as the curriculum writers and designers would work together to create the product. The Implement phase involves doing all tasks necessary to deliver the project properly, and to ensure well-understanding of its proper use. In the Evaluate phase, the project is appraised in terms of both the instructional system and the learners who used it. Revisions can be made, and future versions of the instruction can be planned (Spatioti;

Kazanidis & Pange, 2022:3; Branch & Merrill, 2012: 9 and 3Christiansen, 2009:24).

Figure 1

ADDIE Model



One of the main benefits of using the ADDIE model for instructional design is that it provides a clear, organized, and systematic structure for planning and executing learning projects. Through its five phases, alignment between learning objectives with the learners' needs, and the available resources can be ensured. Designing and developing learning solutions that are relevant, engaging, and effective for the target audience are also ensured. Moreover, the impact and value of these learning solutions can be evaluated, with the use of the results to refine and optimize them. The model's flexibility allows different steps in the process to be conducted and planned at different times as the five stages of the ADDIE model are highly interconnected and modifiable. For example, the Analysis phase directly affects the Design process while results from the Design phase might necessitate further analysis (Spatioti; Kazanidis & Pange, 2022:3; Branch & Merrill, 2012: 9 and Christiansen, 2009:24).

ADDIE model and teaching/learning materials

One of the most common problems encountered in teaching foreign languages is that teachers are not able to find suitable materials as some of these materials are not designed in a way suitable for target learners and purposes of the class. The selection and design of the materials should have a solid theoretical framework to ensure enriching the learning environment. So, using one or some of the instructional design models integrating the needed materials and suitable methods should bring more positive results to the teaching learning environments. ADDIE Instructional Design Model has been widely used as a theoretical framework by instruction designers and education developers (Yüzen and Karamete, 2016:96).

Moreover, the planned selection and design of the materials will make the teaching-learning process more organized and favorable leading to increased learners' engagement and knowledge retention. ADDIE model would ensure alignment between learners' needs, desired outcomes and the selection and design of teaching materials. In addition to that, the iterative nature of ADDIE model with its evaluation phase leads to continuous improvement of these teaching materials. Consequently, this helps maintain quality and ensures that materials are well-structured and engaging. With the help of various materials integrating multimedia such as sound, illustrations, pictures, videos and animations, the learning process becomes more enjoyable with the active participation of the learners (Yüzen and Karamete, 2016:95).

ADDIE Model and Multimedia Principles

People learn better from words and pictures together than words alone. Accordingly, meaningful learning using multimedia is more likely to happen if multimedia integration into instruction should be aligned with the human learning and knowledge processing system. Scholars are of the view that for designing multimedia instructions; analysis, design, development, implementation, and evaluation (ADDIE) model is best suited as it applies a behavioral

approach in designing instructions (Mahajan, Gupta, Gupta, Kukreja, and Singh, 2020: 557).

Following this model, instructional designs pass through five phases of analysis, design, development, implementation, and evaluation. In the analysis phase, the existing materials (e.g. pictures, videos, etc.) will be analyzed for further use in integrating multimedia instructions. In the designing phase, multimedia delivery method (printed text-figures, power point presentations, etc.) will be selected, and then instructional content will be created accordingly in the next phase. Evaluation in multimedia instructions largely measures two aspects: retention and transfer which together would measure learner's outcome. As poor performance on both types indicates no learning; good performance on retention only indicates rote learning, while good performance on both types indicates meaningful learning (Mahajan, et al. 2020 & Mayer, 2001).

Figure (2)
Phases and activities for designing multimedia instructions as per ADDIE model.

Analysis Phase	
Analyze learner, context, picture, and video	Determine instructional goals and learning environment
Design Phase	
Identify learning objectives of multimedia session	Selected multimedia delivery method and learning activities
Development Phase	
Create instructional contents as per chosen multimedia method	Create assessment instruments, preferably using multimedia
Implementation Phase	
Actually deliver the multimedia instructional material	Support students mastery of the learning objectives
Evaluation Phase	
Formative evaluation - to improve multimedia instructions	Summative evaluation - effective-ness of instructions

Mahajan, et al (2020:557)

Mahajan, et al. (2020); Clark and Mayer (2016) and Mayer (2001) identified 12 multimedia principles that can be easily integrated to make learning assets interesting, engaging, and effective:

1. Multimedia principle

It relates to using both words and pictures instead of using words alone. This will also be in accordance with the 'dual channel' assumption of the cognitive theory of multimedia learning.

2. Personalization and embodiment principle

It says that students learn better when words are presented in a conversational style rather than formal style. So, a conversational style of writing or speaking (including using first and second person language), polite wording for feedback and advice, and a friendly human voice help learners learn better.

3. Coherence principle

Unnecessary and unimportant pictures, words and animations should not be used in your assets (videos, presentations, etc.) which would increase cognitive load on the learners. This will also be in accordance with the 'limited capacity' assumption of the cognitive theory of multimedia learning.

4. Voice principle

This principle says that learners learn better from real, clear voices and not from machines. In other words, students learn better from humans, not computers.

5. Signaling principle

The main and important material in the assets must be highlighted. This can be done by using a real, clear, and strong voice with changing intonation or the voice may go up and down at key points and with key words, or by using the glow text effect.

6. Contiguity principle

Learning from slides is better when visuals and concerned words are presented near to each other than separated from each other on a slide (Spatial contiguity). Similarly, learning is better when visuals and related words are presented simultaneously and on the same slide rather than successively or on the next slide (Temporal contiguity). This would enhance 'active processing' assumption of the cognitive theory of multimedia learning.

7. Segmenting principle

Information that is too long can be difficult to understand. So, assets (e.g. videos, presentations, readings, etc.) should be divided into shorter effective segments for better interaction with the content of the presentation and meaningful learning.

8. Redundancy principle

Narration with animation makes better learning than animation, narration, and text in order not to distract learners. Learners learn better from concurrent graphics and audio than from concurrent graphics, audio, and on□screen text. If text is used along with animation, it will compete for the visual channel.

9. Multimedia principle

Designing any learning asset should integrate both words and graphics. Words include either printed or spoken texts while graphics mean static illustrations such as drawings, charts, graphs, maps, or photos, and dynamic graphics such as animation or video.

10.Modality principle

Integration of audio during presenting words rather than on-screen text can result in significant learning gains as learners learn better from visuals and spoken words than from visuals and written words.

11. Interactivity principle

Learning assets should be designed to enable learners to pause, go back, go forward, and watch the video again. Learners also should have the ability to read at their own speed, pause when they want, and go back or take quizzes again or take more time on quizzes.

12. Pre-training principle

Learners learn better when they study key words or difficult words before these words are used in the learning assets. With pre-training, learners should be helped with the names and definitions of major concepts or ideas (e.g. a glossary of terms, at the beginning of each module). Pre-training can really increase student learning.

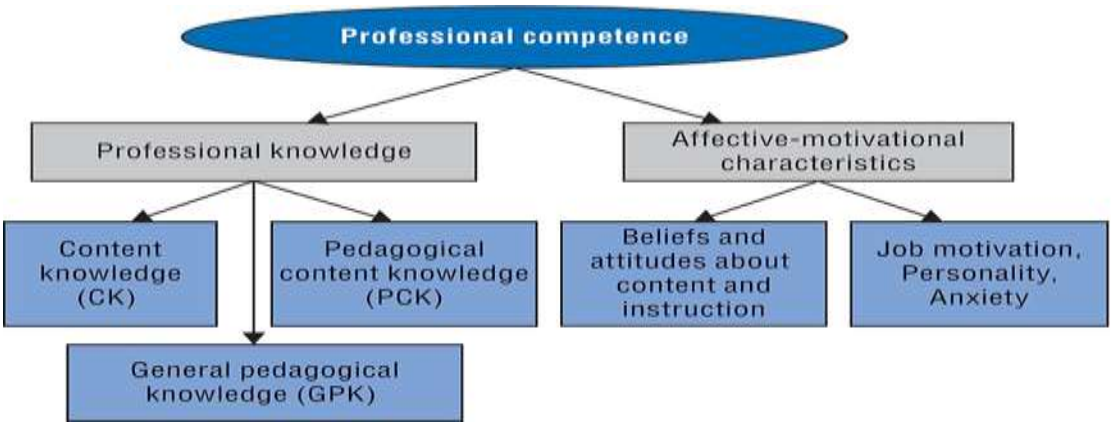
Integrating instructional design with teachers' professional competencies

In recent years, the focus of education has significantly changed. Instead of providing students with the knowledge needed for future application, universities today focus primarily on life skills. The current need is for critical thinkers, creative problem-solvers, skilled and innovative professionals. Teachers are required to help their students work collaboratively in a team, plan and manage their time effectively, and embrace communication skills. Therefore, both teachers and students need to be equipped with 21st century skills. Therefore, teachers need a wide range of competencies to face the complex challenges of today's world.

Teacher professional competence is a complex, multi-dimensional construct and is an inherent element of effective training process. For developing and maintaining teachers' professional competencies, it is essential to address the development of both content knowledge and the essential skills and practices required for competent teaching. Focusing on content knowledge only will limit the opportunity of examining what happens in classrooms to help develop professional competence. Lesson planning, motivating students, classroom management and diagnosing student achievement are together crucial demands all teachers need to master. Competence profiles describe the patterns of how all teacher resources (cognition, affect, motivation, situational skills) play together. Similarly, in teacher education programs, a teacher -trainee must demonstrate the required knowledge, skills, and values as well (Ríordáin, Paolucci & Lyons; 2019:136 &Blömeke;2017:2). Instructional design models also support effective professional learning and teaching competencies because teachers can learn together and focus on improving their practice over time (Instructional Framework 101,2019).

Figure 3

Dimensions and facets of teachers' professional competence



Blömeke. (2017, p.6).

As shown in figure 2, general pedagogical knowledge (GPK)of teachers is a core competence facet. Knowledge of theories of learning and methods of instruction, general knowledge about learners as well as of the principles and techniques of classroom management are essential parts of teachers' GPK. Future teachers need to draw on this range of knowledge and weave it into coherent understandings and skills if they are to become competent to deal with what McDonald (1992 as cited in Blömeke, 2017, p.7) called the "wild triangle" that connects learners, content, and teachers in the classroom.

Pedagogical content knowledge (PCK), as another core competence facet, is subject-specific knowledge of teaching. It encompasses knowledge about teaching materials and curricula, knowledge of target students' prior knowledge, lesson planning, teaching strategies, common misconceptions, feedback techniques, and appropriate intervention strategies. Therefore, the multidimensionality of teacher professional competence needs to be linked to an effective instructional preparation through reworking teacher preparation, instructional design models and professional development in teaching key competencies (Pan, 2004:4 and Blömeke, 2017:7).

Context of the problem

The most important factor affecting student learning is the teacher. More can be done to improve education by improving the effectiveness of teachers than by any other single factor. The challenge is that teaching is a complicated endeavor. For example, teacher evaluation models entail several strategies and practices that teachers should know and be able to do. In addition to that, with every new educational publication or professional development session, teachers learn about more approaches and patterns of teaching that could enable them to support their students' learning. Consequently, teachers can easily become overwhelmed, overloaded with information, and fragmented in their efforts.

To be more specific, the researcher designed and submitted a needs-analysis survey of learning gaps to EFL graduate students enrolled in the Faculties of Arts and Alsun at Minia University who were participating in the general diploma program offered by the Faculty of Education in the academic year (2021-2022). The objective of the survey was to provide the researcher with insights into the needs and challenges faced by those novice English teachers who have not received any pedagogical training in professional settings. Concerning instructional design models, their responses showed their lack of any knowledge concerning instructional design models. Moreover, they stressed their need to learn how to become knowledgeable in designing all the elements of the teaching/ learning situation.

As for multimedia principles, all of them assured their belief in the effectiveness of adding multimedia material to the learning context, especially videos and interactive presentations. Most of their responses also assured the importance of using multimedia materials through teaching English for better understanding, increased retention, and greater learners' engagement. Though, most of their responses revealed their lack of knowledge concerning multimedia principles. All of them also assured their need for sufficient instruction on creating learning/teaching materials integrating the principles of multimedia. Concerning

professional teaching competencies, their responses showed their need for pedagogical skills at that crucial stage of their professional career which ranked at the top of the challenges they encounter through teaching. Regarding their professional development needs, most responses emphasized the importance of reinforcing lesson planning, classroom management, and assessment techniques as their top priorities.

The key to addressing this challenge, through reviewing related literature (Awajan, 2022; Spatioti; Kazanidis & Pange, 2022; Branch & Merrill, 2012 and Christiansen, 2009), is the application of an instructional framework. By utilizing an instructional framework, educators can benefit from a cohesive structure made up of proven components, while also having the flexibility to accommodate varying teaching styles, subject areas, and student needs (while maintaining the fundamental structure of the framework). Teachers can show their creativity with confidence that their students are going to achieve success.

Significant learning outcomes can be achieved by utilizing impactful learning/teaching materials. Incorporating videos into a course is the most effective way to leverage their inherent connection to learning. It involves delivering relevant content at the appropriate time, which is crucial for successful training. However, when creating videos specifically for learning purposes, it is essential to master the instructional design process and adhere to its best practices. The ADDIE model, according to Yüzen and Karamete (2016), aligns well with designing learning materials through providing a structured framework for its development. However, there is a gap in the literature regarding the use of instructional design models, ADDIE model, to help graduate students acquire the skills needed for designing effective learning resources. Thus, the researcher developed an ADDIE- based program integrating multimedia principles to enhance EFL graduate students' creation of learning assets as well as their professional teaching competencies.

Review of Related Literature

Theoretical Background

The necessity for the development of modern course design became apparent during World War II. A lot of psychologists and educators got involved in planning and performing the training process. Then these psychological processes developed into training based on a modified trial-and-error effort. Edgar Dale in 1946 suggested using audiovisuals for learning purposes. He developed a model called the Cone of Experience representing a range of experiences for learning from direct experience to more abstract modes through visual and verbal symbols. This led to the use of multiple modalities and a lot of hands-on training. Then programmed instruction began in the mid-1950s and continued through the mid-1960s. It was among the earliest course development activities in the modern era led by Robert A. Reiser, John V. Dempsey, B. F. Skinner, Robert Mager, and Benjamin Bloom. During the late 1960s and into the 1970s Robert Gagne, Michael Scriven, and David Merrill began work on the principles of course design and development. They worked to develop formulaic procedures for course development either for the military, business, or education audiences (Canipe, 2016:9).

Many instructional design models are involved in learning environments that are problem-based. These models, according to Merrill's first principles of instruction, engage the learners in successive phases of learning: (a) activation of prior learning, (b) demonstration of skills, (c) application of skills, and (d) integration of these skills into real world activities. Moreover, Gagné, the foremost contributor to the systematic approach to instructional design, and his followers are known as behaviorists. They have identified the mental conditions for learning and focused on the outcomes / behaviors resulting from training. The ADDIE model was developed due to the military and training requirements of the U.S. Army and led to heading course development forward. It is based on the general system’s theory/analysis, which ensures that the analysis of tasks follows a logical and smooth process and the underlying theory for this

model is the theory of behaviorism. Regarding the type of knowledge, the ADDIE model approaches procedural knowledge (Spatioti; Kazanidis & Pange, 2022:3).

Related Studies

Reviewing the relevant literature revealed that the ADDIE instructional design model has been approached from various perspectives, Bamrara and Chauhan (2018) proved that the academic writing of undergraduate and graduate students from different departments in Turkey could be improved thanks to the use of the ADDIE model design. Zhang (2020) also used the ADDIE model to improve the competence and performance of his students to become more successful. Almelhi (2021) used the ADDIE model to design a creative writing course for English as a Foreign Language (EFL) college students to improve their creative writing skills. The study found that the course was effective in achieving its goals. Recently, Awajan (2022) showed the positive impact of using ADDIE Model as an instructional design in planning for English Literature Online courses during COVID-19 in higher education from the perspective of the students.

Using ADDIE model to prepare English language educational materials

Yüzen and Karamete (2016) used ADDIE model to prepare English language educational materials for 4th grade primary students to teach numbers in a semi-game environment through a 14-week period. In the analysis, there was a discussion with primary school English language teachers to determine the topic, the content, and the target groups. During the design phase, objectives, strategies, activities, assessments, and methods of learning were determined to present the content based on learning objectives. In the development phase, images, animations, and user interface were created in accordance with students' ages. Additionally, sounds including the pronunciation of digits and numbers were created and the codes of the visual scenarios were designed. At the implementation phase, some of the target group students were tested with prototype material that had been

implemented. In the classroom, students learnt both the pronunciation and the spelling of the numbers. After checking their spelling and typing errors of numbers with quizzes, the students repeated what they learned and then they took the spelling quizzes. Finally, at the evaluation step, the observed problems in the materials were revised. The results showed that with this designed instructional material, subjects can be learned and taught more permanently and livelier.

Christiansen (2009) examined the effectiveness of a multimedia-based, self-paced instructional module- through following the ADDIE instructional design model- to improve southeastern Idaho ELL students' literacy skills in their native languages (primarily Spanish) and English as a second language. While the multimedia-based self-paced instructional module applying the framework of ADDIE appeared beneficial to ELL students, the study did not demonstrate statistically significant improvements in literacy outcomes compared to traditional approaches.

Using ADDIE model to promote teachers' teaching profession

Spatioti, Kazanidis and Pange (2022) searched, through the process of the meta-analysis of the most appropriate studies of the period during 2010-2020, the good teaching practices, such as multimedia presentation, feedback, interaction, and combined learning strategy (individualized and collaborative), as well as basic approaches of distance education using ADDIE model of instructional design. They assured its effectiveness in all learning environments in addition to providing good teaching practices enhancing the work of both instructional designers and educators.

Ngussa (2014) investigated the application of ADDIE model of instruction among 49 teachers at Secondary Schools in Tanzania. She concluded that gender, education level, and teachers' area of specialization did not influence the application of ADDIE model of instruction in teaching-learning transaction. This study recommended in-service training that can give strength for teachers to keep applying ADDIE principles throughout their professional life and further investigation on factors causing

diminishing of intensity in applying ADDIE model of instruction due to increasing years of teaching experiences.

Commentary

When educational organizations (e.g. schools, institutions, etc.) lack a shared and well-defined instructional framework, teachers would be then left to independently figure out things on their own, select among various instructional strategies out there, and attempt to collaborate with colleagues who may have different perspectives on effective instruction. As a result, improvement efforts become scattered and lose focus over time, often being abandoned in favor of the recent trend or approach. Consequently, there is a pressing need to train teachers in the utilization of instructional design models. This training will enhance their teaching abilities, enable them to design engaging activities, create effective teaching and learning resources, follow the multimedia principles, and develop other skills that contribute to the growth of their professional teaching competencies as educators.

The statement of the problem

Instructional design models play integral roles at any sector that many do not often see. When new training programs are introduced within institutions, instructional designers are the ones who systematically collect, process and analysis data, determining if trainees were properly educated on the new topics introduced. If an area of the training does not meet the previously set standards, it becomes the responsibility of the instructional designer to redesign the course to ensure that trainees can comprehend the topics in the future. This process helps ensure that institutions are working efficiently and using their resources wisely. Hence, this study aimed to enhance the skills of EFL graduate students, who are enrolled in the general diploma program at the Faculty of Education, Minia University, in creating and designing impactful learning assets. This was achieved through the application of the ADDIE instructional design model integrating multimedia principles, while also focusing on the development of their professional teaching competencies.

Questions of the Study

The present study attempted to answer the following question: How can a program based on ADDIE instructional design model integrating multimedia principles be designed to develop EFL graduate students' creation of learning assets and professional teaching competencies?

More specifically, the following questions can be branched out:

1. What is the effect of using a program based on ADDIE instructional design model integrating multimedia principles on developing EFL graduate students' creation of video scripts?
2. What is the effect of using a program based on ADDIE instructional design model integrating multimedia principles on developing EFL graduate students' professional teaching competencies?

Purposes of the Study

The purpose of this quantitative study was to explore the impact of using ADDIE instructional design model with the integration of multimedia principles to develop EFL graduate students' creation of some learning assets and professional teaching competencies.

Hypotheses of the Study

The present study attempted to test the following hypotheses:

1. There would be a statistically significant difference between mean values obtained by the treatment and the non-treatment groups on the post- performance on the video script scoring checklist (favoring the treatment group).
2. There would be a statistically significant difference between mean values obtained by the treatment and the non-treatment groups on the post- performance on the inventory of professional teaching competencies (favoring the treatment group).

Significance of the Study

The use of an ADDIE model integrating multimedia principles within the realm of higher education in relation to EFL instruction design is hopefully expected to:

1- Develop educators' essential instructional design skills through gaining a deep understanding of instructional theories, pedagogical principles, and best practices in designing effective learning materials which would promote effective learning experiences for their students. This holistic approach strengthens their overall teaching competence and equips them with the necessary skills to be effective educators in the EFL context.
2- Enable educators to effectively incorporate videos, audio recordings, interactive presentations, online simulations, and other multimedia resources to enhance the learning experience leading to a dynamic and engaging learning environment for their students.
3- Enable educators to reflect on their teaching practices, gather feedback from students and colleagues, and make necessary revisions to their learning assets. This continuous improvement cycle allows them to refine their teaching strategies and enhance the quality of their learning materials over time.
4- Benefit educational institutions through fostering a culture of instructional excellence as they can ensure the delivery of high-quality education that would positively impact the reputation and success of these institutions.
5- Enable teachers to design instructional materials that cater to diverse learning styles and engage their students effectively which would improve the overall learning experience, enhance student motivation and achievement, and promote better retention of knowledge and skills.
6- Equip graduate students with enhanced instructional design skills, the ability to create engaging learning assets, and improved teaching competencies. This would make them more competent and valuable professionals in the job market, meeting the demands of employers seeking skilled and effective EFL educators.

7- Enable professional development providers to offer training and workshops that address instructional design skills and effective learning assets production leading to overall professional growth and competence of EFL educators.
8- Provide educational researchers with a rich area of research to explore that would contribute to the knowledge base in instructional design and EFL education.

Delimitations of the study

The present study was delimited to the following elements:

1. The participants were graduate students enrolled at the general diploma program of the faculty of Education, Minia University, in the first semester of the academic year 2021/2022.
2. All the participants were fresh in Micro-teaching Course due to the policy of the general diploma program in the Faculty of Education, Minia University as this course dropouts or repeaters must rejoin it again in the following year.
3. There is no balance between male and female graduate students at the general diploma program at the Faculty of Education in both the treatment and the non-treatment groups. This is due to the sex ratio of this population.
4. The learning assets created in this study were delimited to video scripts.

Limitations

The present study was limited to the following elements:

1. One college (Faculty of Education).
2. One program (general diploma) at the Faculty of Education, Minia University.

Definitions of terms

ADDIE Model

ADDIE model — ADDIE is an acronym referring to the major instructional system development processes that comprise the generic instruction system design (ISD) process: Analyze, Design, Develop, Implement, and Evaluate (Christiansen, 2009:5)

It is procedurally defined as a common and iterative structural framework of instructional design that includes the processes of analyzing, designing, developing, implementing, and evaluating to ensure that the resulting learning experiences are well-planned, effective, and aligned with the desired outcomes.

Multimedia principles

They are procedurally defined as actionable rules or principles for integrating spoken or written words and visuals into various learning assets aiming at increasing learners' engagement, interaction, and retention of knowledge.

Learning Assets

Items within a course that learners must respond to. These might include readings, videos, quizzes, or discussion sections (Mayer, 2001:4).

They are procedurally defined as resources, materials, or tools (e.g. textbooks, worksheets, videos, multimedia presentations, interactive modules, simulations, assessments, etc.) that are intentionally designed and developed to tailor the learning objectives, needs, and preferences of the target audience and are intended to enhance the overall learning experience and outcomes.

Professional teaching competencies`

A complex, multi-dimensional and inherent element of effective training process that is inclusive of both professional knowledge and affective-motivational characteristics (Ríordáin, Paolucci & Lyons; 2019:131).

Professional teaching competencies are procedurally defined as a wide range of abilities and qualities (the specific knowledge, skills, attitudes, and behaviors) that enable teachers to analyze, design, develop, implement, and evaluate instruction in an effective manner that enhances student learning and development.

Method

Design

The present study utilized quasi-experimental research design.

The pre-post non-treatment group design (Hatch and Farhady, 1982) was used in designing and conducting the study. A treatment group and a non-treatment group were exposed to pre and post means of getting data. The treatment group was only instructed and trained using an ADDIE model- based program integrating multimedia principles while the non-treatment group did not receive such training.

Participants of the Study

Forty (40) EFL graduate students enrolled at the general diploma program at the Faculty of Education, Minia university in the academic year 2021-2022 were recruited for this study. The participants were randomly divided into two equal intact groups, treatment, and control. Homogeneity was established between participants in both groups at the entry level before the intervention as follows:

Age.

All the participants recruited in both groups were aged between 23 and 25 at the beginning of the study.

Linguistic background.

Both groups of participants in this study have completed a 12-year English language education, starting from primary school until the end of the secondary stage, in Minia Governorate. Moreover, all the participants selected for this research are graduates with a major in English from either the Faculties of Arts or Alsun.

Pedagogical background

All the participants in both groups have not undergone any formal pedagogical training as they are fresh students at the Faculty of Education.

Instructor

The researcher taught only the treatment group by herself while the non-treatment group was taught by another instructor. This

was done to avoid contamination of the procedures of teaching the non-treatment group and to keep the two groups intact.

Variables of the Study

The independent variable.

The use of an ADDIE model-based program integrating multimedia principles.

The dependent variables.

The level of creating video scripts as one of the learning assets and the level of professional teaching competencies.

Piloting

The pilot sample of the study consisted of thirty (30) male and female EFL graduate students enrolled at the general diploma program at the Faculty of Education, Minia university in the academic year 2020-2021. The pilot study lasted for fifteen days and helped in determining the validity and reliability of the study tools.

Instruments of the study

1. *Needs Analysis Survey of Learning Gaps*

Purposes of the survey. Identifying the needs and challenges faced by novice English teachers who have not received any pedagogical training in professional settings.

Construction of the survey. (a) Reviewing the literature related to the needs and challenges of English teachers in professional settings, (b) Stating the objectives of the survey, (c) Designing a preliminary survey which consisted of five variables with twenty questions, (d) Evaluating the preliminary form of the questionnaire by a jury of 5 TEFL experts, (e) The final version of the questionnaire after modification consists of four variables with nine closed-ended questions with pre-defined options in addition to 7 open-ended questions.

Validity of the survey. A jury of 5 TEFL experts was asked to approve the validity of the questionnaire. 80% of them approved

its face validity, suitability and appropriacy for the study participants.

Administration of the survey. The survey was administered to EFL graduate students enrolled at the general diploma program at the Faculty of Education to determine their needs and challenges in relation to English language teaching.

Results. Analyzing the data obtained revealed that in relation to instruction design, all participants agreed on lacking experience in this domain. More specifically, their responses have shown their need for leaning about designing almost all the elements of the teaching context. As for multimedia principles, their responses have revealed their belief in the importance of using multimedia in teaching due to its great impact especially videos and interactive presentations. However, all of them assured their need for becoming knowledgeable through receiving training about the different principles that should align with using multimedia materials in teaching. All the participants stressed the need for sufficient instruction on creating teaching materials integrating multimedia principles. As for the professional teaching competencies, most of them have selected pedagogical skills as the most challenging aspect they faced through teaching. In relation to professional development needs, participants have indicated that lesson planning, classroom management, and assessment techniques are their top priorities due to their importance for their teaching career advancement and improvement. Table (1) shows the percentage of the students' choice of the items of the survey.

Table (1)
Variable /items distribution
Of the needs-analysis survey of learning gaps. N=20

The Variable	Corresponding number of statements	Variable/ item distribution		Total number (N)
Instructional Design Models	1	None	100%	20
	2	What are your strengths in instructional design models?		
	3	What are your weaknesses in instructional design models?		
	4	What topics in instructional design models would you like to learn more about?		
Multimedia principles	6	Occasionally	70%	
	7	Highly effective	90%	
		Videos	50%	
		Interactive presentation	50%	
	8	Enhance retention	50%	
		Enjoyable learning	50%	
	9	Yes	90%	
	10	Minimal	90%	
	11	Yes, definitely	90%	
		Few	80%	
Professional teaching competencies	12	Pedagogical skills	90%	
	13	The biggest challenges		
Professional development needs	14	Topics to be covered		
	15	Format for professional development		
	16	Time for professional		

development

2. A Scoring checklist for video scripts

Purpose of the scoring checklist. The researcher developed a scoring checklist for EFL graduate students to assess their proficiency in writing video scripts. The checklist was designed based on a pre-defined template and aligned with the ADDIE model of instructional design, incorporating multimedia principles. This tool allows for the identification and evaluation of the students' performance levels in both groups in creating video scripts. Moreover, the scoring checklist would enable the participants to identify any areas that need future development. ***Construction of the scale***. It is constructed based on a three- point Likert-type scale. The scoring checklist incorporates the most important and relevant categories for creating video scripts based on the ADDIE model and the integration of multimedia principles. These categories are organized into five dimensions, each accompanied by a set of criteria to assess the participants' proficiency in video script creation. The checklist comprises a total of 15 criteria, and each criterion is assigned one of three response categories: needs improvement, fair, or excellent. These response categories are assigned corresponding scores or weights: needs improvement (1), fair (2), and excellent (3). The maximum score attainable on the scale is 45, as depicted in Table 2.

Table (2)

The Dimensions and criteria of the scoring checklist

No.	Scale Dimensions	No. of {riteria
1	Content	5
2	Organization	3
3	Clarity and Conciseness	3
4	Technical Aspects of the Visuals used	2
5	Multimedia Principles Integration	2
Total number of items		15
Total score		45

Instructions for the scoring checklist. They are written in English. They are easy to understand. They include information about the purpose of the scoring checklist, its dimensions, the distribution of the values on the response performance levels of

the scoring checklist, and the way of recording the answer.

Piloting the scoring checklist. Piloting the scoring checklist was done with a group of thirty (30) male and female EFL graduate students enrolled at the general diploma program, Faculty of Education, Minia University in the first semester of the academic year 2020/2021.Time taken by each participant was recorded, divided by the whole number of participants who created the video scripts and was found to be 45 minutes. Thus, the allotted time for using the scoring checklist was 45 minutes.

Validity of the scoring checklist.

1. **The face validity of the scoring checklist**. It was determined by submitting it to a jury of 5 TEFL experts to judge its validity according to the following criteria: linguistic stating of criteria, relatedness of the criteria to the dimensions of creating video scripts based on ADDIE Model integrating multimedia principles and suitability of the criteria to the subjects. The suggestions and recommendations of the jury members were taken into consideration and the scoring checklist was revised to reach its final form. The first form consisted of 6 dimensions, with a total of 20 criteria, whereas the final version consisted of 5 dimensions with a total of 15 criteria.

2. **Pearson correlation formula**. It was used to determine the internal consistency of the scoring checklist. The same piloting sample (30 EFL graduate students enrolled at the general diploma program at the Faculty of Education) created the video scripts. The internal consistency of each dimension was determined and the correlation between the five dimensions of the scoring checklist and the total scale was determined as shown in table (3). The values of the correlation coefficient, ranged from (.942: .985) and significant at (0.01 level), are considered acceptable.

Table (3)

Establishing the internal consistency of the scoring checklist/ The Correlation Between Each dimension and The Total scoring checklist

The Dimensions	Internal consistency
Content	.980**
Organization	.985**
Clarity and Conciseness	.942**
Technical Aspects of the visuals used	.978**
Multimedia-principles integration	.962**

Note. **Correlation is significant at the 0.01 level.

Reliability of the scoring checklist

Establishing the reliability of the scoring checklist was done during piloting. The same piloting sample (30 EFL graduate students at the Faculty of Education) created the video scripts. The reliability coefficient of the scale was determined using:

1. **Alpha Cronbach (α) coefficient**. It ranged from (0.812) to (0.932) for each of the dimensions of the scoring checklist and for the total of the dimensions. The alpha coefficient of the whole scoring checklist is (.973). It is considered acceptable as shown in table (4).

Table (4)

Establishing the reliability of the scoring checklist / The Cronbach Alpha's Reliability coefficient of the scoring checklist

Dimensions	Means	Variance	No. of items	Alpha
Content	1.402	.020	5	.940
Organization	1.261	.000	3	.935
Clarity and conciseness	1.361	.037	3	.935
Technical Aspects of the visuals used	1.277	.000	2	.932
Multimedia-principles integration	1.818	.750	3	.812
Total dimensions	1.430	.150	16	.973

Note. **Correlation is significant at the 0.01 level.

2. ***The split-half method***. It ranged from (0.814) to (0.932) for each of the dimensions of the scoring checklist and for the total of the dimensions. The Guttman Split-half coefficient of the whole scoring checklist is (.969). It is considered acceptable as shown in table (5).
3. The Spearman-Brown Coefficient of the scoring checklist is 0.969. It is considered acceptable as shown in table (5).

Table (5)
Establishing the reliability of the Scoring Checklist/ Split Half Reliability Coefficient of the Scoring Checklist

Dimensions	Correlation Between Forms	Spearman-Brown Coefficient	Guttman Split-Half Coefficient
Content	.924	.962	.918
Organization	.864	.934	.834
Clarity and Conciseness	.838	.920	.816
Technical Aspects of the visuals used	.873	.932	.932
Multimedia-principles integration	.689	.830	.814
Total dimensions	.945	.972	.969

Note. **Correlation is significant at the 0.01 level.

4. ***The Pearson correlation formula***. It was also used to determine the inter-rater reliability of the scoring checklist. Two raters with approximately the same academic level checked the video scripts created by the students of the same piloting sample using the scoring checklist. The mean values received by the participants were calculated. The inter-rater reliability ranged from (0.738) to (0.829).

Cohen et al. (2007:506) point out that the split half coefficient and the alpha coefficient are considered reliable if they range from 0.70 to 0.90. Thus, both reliability coefficients of the scoring checklist are considered within the acceptable range.

3. A professional teaching competencies inventory

Purpose of the inventory. The researcher created an inventory to evaluate the professional knowledge of EFL graduate students, which encompasses their alignment with the ADDIE model of instructional design, beliefs, attitudes, teaching skills, and self-development that impact their students' learning. Moreover, the scoring checklist would enable the participants to identify any areas that need future development.

Construction of the inventory. It is constructed based on a three-point Likert-type scale. The inventory incorporates the most important and relevant dimensions for professional teaching competencies based on ADDIE model as well as their beliefs, attitudes, and professional development skills. These dimensions are organized into two domains, each accompanied by a set of indicators to assess the participants' professional teaching

competencies. The inventory comprises a total of 46 indicators, and each indicator is assigned one of three response categories: needs improvement, average, or professional. These response categories are assigned corresponding scores or weights: needs improvement (1), average (2), and professional (3). The maximum score attainable on the scale is 138, as depicted in Table 6.

Table (6)
The Domains and Dimensions of The Professional Teaching Competencies Inventory

No.	Inventory Domains	Dimensions	No. of items
1	Professional Knowledge	Planning	11
		Designing	6
		Developing	6
		Implementing	8
		Evaluating	5
2	Affective-Motivational Characteristics	Job attitudes and motivation	10
Total number of items		46	
Total score		138	

Instructions for the inventory. They are written in English. They are easy to understand. They include information about the purpose of the inventory, its domains, dimensions, indicators, and the distribution of the values on the response performance levels of the inventory, and the way of recording the answer.

Piloting the inventory. Piloting the inventory was done with a group of thirty (30) male and female EFL graduate students enrolled at the general diploma program, Faculty of Education, Minia University in the first semester of the academic year 2020/2021.Time taken by each participant was recorded, divided by the whole number of participants, and was found to be 30 minutes. Thus, the allotted time for using the inventory was 30 minutes.

Validity of the inventory.

1. **The face validity of the inventory**. It was determined by submitting it to a jury of 5 TEFL experts to judge its validity according to the following criteria: linguistic stating of indicators, relatedness of the indicators to the dimensions of

professional teaching competencies based on ADDIE Model and suitability of the indicators to the subjects. The suggestions and recommendations of the jury members were taken into consideration and the inventory was revised to reach its final form. The first form consisted of 3 domains, 8 dimensions, with a total of 50 indicators, whereas the final version consisted of 2 domains, 6 dimensions with a total of 46 indicators.

2. **Pearson correlation formula**. It was used to determine the internal consistency of the inventory. The same piloting sample (30 EFL graduate students enrolled at the general diploma program at the Faculty of Education) responded to the inventory. The internal consistency of each dimension was determined and the correlation between the six dimensions of the inventory and the total inventory was determined as shown in table (7). The values of the correlation coefficient ranged from (.974: .998) and significant at (0.01 level), are considered acceptable.

Table (7)

Establishing the internal consistency of the inventory/ The Correlation Between Each domain and The Total Inventory

The Domains	Internal consistency
Professional Knowledge	.998**
Affective-Motivational Characteristics	.974**

Note. **. Correlation is significant at the 0.01 level (2-tailed).

Reliability of the inventory

Establishing the reliability of the inventory was done during piloting. The same piloting sample (30 EFL graduate students at the Faculty of Education) responded to the inventory. The reliability coefficient of the inventory was determined using:

1. **Alpha Cronbach (α) coefficient**. It ranged from (0.943) to (0.974) for each of the dimensions of the scoring checklist and for the total of the dimensions. The alpha coefficient of the whole scoring checklist is (.981). It is considered acceptable as shown in table (8).

Table (8)

Establishing the reliability of the inventory / The Cronbach Alpha's Reliability coefficient of the inventory

Domains	Means	Variance	No. of items	Alpha
Professional Knowledge	.452	.030	36	.974
Affective-Motivational characteristics	.446	.015	10	.943
Total domains	.451	.026	46	.981

2. ***The split-half method***. It ranged from (0.961) to (0.967) for each of the domains of the inventory and for the total of the domains. The Guttman Split-half coefficient of the whole inventory is (.977). It is considered acceptable as shown in table (9).
3. The Spearman-Brown Coefficient of the inventory is 0.985. It is considered acceptable as shown in table (9).

Table (9)

Establishing the reliability of the Inventory/ Split Half Reliability Coefficient of the Inventory

Domains	Correlation Between Forms	Spearman-Brown Coefficient	Guttman Split-Half Coefficient
Professional Knowledge	.962	.981	.967
Affective-Motivational characteristics	.925	.961	.961
Total domains	.971	.985	.977

Note. **Correlation is significant at the 0.001 level.

Cohen et al. (2007:506) point out that the split half coefficient and the alpha coefficient are considered reliable if they range from 0.70 to 0.90. Thus, both reliability coefficients of the inventory are considered within the acceptable range.

The program

The instructional program of the study integrates the ADDIE model with multimedia principles. It provides EFL graduate students with a comprehensive and structured approach to instructional design, encompassing the five phases of the ADDIE model: Analysis, Design, Development, Implementation, and Evaluation. The program aims to offer students a holistic learning experience, enabling them to design all the necessary elements of the teaching/learning process through a systematic and iterative

design model. It guides EFL graduate students through the step-by-step instructional process, starting from analyzing student needs and progressing towards evaluation, while allowing for flexibility and iteration within the design model. Multimedia principles are integrated to enable them to enrich the learning experience, enhancing student engagement and comprehension.

The primary goal of the program is to equip EFL graduate students with the necessary teaching skills to create effective learning materials and activities aligned with desired outcomes. By following the program, students develop a deeper understanding of instructional design, enhance their pedagogical skills, and cultivate positive beliefs and attitudes towards their teaching careers. Ultimately, the program aims to enhance students' professional teaching competencies, enabling them to create engaging and impactful teaching/learning environments for their future learners.

1. The program is divided into six different modules with two sessions for each module that cover the different stages of ADDIE model together with the integration of multimedia principles. These modules are: Analyze, Design, Develop, Implement, and Evaluate with an additional module about multimedia principles. Each module covers each stage through two sessions.
2. Within each module, a diverse range of language learning activities and tasks are incorporated, specifically chosen, and designed to foster the development of instructional design skills that integrate multimedia principles. Students are provided with various learning assets, including videos, readings, discussions, and quizzes, to actively engage with and interact. Additionally, the program incorporates assessments and feedback mechanisms to enable learners to monitor their progress and pinpoint areas where they can enhance their performance.
3. Each study session within the program is carefully designed to last approximately 2 hours, providing users with a consistent structure that facilitates effective planning of study activities.

The study session template follows a standardized format, allowing users to become familiar with its framework. The key components of each study session include: (a) Glossary: A section that provides definitions and explanations of relevant terms and concepts, (b) Introduction: An introductory segment that sets the context and outlines the objectives of the study session, (c) Learning outcomes: Clearly defined goals that specify what learners should be able to achieve by the end of the session, and (d) Overview: A comprehensive overview of the session content and its relevance to the overall program.

4. Then (e) Videos for the main session topic: Engaging videos that focus on the core theme of the study session, (f) Relevant modal examples: Illustrative examples related to the session topic that aid in understanding and application, (g) Discussions based on the ideas presented: Interactive discussions that encourage learners to engage with and reflect upon the ideas and concepts introduced, (h) Formative evaluation tasks based on the modal examples previously introduced: Assessments and tasks that allow learners to apply their knowledge and receive feedback on their understanding, (i) Module summary: A concise summary that recaps the key points covered in the study session, and (j) Homework assignments: Assignments given to learners to extend their learning beyond the study session.
5. Two important features are interwoven throughout the sessions. The first is the inclusion of takeaways, which provide opportunities for increased engagement and reflection, enabling learners to extract valuable insights from each session. The second feature is the concept of cascading knowledge, where students are encouraged to grow professionally through enhancing the impact of the session by fostering a community of shared learning. Moreover, cascading knowledge would enable students to double their own learning though improving recognition and pinpointing ideas that need improvement. Thus, learners can progressively develop their professional learning competencies throughout the sessions.

The construction of the training program has gone through the following steps: reviewing the literature related to the domain of

instruction design models, multimedia principles and professional teaching competencies, stating the general and the specific objectives of all modules and their sessions, preparing the content, submitting the program to 5 TEFL jury members to be judged according to the following criteria; statement of items, academic verification of the content, appropriateness of the method and the techniques used for the content and the participants of the study and applicability of the program.

Instructional design of the study

1. A needs-analysis survey of learning gaps was developed and administered by the researcher to identify and understand the concerns and challenges faced by EFL graduate students regarding their teaching profession skills. The purpose of this survey was to gather relevant information that would enable active engagement during the intervention and support them in their future professional careers.
2. Pre-testing the participants of both the treatment and non-treatment groups, (N=40), using the scoring checklist of video scripts and the inventory of professional teaching competencies before the intervention to ensure their homogeneity at the entry level.
3. **The treatment intervention**. Participants at the treatment group were trained using the ADDIE-model based program that integrates multimedia principles which has gone through the following stages:
   a. During the Analysis stage, students were introduced to the concept of needs analysis and various tools to effectively identify the specific needs of their learners. They learned how to create learners' stories, which helped them develop course objectives that were closely aligned with the results of the needs analysis process.
   b. In the Design stage, students were familiarized with the distinction between a course outline and a course framework. This understanding served as a foundation for students to begin designing the course blueprint, incorporating various learning assets such as videos, readings, discussions, infographics, and more. Ideas as the

importance of learners' engagement and effective learning experiences were introduced.

c. In the Development stage, students were acquainted with various assessment types, comprehending their unique characteristics. Additionally, they acquired knowledge about the essential steps in crafting assessment tasks that align with the instructional design of the course.
d. Furthermore, the development stage also incorporated the introduction of multimedia principles during the development of learning assets. Specifically, students were guided in the process of creating video scripts using predefined templates that integrate multimedia principles. This approach aimed to enhance the students' understanding and application of multimedia elements in their learning materials.
e. In the implementation phase, students started to finalize their complete blueprint for a whole instruction design to be ready to micro teach it. Individual students started to micro teach their lessons with their prepared blue print. They were required to use a video and submit a video script template integrating multimedia principles.
f. During the implementation phase, students began the finalization of their comprehensive blueprint for an entire instructional design, preparing themselves for micro-teaching. Each student proceeded micro-teaching their lessons, utilizing their meticulously prepared blueprints. As part of that process, they were tasked with incorporating a video component and submitting a video script template that integrated multimedia principles.
g. In their micro-teaching sessions, students had the opportunity to put their instructional design plans into action. They delivered their lessons, employing various instructional strategies, multimedia elements, and interactive activities outlined in their blueprint. The inclusion of a video component allowed students to enhance the learning experience by leveraging visual and auditory elements to engage their audience effectively.
h. To ensure alignment with multimedia principles, students

were required to develop a video script template. This template guided them in structuring their videos, ensuring clarity, coherence, and the integration of multimedia elements to enhance the overall learning experience. By adhering to the principles of multimedia design, students aimed to create engaging and impactful video content that supported their instructional goals and facilitated effective knowledge transfer.

i. In the Evaluation phase, the primary objective was to assess the effectiveness of the program and its impact on the learners. A key emphasis of this phase was shifting students' perspective on evaluation. Rather than solely evaluating their learners, students are introduced to the significance of evaluating the course design process itself as teachers and course designers.

j. During this phase, students gained an understanding of the importance of evaluating the instructional design process from a critical standpoint. They learned to assess the various components of the course, including the instructional materials, activities, assessments, and multimedia elements. By evaluating the course design process, students could identify strengths, weaknesses, and areas for improvement to enhance the overall effectiveness of the program.

k. This evaluation process involved examining the alignment between the learning objectives and the instructional materials, evaluating the clarity and relevance of the content, assessing the effectiveness of multimedia integration, and considering the overall engagement and satisfaction of the learners. Students were encouraged to gather feedback from their peers, instructors, and even the learners themselves, using a variety of evaluation methods such as surveys, interviews, and observations.

l. By adopting a reflective and evaluative mindset, students developed a deeper understanding of the instructional design process and gained insights into how to refine and improve future iterations of the program. This self-evaluation should not only enhance their own learning experience but also equip them with valuable skills in critically analyzing and

optimizing instructional design practices and thus boost their professional teaching competencies.

4. Post-testing the participants of both the treatment and nontreatment groups, (N=40), using the scoring checklist of video scripts and the inventory of professional teaching competencies after the intervention to compare the results with the pre-testing results.

The non-treatment group. Participants in the non-treatment group received instruction on Micro-teaching course using the regular way with no ADDIE model intervention.

Findings

Hypothesis 1

The first hypothesis of the study predicted that there was a statistically significant difference (favoring the treatment group) between mean values obtained by the participants of the treatment and the non-treatment groups on the post- performance on the scoring checklist of video scripts. Statistical analysis of the obtained data showed that the treatment group achieved a higher degree of improvement than the non-treatment group on this scoring checklist as t-value (41.020) is significant at (0.01) level and beyond. Thus, the first hypothesis is confirmed. Table (10) below shows the data obtained to test this hypothesis.

Table (10)

Statistical analysis of data obtained by the participants of the treatment and the non-treatment groups on the post- performance on the video script scoring checklist N=20

Aspects of comparison	Group	Mean	Std. Deviation	t-value	df	Sig.	η2	Effect size
Content	Post-non-treatment	5.7000	.65695	**23.891	38	.000	.938	High
	Post – treatment	13.2500	1.25132					
Organization	Post-non-treatment	3.0500	.22361	**22.974	38	.000	.933	High
	Post – treatment	7.2500	.78640					
Clarity and Conciseness	Post-non-	3.3500	.48936	**14.824	38	.000	.853	High

	treatment							
	Post – treatment	7.2500	1.06992					
Technical Aspects of the visuals used	Post-non-treatment	2.0000	.00000	**19.874	38	.000	.912	High
	Post – treatment	5.0500	.68633					
Multimedia-principles integration	Post-non-treatment	2.0500	.22361	**19.213	38	.000	.907	High
	Post – treatment	5.4500	.75915					
Total of Dimensions	Post-non treatment	16.1500	.93330	**41.020	38	.000	.978	High
	Post – treatment	38.2500	2.22131					

Note. **. significant at the 0.01 level.

To assess the effectiveness of the ADDIE model-based program in enhancing the instructional design skills of EFL graduate students, particularly in creating video scripts, statistical analysis utilizing the eta-squared formula (η2) was employed. Cohen et al. (2007:522) have indicated that an eta-squared value of 0.01 signifies a weak effect, 0.06 represents a medium effect, and 0.14 indicates a large effect. The results, as presented in Table 10, reveal an eta-squared value (η2) of 0.978, which is a large effect. This suggests that the implemented program has a substantial impact on improving the ability of EFL graduate students to create video scripts.

Additionally, the comparison of the values obtained by the participants of both the treatment and non-treatment groups in the pre-post-performance on the scoring checklist revealed that the treatment group outperformed the non-treatment group as t-value (42.084) is significant at 0.01level and beyond. Eta- squared value (η2) equals (0.979) which is considered large. This is shown in table (11).

Table (11)

Comparison of the values obtained by the participants of both the treatment and non-treatment groups in the pre-post-performance on the video script scoring checklist N=20

Aspects of comparison	Group	Mean	Std. Deviation	t-value	df	Sig.	η2	Effect size
Content	Pre- treatment.	5.6000	.68056	24.018	19	0.000	.938	High
	Post- treatment.	13.2500	1.25132					
	Pre-non-treatment	5.6000	.68056	.473	19	.639		
	Post-non-treatment	5.7000	.65695					
Organization	Pre- treatment.	3.0000	.00000	24.169	19	0.000	.939	High
	Post- treatment.	7.2500	.78640					
	Pre-non-treatment	3.0000	.00000	1	19	.324		
	Post-non-treatment	3.0500	.22361					
Clarity and Conciseness	Pre- treatment.	3.3500	.48936	14.824	19	0.000	.853	High
	Post- treatment.	7.2500	1.06992					
	Pre-non-treatment	3.3500	.48936	.000	19	1		
	Post-treatment	3.3500	.48936					
Technical Aspects of the visuals used	Pre- treatment.	2.0000	.00000	19.874	19	0.000	.912	High
	Post- treatment.	5.0500	.68633					
	Pre-treatment	2.0000	.00000[a]	.000	19	1		
	Post-treatment	2.0000	.00000[a]					
Multimedia-principles integration	Pre- treatment.	2.0000	.00000	20.324	19	0.000	.916	High
	Post- treatment.	5.4500	.75915					
	Pre-treatment	2.0000	.00000	.000	19	1		
	Post-treatment	2.0500	.22361					
Total of two Dimensions	Pre- treatment.	15.9500	.82558	42.084	19	0.000	.979	High
	Post- treatment.	38.2500	2.22131					
	Pre-treatment	15.9500	.82558	.718	19	.477		
	Post-treatment	16.1500	.93330					

Note. **. significant at the 0.01 level.

Hypothesis 2

The second hypothesis of the study predicted that there was a statistically significant difference (favoring the treatment group) between mean values obtained by the participants of the treatment and the non-treatment groups on the post- performance on the inventory of professional teaching competencies. Statistical analysis of the obtained data showed that the treatment group achieved a higher degree of improvement than the non-treatment group on the inventory as t-value (57.649) is significant at (0.01) level and beyond. Thus, the second hypothesis is confirmed. Table

(12) below shows the data obtained to test this hypothesis.

Table (12)

Statistical analysis of data obtained by the participants of the treatment and the non-treatment groups on the post- performance on the inventory of professional teaching competencies. N=20

Aspects of comparison	Group	Mean	Std. Deviation	t-value	df	Sig.	η2	Effect size
Professional Knowledge Domain 1	Post-control	36.0000	.00000	**75.061	38	0.000	.992	High
	Post – treatment	86.0500	2.98196					
Planning	Post-control	11.0000	.00000	**46.322	38	0.000	.983	High
	Post – treatment	27.6000	1.60263					
Designing	Post-control	6.0000	.00000	**34.458	38	0.000	.965	High
	Post – treatment	16.4500	1.35627					
Developing	Post-control	6.0000	.00000	**28.996	38	0.000	.955	High
	Post – treatment	14.9000	1.37267					
Implementing	Post-control	8.0000	.00000	**33.456	38	0.000	.966	High
	Post – treatment	16.1500	1.08942					
Evaluating	Post-control	5.0000	.00000	**29.998	38	0.000	.959	High
	Post – treatment	10.9500	.88704					
Affective-Motivational characteristics Domain 2	Post-control	10.0000	.00000	**24.177	38	0.000	.941	High
	Post – treatment	24.4000	2.66359					
Total of Domains	Post-control	46.0000	.00000	**57.649	38	0.000	.988	High
	Post – treatment	110.4500	4.99974					

Note. **. significant at the 0.01 level.

To assess the effectiveness of the ADDIE model-based program in enhancing the instructional design skills of EFL graduate students, particularly in their professional teaching competencies, statistical analysis utilizing the eta-squared formula (η2) was employed. The results, as presented in Table 12, reveal an eta-squared value (η2) of 0.988, which is a large effect. This suggests that the

implemented program has a substantial impact on improving EFL graduate students' professional teaching competencies.

Additionally, the comparison of the values obtained by the participants of both the treatment and non-treatment groups in the pre-post-performance on the inventory of professional teaching competencies revealed that the treatment group outperformed the non-treatment group as t-value (38.826) is significant at 0.01level and beyond. Eta- squared value (η2) equals (0.975) which is considered large. This is shown in table (13).

Table (13)

Comparison of the values obtained by the participants of both the treatment and non-treatment groups in the pre-post-performance on the inventory of Professional Teaching Competencies. *N=20*

Aspects of comparison	Group	Mean	Std. Deviation	t-value	Df	Sig.	η2	Effect size
Professional Knowledge Domain 1	Pre- treatment.	43.7500	3.29074	**42.598	19	0.000	.979	High
	Post- treatment.	86.0500	2.98196					
	Pre-non-treatment	41.9000	2.95403	8.932	19	0.000		
	Post-non-treatment	36.0000	.00000					
Planning	Pre- treatment.	13.6500	1.30888	**30.150	19	0.000	.960	High
	Post- treatment.	27.6000	1.60263					
	Pre-non-treatment	13.3500	1.69442	6.202	19	0.000		
	Post-treatment	11.0000	.00000					
Designing	Pre- treatment.	7.4000	1.42902	**20.543	19	0.000	.917	High
	Post- treatment.	16.4500	1.35627					
	Pre-treatment	7.3000	1.17429	4.951	19	0.000		
	Post-treatment	6.0000	.00000					
Developing	Pre- treatment.	7.5000	1.23544	**17.920	19	0.000	.894	High
	Post- treatment.	14.9000	1.37267					
	Pre-treatment	7.3500	1.18210	5.107	19	0.000		
	Post-treatment	6.0000	.00000					
Implementing	Pre- treatment.	9.2000	1.00525	**20.968	19	0.000	.920	High
	Post- treatment.	16.1500	1.08942					
	Pre-non-treatment	8.9000	.96791	4.158	19	0.000		
	Post-non-treatment	8.0000	.00000					
Evaluating	Pre- treatment.	6.0000	.91766	**17.345	19	0.000	0.888	High
	Post- treatment.	10.9500	.88704					
	Pre-non-treatment	5.0000	.00000[a]	1.000	19	0.324		
	Post-non-treatment	5.0000	.00000[a]					
Affective-	Pre- treatment.	12.1000	1.44732	**18.146	19	0.000	.897	High

Motivational Characteristics Domain 2	Post- treatment.	24.4000	2.66359					
	Pre-non-treatment	10.0500	.22361		19	0.000		
	Post-non-treatment	10.0000	.00000					
Total of two Domains	Pre- treatment.	55.8500	3.81514	**38.826	19	0.000	.975	High
	Post- treatment.	110.4500	4.99974					
	Pre-non-treatment	51.9500	3.01706	8.820	19	0.000		
	Post-non-treatment	46.0000	.00000					

Note. **. significant at the 0.01 level.

Findings

The study's design, which incorporates the principles of behaviorism, forms the basis for interpreting the findings.

The relationship between the integration of multimedia principles into the ADDIE model and the theory of behaviorism becomes apparent through their shared emphasis on learning outcomes and effective instructional strategies. When multimedia principles are incorporated into the ADDIE model of instructional design, the learning experience is enriched by employing a wide range of multimedia elements such as videos, graphics, and interactive activities. Additionally, the application of multimedia principles (e.g. personalization, voice, segmenting, coherence, contiguity, etc.) has resulted in the enhancement of teaching skills and improved learning experiences. This integration not only elevates the quality of learning experiences but also contributes to the professional growth of teachers by strengthening their teaching competencies.

Likewise, behaviorism, as a psychological theory, aligns with the integrated approach by supporting the connection between stimuli and responses, where reinforcement and repetition play crucial roles in shaping desired behaviors. The combination of the ADDIE model with multimedia principles and behaviorism ensures that instructional strategies employed are effective in promoting learning outcomes. By employing instructional strategies that align with behaviorist principles, such as providing clear cues, offering meaningful reinforcement, and facilitating repeated practice, the integrated use of the ADDIE model and

multimedia principles ensures that the instructional design is tailored to elicit desired behaviors and promote successful learning outcomes.

The distinctive characteristics of the study derived from the researcher's reflections and observations of participants' reactions.

The participants' reflections following the intervention yielded two distinct perspectives. First, from the teachers' viewpoint, they emphasized the significance of integrating the ADDIE model with multimedia principles to create video scripts, specifically highlighting:(a) the organization of ideas ensuring the logical flow of ideas, (b) supporting each idea with relevant examples and extended explanation, (c) simplified review, as the script served as a handy reference for future revisits without the need to rewatch the entire video.

Second, from the students' standpoint, their reflections highlighted: (a) Improved understanding by gaining a more comprehensive grasp of the overall concept, b) Enhanced memorization through the emphasis on core elements presented in the video, c) Improved retention of information for better recall, d) Achieving a clearer understanding by consolidating all information in one place, facilitating the formation of connections.

The interpretation of the results with reference to the related literature

Several studies have provided support for the use of the ADDIE model in instructional design emphasizing its effectiveness in creating well-structured, learner-centered, and outcome-driven learning experiences. Mexia, Ponce, Franco-Campos, (2017) and Rayan (2015) have pointed out that the strength of the ADDIE model lies in the elaboration of the activities and their impact on the development of the lessons, the creation of teaching material that will be complementary in face-to-face classes, the time dosage to evaluate classroom and online activities that allow to give a precise follow-up to the students.

The relation of the present study's results to the results of other conducted studies:

Results of similar research findings with those obtained by the present study. The findings of the present study corresponded with Ebru (2020), Dong (2021) and Awajan (2022) in assuring that the ADDIE model facilitated a systematic, comprehensive, and structured approach to instructional design concerning the alignment of instructional objectives, content, and assessment methods, more specifically in higher education. Similarly, the use of ADDIE model positively influenced learner satisfaction, engagement, achievement of learning outcomes and boosted teachers' professional competencies (Spatioti et al.,2022 and Wahyudin & Darmawan ,2022).

Results of different research findings with those obtained by the present study. Other studies provide insights into the drawbacks of the ADDIE model, highlighting situations where it may not be the optimal or efficient approach in certain contexts. Ngussa (2014) found that the implementation phase is given the highest priority while the evaluation phase is given the lowest priority in practical application of the ADDIE model. Similarly, Ritzhaupt and Covello (2017) indicated its heavy emphasis on upfront analysis and planning. In relation to the sequential nature of the model, Ebru (2020) found that the linear nature of the model could be restrictive when dealing with complex and dynamic content. The study also identified potential delays in the design process due to the sequential nature of the model. This study, therefore, recommends that teachers need to be encouraged to keep applying the ADDIE instructional design in teaching-learning transaction to create rooms for students' higher academic performance.

Limitations

While the use of an ADDIE model-based program integrating multimedia principles to enhance EFL graduate students' creation of learning assets and their professional teaching competencies offers several benefits, it is important to acknowledge some limitations:

1- The program requires EFL graduate students to learn and apply the ADDIE model and multimedia principles effectively which

need a wide span of time especially for students with limited prior knowledge or experience in instructional design. But this has been managed by offering two introductory sessions about the concept of instructional design in general as well as setting up a what's app group for continuous communication, reflection, and feedback.

2- Unequal access to technology among students can impede their capacity to effectively explore and utilize multimedia elements, leading to disparities in the quality of learning assets produced. To address this challenge, students have been grouped based on their technology skills to ensure group support and collaboration. Additionally, providing continuous support and assistance to all students has helped to bridge the technology gap and enabled them to fully engage with multimedia tools and techniques.
3- It was essential to ensure that the integration of multimedia elements has supported meaningful learning experiences and aligned with the desired learning outcomes and pedagogical principles. This has been managed by continuous observation and feedback to ensure the appropriate integration of suitable multimedia elements (especially videos).
4- Since the field of instructional design and multimedia integration is constantly evolving, with new technologies and trends emerging regularly, it has been essential to address the importance for EFL graduates to keep pace with advancements through continuous professional development to ensure the program's relevance and effectiveness.

Conclusion

Instructional design plays a crucial role in recognizing the learning process, its aspects and determining the most effective materials and methods, assessment tools to support individuals in achieving their educational objectives. The principles of instructional design are applicable to various learning groups, ranging from grade school students to adult employees in diverse industries (Wahyudin, & Darmawan:2022: 10). Designing courses that are effective and impactful is paramount for fostering high-quality teaching and learning experiences. For EFL graduate students aspiring to become English teachers, it is essential to

develop the necessary skills and knowledge in instructional course design. This will empower them to create engaging and effective courses that meet the specific needs of their future students. By refining their instructional design skills, EFL graduate students could make valuable contributions to the progress of education and facilitate favorable learning outcomes for their prospective students. As a result, their overall professional teaching competencies will be further enhanced.

Implications

1- There is a need for a professional curriculum focused on the knowledge utilized most in teacher practice to be used for teacher preparation programs.
2- Both pre-service and in-service teachers need to have an opportunity to practice and receive feedback in a variety of learning contexts such as in the classroom, universities, summer workshops, communities of practice and virtual learning environments**.**
3- EFL graduate students need to enhance their professional teaching competencies and become more marketable in the field of English language teaching to become valuable assets to educational institutions and organizations seeking educators who can create engaging and effective learning experiences.
4- Teachers should be able to create learning assets that cater to the specific needs, preferences, and cultural backgrounds of their students to address the diverse learning styles and requirements found in today's classrooms.

Recommendations

1- A well-structured curriculum that covers the essential components of the ADDIE model and multimedia principles and aligns with the specific needs and goals of EFL graduate students should be developed.
2- Hands-on practice (practical exercises, projects, and assignments) for EFL graduate students should be provided to foster skill development and refinement.
3- Collaboration and peer feedback should be encouraged among EFL graduate students by incorporating group projects or peer review

sessions to promote the exchange of ideas, insights, and constructive feedback.

4- Access to experienced instructional designers or educators who can serve as mentors or advisors throughout the program can be provided, helping EFL graduate students refine their skills and enhance their professional teaching competencies.
5- Real-world examples and case studies should be integrated into the program to showcase successful examples of learning assets created using multimedia elements to inspire and motivate EFL graduate students in their own creations.
6- Reflection and self-assessment should be encouraged by incorporating reflective exercises and self-assessment tools that prompt EFL graduate students to critically evaluate their learning assets and teaching approaches. This encourages self-reflection, self-improvement, and the development of a growth mindset.
7- Ongoing professional development should be fostered by emphasizing the importance of lifelong learning and continuous professional development for EFL graduate students through attending workshops, or networking opportunities that allow them to further enhance their skills beyond the program.

Suggestions for further research

1- The comparison between the effectiveness of the ADDIE model with other instructional design approaches or traditional methods.
2- The transferability of the skills acquired through the ADDIE model-based program across different educational contexts (diverse learners, including different age groups, proficiency levels, etc).
3- The effectiveness of the learning assets created by EFL graduate students on students' language learning progress, engagement, and motivation.
4- The way multimedia elements can be effectively incorporated into various learning assets, such as lesson plans, instructional videos, interactive exercises, and assessments.
5- The potential for integrating the ADDIE model-based program integrating multimedia principles into professional development programs for EFL teachers.

6- This study may be replicated with a larger and more diverse sample of EFL graduate students from different governates in Egypt.

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