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Designing Mobile Learning Instruction for ESL Context: A Review of Instructional Designs

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Abstract

The emerging trend of education in embracing mobile learning is irrefutable. Mobile learning has become a panacea to unexpected situations such as the Covid-19 pandemic. Due to that, a lot of educators designed mobile learning instructions to cater to their students' needs. However, the wide variety of instructional design models caused confusion and difficulties for educators, especially English as Second Language (ESL) educators, to design practical instructions via a mobile application. Therefore, this paper aims to review the instructional design models in creating a mobile application, particularly for language learning. Five instructional design models were reviewed, which include 1) Merrill's Principles of Instruction Model, 2) Gagne's Nine Events of Instruction Model, 3) The Kemp Instructional Design Model, 4) The ADDIE model, and 5) The ASSURE model. Each model has its strengths and weaknesses. From the review, each model is also suitable for specific contexts. This paper implied that instructional designs are crucial as they provide step-by-step guidelines for educators or content developers in creating the materials or tools for learning. With the aid of instructional design, a content developer could plan content creation systematically for a better learning outcome.

Keywords: *design and development, English language teaching and learning, instructional design, mobile learning*

Introduction

Instructional design (ID) generally refers to designing a comprehensive output to solve problems by systematically analysing the conditions (Abdurrahman et al. 2020; Dick et al., 2015; Moore et al., 2006). Instructional designs involve planning based on various theories and approaches to solve the problems mentioned. In a DDR approach, instructional design is an element that guides the researchers in designing and developing the best-fit solution for a context-specific problem (Branch, 2009). Instructional design also means an "instructional theory" (Aldoobie, 2015, p. 68). The instructional designs provide step-by-step guidelines for educators or content developers in creating the materials or tools for learning. With the aid of instructional design, a content developer could plan content creation systematically for a better learning outcome.

Many instructional designs could be used as a guide. Based on a systematic literature review of the most popular instructional model carried out by Göksu et al., (2017), the ADDIE instructional design model is the most popular. The notion that ADDIE is the most popular instructional design model was also supported by Mohammad Taufiq and Wan Ab Aziz (2018). Regardless, it is essential to look into the five main

types of instructional design models: 1) The Kemp Instructional Model, 2) Gagne's 9 Events of Instruction Model, 3) The Kemp Instructional Model, 4) ASSURE Model, and 5) ADDIE Model.

Merill's Principles of Instruction Model

Merrill introduced Merrill's Principles of Instruction Model. This model includes five main principles: 1) Problem Centred, 2) Activation, 3) Demonstration, 4) Implication, and 5) Integration. Figure 1 below shows Merrill's Principles of Instruction Model.

Figure 1: Merrill's Principles of Instruction Model

According to the five principles in Figure 1, learning is promoted or enhanced when learners acquire knowledge and skills in solving real-life problems. This refers to the first principle, which is problem-centred. In designing instruction, identifying the issue in a real-life context could benefit learners. Next, the activation principle refers to the learners' ability to recall or apply existing knowledge and skill to a newly acquired skill. After activating knowledge or skill, learners observe a demonstration of the knowledge and skills in the demonstration principle. This is closely related to the classroom context, where learners learn new knowledge before applying it. After the demonstration, learners use their newly acquired knowledge to

solve the problems given in the integration principle. Finally, in the integration principle, learners reflect, discuss and integrate their newly acquired skills into the real-world situation.

In a study by Odo et al., (2021), knowing the relation between real-life problems and content could boost the learning outcome in Mathematics education. However, in a language classroom context, Rahayu and Bandjarjani (2021) reported that the results for each principle in this model could not be measured or seen, which needs a thorough rubric for further implementation. Hence, this model is less suitable for designing and developing a mobile application because this model begins with problem activation, which means that learners already have a manual or curriculum.

Gagne's Nine Events of Instruction Model

Gagne's Nine Events of Instruction Model involves nine instructions for designing instruction. Robert Gagne introduced it to look into events that could help adult learners to learn effectively with well-designed instruction (Gagne & Briggs 1974). The model is shown in Figure 2 below.

Figure 2: Gagne's Nine Events of Instruction

As seen in Figure 2, the first event is to gain learners' attention. In this model, the hook or pre-instruction starts with gaining attention to ensure that learners are focused and ready before learning. Next, once the learners' attention is grabbed, the learners should be informed of the learning objectives. This encourages learners to be more prepared mentally for what they are expected to achieve at the end of the lesson. Third, stimulating or recalling prior learning of learners. This ensures that learners could relate their previous learning experiences and knowledge to new information. Fourth is presenting the content to the learners. In this fourth instruction, learners are introduced to the learning content of the day, which is new to them.

Once learners are introduced to the learning content, guidance is provided in the next event, whereby teachers or instructors guide learners to understand the new content. In this event, teachers and instructors provide meaningful resources to help learners understand the context. After that, the sixth event looks at the performance of learners via practice. Learners are guided to practice the content to enhance their understanding further. Seventh, the teachers or instructors provide feedback to learners to assist them after practice. The eighth event in this model is assessing performance. Once learners have been guided, they would be evaluated in this instruction. Finally, in the last event, teachers or instructors should enhance the retention of learners by providing extra tasks to apply the knowledge they have learnt in different contexts.

Gagne's Nine Events of Instruction is a thorough model to be followed. It is an effective model for designing an effective lesson plan, especially for teachers and instructors (Iqbal et al., 2021). However, this model is less flexible for creativity and too complex for instructors who do not deal with cognitive information processing, as Gagne's Nine Events of Instruction has specific components which are too rigid (Model, 2021).

The Kemp Instructional Design Model

The Kemp Instructional Design Model is a cyclic model with nine stages introduced by Morrison, Ross, and Kemp (Morrison et al., 2013). The model is an iterative model, which allows teachers and instructors to start at any stage. Figure 3 below shows the Kemp Instructional Design Model, and it demonstrates how this model's nine stages are interchangeable and do not follow a specific sequence. However, as Morrison et al. (2013) visualised, the Kemp Instructional Design Model starts with an instructional problem, whereby teachers or instructors determine specific goals and potential issues. After identifying the issue, the learner characteristics are identified, whereby teachers or instructors need to know the learners' background to plan suitable and appropriate instruction. Next, the teachers or instructors decide on the learning content, analyse tasks and align them with the instructional objectives and goals.

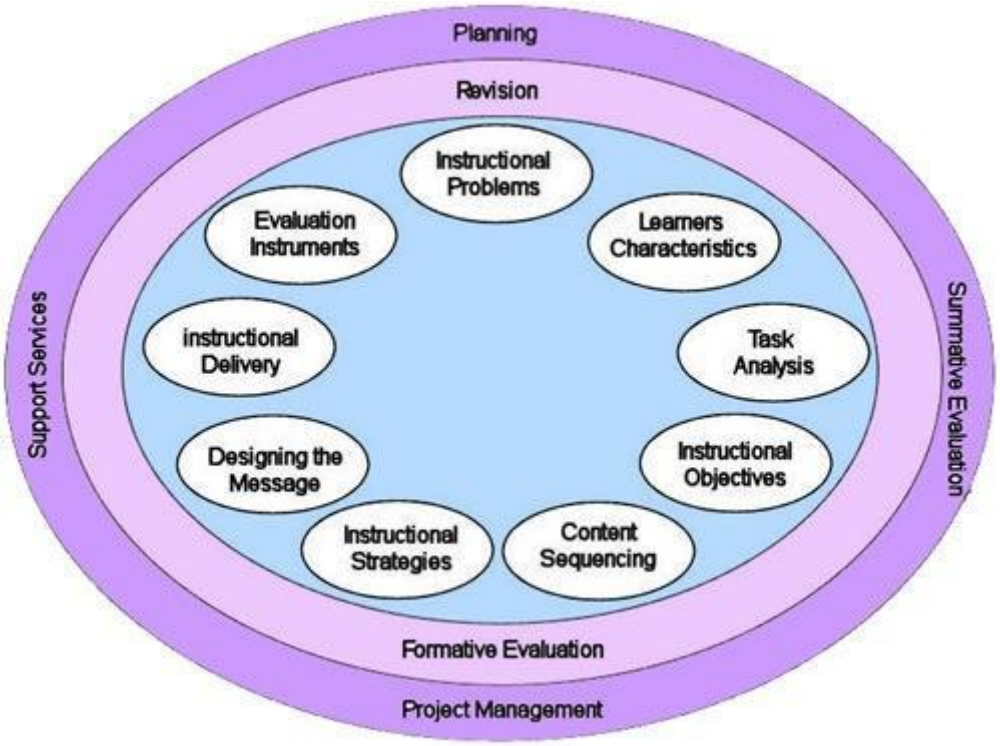

Figure 3: The Kemp Instructional Design Model

After that, the instructional goals and objectives are detailed according to measurable and achievable learning outcomes. The fifth stage is content sequencing, whereby teachers or instructors structure the content logically to ensure learning outcomes could be achieved. Then, the instructional strategies are designed based on learners' awareness and learning outcomes. In this stage, activities are designed to assist the content. Seventh, the message is designed whereby teachers or instructors plan and decide the content delivery mode. Next, the instructional delivery is designed to provide supporting resources to encourage effective learning content delivery. Finally, in the final stage, the evaluation instruments are designed as formative and summative evaluations to assess the effectiveness of the content developed.

A review by Hess (2021) mentioned that the Kemp Instructional Design Model has a cognitivist approach because it focuses on learners from assessment to evaluation. The Kemp Instructional Design Model also looks at learners and the system (technology). However, Bajracharya (2019) stated that the Kemp Instructional Design Model is a classroom-oriented instructional design model that guides in enhancing classroom teaching and learning experiences. The Kemp Instructional Design Model is the best choice for designing instructions with technology adoption.

The ASSURE Model

ASSURE is a linear and straightforward design whereby the steps suggest the approaches and principles when designing a course or program. The ASSURE model stands for the six stages in its instructional de-

sign: "analyse the learner, state objectives, select media, utilize, require students' participation, evaluate and revise" (Reyes & Oreste, 2017, p. 64). This model was developed in 1999 by Heinich, Molenda, Russell and Smaldino (Rahman, 2017). Figure 4 below shows the ASSURE model.

Figure 4: The ASSURE Model

As shown in Figure 4, the ASSURE model starts by analysing the learners and noting the learners' backgrounds (Reyes & Oreste 2017). In this stage, the teacher or instructor identifies the learners' age, level of education, proficiency, and other necessary information. Then, the objectives of the program or course are stated. After identifying the objectives, suitable media is chosen based on the learners' backgrounds. Next, media is utilized, which means the materials are reviewed and implemented. This is important because it allows the instructor to evaluate the media's appropriateness and suitability. The students need to participate in the course with media utilisation, such as giving feedback or comments or completing the tasks. Finally, adhering to the feedback given, the evaluation and revision stage is carried out.

The ASSURE model is used mainly by teachers in the classroom, similar to lesson plans in school (Hairudin 2017). Regardless, the ASSURE model could be used to guide instruction. Since the ASSURE model is a linear process, it is more classroom-oriented, which provides a detailed and comprehensive guide to creating lesson plans with technology adoption (Okoroma, 2018).

The ADDIE Model

The ADDIE model is one of the most popular designs used in design and development research (Mohammad Taufiq & Wan Ab Aziz, 2018). ADDIE is the abbreviation of Analysis, Design, Develop, Implement and Evaluate (Branch, 2009; Budoya et al., 2019). This instructional model helps instructional designers plan, design, and develop their courses or tools, specifically more prominent in the educational field, where ADDIE is used as a model for improving teaching and learning (Cheung, 2016; Hess & Greer, 2016; Islami 2020; Van Wyk et al. 2020). ADDIE allows instructional designers to design appropriate content based on the analysis output. Although many studies claim that ADDIE is a linear instructional design model (Hanafi et al., 2020), it is cyclical as each stage in the ADDIE model requires an evaluation (Rafiq et al., 2019; Shahril et al., 2015). ADDIE has been mentioned to cater to two uses: a framework for learning and a process of multimedia creation (Hanafi et al. 2020).

The first step in the ADDIE model is the Analysis stage. In this stage, the needs of target learners are identified. This is an essential step in design and development research as it is crucial to identify the objectives and expected outcomes of a course or tool (Cheung, 2016; Rafiq et al., 2019). Knowing what a particular learner needs or expects from the course eventually contributes to the estimated length or evaluation criteria. In the Design stage, the objectives, learning topics, assessment, and content delivery methods are identified. This stage includes the storyboard design, which could fit the feedback from the Analysis stage. Instructional designers adhere to the needs and design accordingly, choosing appropriate materials and strategies to present them (Hess & Greer, 2016).

The third stage is the development stage, which usually comes hand-in-hand with the Design stage. In this Development stage, instructional designers develop the materials and contents based on the design stage. This stage condones the iterative design of ADDIE. After developing materials on a preferred platform, the instructional designer would conduct a pilot study to improve the course before implementing it to the targeted audiences. This iterative stage continues until the course content is developed completely (Cheung 2016; Hess & Greer 2016). After the course development is completed, the Implementation stage comes into view, where the course is tested on the targeted audiences. Instructional designers often consider the learners' feedback throughout the implementation stage, as it allows the instructional designer to know any unforeseen issues within the course delivery (Cheung 2016). After that, the final stage, the Evaluation stage, takes place. This stage allows learners to provide feedback on the course created. The feedback is vital as it helps the instructional designer re-evaluate the course and address issues in the Implementation stage (Cheung 2016). Figure 5 shows the ADDIE model by Branch (2009).

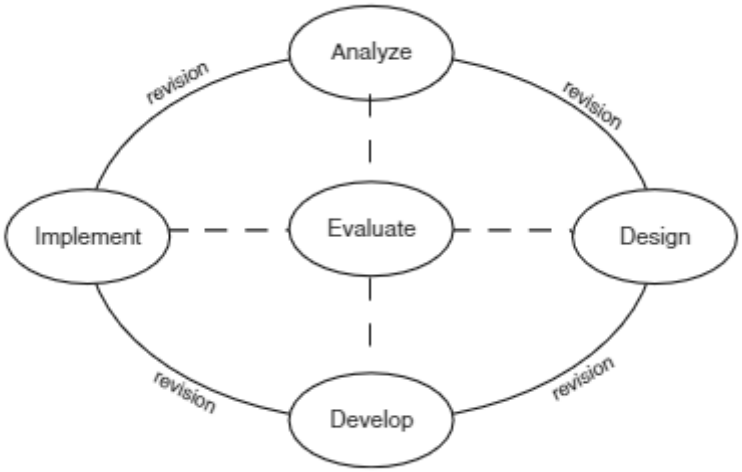

Figure 5: The ADDIE model by Branch (2009)

As shown in Figure 5, ADDIE is cyclic. ADDIE undeniably has pros and cons which need to be considered by researchers before using it as a guide. The most prominent feature of ADDIE is that it provides a step-by-step approach that helps instructional designers plan accordingly (Chen, 2016). The five stages act as a comprehensive guideline, focusing on designing, developing, and incorporating the evaluation stage, including formative and summative assessments (Chen, 2016). However, there is also a notion that ADDIE has disadvantages (Alnajdi, 2018; Jung et al., 2018; Nadiyah & Faaizah, 2015). First, some researchers argue that the analysis stage is not broad enough for the designing process in terms of the analysis stage. This causes trouble for new instructional designers as they could not identify the design stage's exact needs. It was also stated that ADDIE is too linear and does not allow inspiration. The flow is too rigid, hindering instructional designers' creativity (Jung et al., 2018).

ADDIE as the winning model

ADDIE, especially, is not an unknown model in the educational technology field. ADDIE was used to evaluate a developed programme (Bamrara, 2017). This study involves the ICT (Information and Communication Technology) programme based on its applicability, which focuses on the ADDIE approach. Another study by Alnajdi (2018) used ADDIE to design and develop interactive lessons. Similarly, both studies reported that the end product's performance was significantly positive. Budoya et al. (2019) also used ADDIE as a model for developing software. Interestingly, they integrated the Feature Driven Development Process (FDDP) into ADDIE and specifically mentioned that the model is effective to be used by other instructional designers.

In STEM, Gusmida and Islami (2017) developed media for learning Physics using the ADDIE model and augmented reality. Following the steps in ADDIE, these researchers validated their media and found it

effective for the teaching and learning of Physics. Another study in the field of STEM was carried out by Susiana (2019), who developed learning materials for actuarial mathematics with the ADDIE model. The process followed by this researcher has gained positive results in terms of students' performance. On another note, the integration of the ADDIE model has also been used by various researchers, such as Zulkifli et al. (2018), who developed the Moral Education module. Also, the researchers mentioned that ADDIE is the basis for developing a systematic and feasible module.

Additionally, Ismail et al. (2018) researched developing a catering course for vocational colleges in the Massive Open Online Course (MOOC) using the ADDIE model, and KOÇ (2020) developed an English for Academic Purpose (EAP) web-based course with the aid of ADDIE. Both these studies reported that ADDIE supports the development of modules, making them suitable and feasible for learning. This shows that ADDIE has been widely used, and the usability of ADDIE as an instructional model is irrefutable (Curum & Khedo, 2021). It is undeniable because ADDIE serves as a comprehensive guideline for researchers in designing and developing instructions to solve contextualised issues.

Conclusion

Designing and developing a mobile learning module ensures that the end product is feasible, so evaluation in each stage is crucial. The ADDIE model is chosen as an instructional design model for this study. The rationale for this is that ADDIE has formative assessments for each stage. These formative assessments allow the researcher to make amendments before proceeding to the next stage. Also, ADDIE, which is more interactive and dynamic, is chosen to ensure that the mobile learning module is usable, acceptable, and suitable to solve the problem mentioned. Branch (2009) stated that the ADDIE model is interactive, which gives a more detailed guide in designing instructions. Moreover, ADDIE allows for self-learning conditions and effective mobile learning design because it is a responsive model (Curum & Khedo, 2021). Hence, to ensure the usability and feasibility of the mobile learning module, ADDIE is the best choice for this study.

Author contributions

Conceptualisation, K.R.M.R., H.H. and M.M.Y.; writing—original draft preparation, K.R.M.R.; writing—review and editing, K.R.M.R., H.H. and M.M.Y; visualization, K.R.M.R.; supervision, H.H. and M.M.Y.; funding acquisition, H.H. and M.M.Y. All authors have read and agreed to the published version of the manuscript.

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Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Conflicts of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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