



Preferences for Procedures and Learning Media Development Models

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ABSTRACT

Learning media as a component of the learning system must be in accordance with the learning components so that its function is optimal in facilitating learning activities. This article aims to explain the selection criteria and procedures for developing adaptive learning media. This article is the result of a literature review by searching various references to obtain valid and reliable data. The results of this research show that in general the learning media development procedure consists of three main steps, namely: 1) planning, 2) design, 3) development, and 4) evaluation. The learning media development models are as follows: ADDIE, ASSURE, 4D, PIE, Roblyer, Hannafi & Peck, Dick & Carey, and Smith & Ragan. Of course, each development model will be implemented according to learning needs in order to achieve learning goals.

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INTRODUCTION

Learning media is an important factor in improving the quality of learning. This is caused by the development of new technology in the field of education which demands efficiency and effectiveness in learning. To achieve the highest level of efficiency and effectiveness, it is important to reduce the dominance of verbalistic systems in delivering lessons using learning media.

In connection with the use of media in learning activities, educators and teachers must be careful in selecting and determining the media to be used. Choosing media carefully and appropriately will help students learn better. Apart from that, learning activities become interesting so that they can attract students to learn. Many factors influence the accuracy and speed in selecting learning media, such as the instructor's limited knowledge and their understanding of the standards that must be considered when selecting media (Hasan, 2021). As a component, learning media should be adaptive, that is, adapt itself to the overall learning process. Therefore,

educators must follow standards that can be used as guidelines in choosing adaptive learning media (Batubara & Ariani, 2019).

Several criteria that must be considered when choosing learning media are as follows: purpose of using the media, target of using the media, media features, time allocation, costs required, and media availability. Adaptive learning media, based on these six criteria, can be considered appropriate to learning objectives, user needs and conditions, and overall environmental conditions. Because learning media is directly related to other learning elements, the adaptive learning media development method can be adapted to various learning design development models. Several models used as guidelines for developing adaptive learning media will be discussed further.

LITERATURE REVIEW

Procedure Preferences

Media selection criteria must be made by considering the objectives to be achieved, current conditions and limitations, as well as the capabilities and characteristics of the media concerned. The fact that media is part of the overall instructional system should not influence the choice of media. Therefore, even though the objectives and materials are known, additional elements, such as time and resources, also need to be considered as a practical matter. It is therefore advisable to consider what media are available, cost, time required to obtain them, and formats that suit user preferences (such as teachers and students).

Choosing the media to be used in learning activities is a difficult task, because many factors must be considered, the choice is complicated and difficult. First, media selection model—Anderson (1976) proposed two models for the learning media selection process: closed model and open model. Closed choices occur when media alternatives have been determined "from above", such as by the Department of Education, so that certain media must be used. If we choose, we will do more to choose the right topic or subject matter for a particular type. For example, it has been decided that the media used is sound media. In such a situation, asking why sound media is being used is not the right step. The open election model is the opposite. This means that there are many media choices available, and we can still choose any type of media that suits our needs. The open selection process is more flexible because we adapt it to current needs and situations. However, learner abilities and skills are required to carry out this open selection process. Sometimes, students may combine open and closed media selection.

Second, reasons for media selection. Media is actually part of the learning system. As part, media must be an important component and appropriate to the overall learning process. Ultimately, media selection is used in learning activities to

enable students to interact with the media. After we determine what media we will use in learning, is this media available at school or on the market? We only need to borrow or buy available media if it is available, as long as the existing media is in accordance with the learning objectives we have planned and the price is affordable. However, if the media we need is not available, we must create our own media program to meet these needs. To choose media that best suits students' needs and requirements, we need to choose media with the right procedures. This is because many types of media have various advantages and disadvantages (Falahudin, 2014).

Azhar Arsyad (1997) states that there are six criteria that must be considered when selecting media, namely: in accordance with the objectives to be achieved; appropriate to support the lesson content; practical, flexible and durable; used by experienced teachers; target grouping; and technical quality. Furthermore, Brown, Lewis, and Harclerod (1983) state that when selecting media, you must consider the factors content, purposes, appropriateness, cost, technical quality, circumstances of uses, learner verification, and validation.

As a conclusion from the opinions above, it can be said that these opinions basically complement each other. Furthermore, the authors believe that the following factors should be considered when selecting media: learning objectives, learners, availability, technical quality, cost, flexibility, and the user's ability to use them. The following will be outlined to give a better idea of this.

First, learning objectives. Media must be selected that can help achieve previously determined learning objectives; there may be many alternatives considered suitable for this purpose, so the best choice must be made. The suitability of the characteristics of the goals to be achieved with the characteristics of the media to be used is very important for compatibility. Second, effectiveness. Of the various media options that have been chosen, which one is considered the most efficient for achieving the goal. Third, students. When choosing appropriate learning media for students, there are several questions that may arise. For example, is the learning media suitable for students, according to their capacity and experience, or is the learning media interesting for students? For which students and at what level of education is this used? Is it individual, small group, or class? How many students? Where is the location? When selecting and using media in learning activities, these questions must be considered.

Fourth, availability. Availability is related to the suitability of the number of products available to needs, the availability of means of transportation to provide the media, and the ability of the school infrastructure or its users to use it at school and outside school. Fifth, technical quality. New learning media usually offer different and more interesting experiences compared to the experiences provided by previous learning media. Therefore, it is important for educators and students to recognize and

utilize new learning media so that the learning process is more interesting and not outdated.

Sixth, fees. The costs referred to here include product purchases, supporting technology and maintenance. The quality of materials, sophistication of features, production quantity, and distribution process all influence the price of an item. Seventh, media flexibility and convenience. When choosing a media, flexibility must be considered in the sense that it can be used in various situations and is not dangerous when used. Eighth, user capabilities. Although media has many benefits, those who cannot use it will not gain much benefit. Ninth, time allocation. The time available for the learning process will influence the use of learning media. Therefore, we must consider whether the available time is sufficient to purchase media or just to use it.

Instructional Media

Before discussing further about learning media, it is important to understand the overall definition of media. "Medium", the singular form of the word "media", comes from Latin and means "between" or "intermediary". This term refers to anything that has the ability to connect the source and recipient of information (Yaumi et al., 2016). Learning media, which are tools and means to support education and training, must receive special attention. It is impossible to just ignore it during the educational process, especially during the learning process.

This is due to the fact that without learning tools, education will not run well. At first, this media advancement was only considered as a teaching aid for teachers. The tools used are visual aids, namely pictures, models, objects and other tools, which can provide real experience and motivation to learn. Thus, this tool can increase student absorption and learning outcomes.

Media is very important in the teaching and learning process. Because the presence of the media as an intermediary in these activities can help overcome the ambiguity of the material to be conveyed. Media can represent what teachers cannot say through certain words or sentences. With the presence of media, even the abstractness of material can be concretized (Zain, 2010).

METHOD

This research uses the library study method, a qualitative research method commonly used in the fields of social sciences, religion and humanities. The library study method was used to collect data and sources for this research. Data sources can come from related journals and books (Darmalaksana, 2020). In library research, references and references are used in data management using benchmarks from various literature. This research collects data from various literature, including

books, journals and other relevant sources. The focus of this research is to examine and discuss theories that have been recognized in the scientific literature and are relevant to the research topic: "Learning Methods and Media." (Ilham, 2024).

FINDINGS

There are 2 sub-sections of data analysis that are in accordance with the research focus formulated by the researcher, namely the function and role of learning media that can be emphasized by teachers in the classroom; and procedures and learning media development models, namely: ADDIE Model, ASSURE Models, 4D Models, Hannafin & Peck Models, PIE model, Roblyer Model, Dick & Carey Model, dan Smith and Ragan model.

DISCUSSION

Function and Role of Learning Media

The function of learning media can be emphasized because of the following things: learning media has a special role as a tool to create a better learning environment; learning media play an important role in the overall learning process, because they function as components that do not stand alone but are interconnected with each other to create the expected learning situation; the use of learning media must be in accordance with student competencies and teaching materials. This means that the media must be relevant to the components to be achieved and the learning itself; learning media is not entertainment; therefore, it should not be used simply for games or to attract students' attention; learning media can speed up the learning process, which means students can grasp the objectives and teaching materials more quickly and easily; learning media improves the learning process. The learning outcomes of students using this media are usually more immersive, which means the learning is of higher value; and learning media can reduce verbalism because they provide concrete foundations for thinking.

The urgency of media in learning is by understanding the concept of media and its role as part of learning. It is important to understand that the role of media in planning and implementing learning is more than just a tool that can be ignored if media is not available. It needs to be understood that the role of media in learning is very important to achieve the expected learning objectives (Yaumi, 2017).

Instructional Media Development Procedures and Models - ADDIE

In instructional system design, the ADDIE model uses a systems approach. Critical to a systems approach is dividing the learning planning process into steps, organizing each step into a logical sequence, and using the output of each step as input for the next step. Analysis, design, development, implementation, and

evaluation are the five phases of the ADDIE Model instructional process. To make it easier to depict, see the following image illustration.

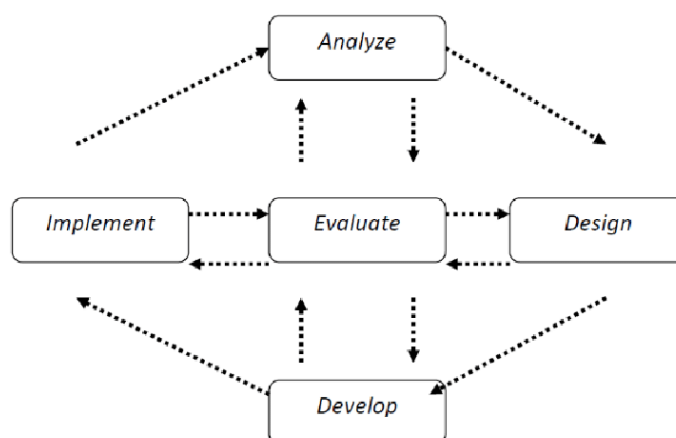


Figure 1. Stages of the ADDIE Model (Anglada, 2007)

First, analysis stage. At this stage, the main task is to evaluate how teaching materials should be created to achieve learning objectives. Some of the analyzes carried out here are as follows. Performance analysis: At this stage, the basic problems faced in learning begin to emerge. Student analysis: This analysis assesses student characteristics based on their knowledge, skills and progress. The purpose of this analysis is to determine the level of various students' abilities. The results of the analysis of students' critical and creative thinking abilities can be used to provide an idea of how to make teaching materials.

Analysis of learning material about facts, concepts, principles and procedures: Analysis of material about facts, concepts, principles and procedures is a way to identify material that is relevant to the development of teaching materials in learning. At this stage, the analysis is carried out using the literature study method. The aim of analyzing facts, concepts, principles and procedures of learning material is to identify the main parts of the material to be taught and arrange them systematically. This analysis can be used as a basis for formulating learning objectives. Analysis of learning objectives: Analysis of learning objectives is a necessary step to determine the abilities needed by students. There are two points that need to be considered here, namely the learning objectives that have been determined and the achievement of the learning objectives. Therefore, this step can be used as a basis for creating teaching materials for learning.

Second, design stage. The design stage includes planning the development of teaching materials, which includes several activities such as the following. Preparation of teaching materials in contextual learning by reviewing core competencies and basic competencies to determine learning materials based on facts, concepts, principles and procedures, allocation of learning time, indicators and student assessment instruments. Designing learning scenarios or learning activities

with a student understanding approach. Designing learning activities or learning scenarios using an approach.

Third, development stage. In the ADDIE model, aviation functions as teaching material and contains steps to achieve product design goals. Creating and changing teaching materials is a development step in this research. The conceptual framework for developing teaching materials is created during the design stage. Next, the conceptual framework is formed into a teaching material development product that is ready to be used to achieve the goals. Two important goals that must be achieved in the process of developing teaching materials are as follows. Create or revise teaching materials that will be used to achieve the learning objectives that have been formulated and choose the best teaching materials that will be used to achieve learning objectives.

Fourth, implementation stage. At the implementation stage of this research, the design of teaching materials was applied to actual classroom situations. Teaching materials are delivered according to learning. After it has been implemented in the form of learning activities, an initial evaluation is carried out to provide feedback on the application of subsequent teaching materials. The main objectives of the implementation step are as follows: helping students achieve learning goals; guarantee that problem solving occurs to resolve the problems that students have faced during the learning process; and ensure that when the lesson is finished, students' abilities have increased.

Fifth, evaluation stage. In the ADDIE learning system design model, the final step is evaluation. Evaluation is a process carried out to provide value to the development of teaching materials in learning. Formative evaluation and summative evaluation are carried out at the end of each face-to-face meeting (weekly), while summative evaluation is carried out after the activity is completed (semester). Summative evaluation assesses the final competency or learning objective. The results of the evaluation of the development of teaching materials in learning are used to provide feedback on the development of teaching materials. Furthermore, revisions are made according to evaluation findings or needs that cannot be met by the objectives of developing teaching materials. This evaluation aims to determine students' attitudes towards learning activities as a whole and the improvement of students' abilities which is influenced by their involvement in learning activities (Cahyadi, 2019).

Instructional Media Development Procedures and Models - ASSURE

The ASSURE model is a guide and plan that can help teachers in planning, identifying, determining goals, choosing methods, materials and media and evaluating. The ASSURE model is a reference for educators in developing their learning by making systematic plans that integrate technology and media so that

learning becomes more effective and meaningful for students. The stages are as illustrated in the following image:

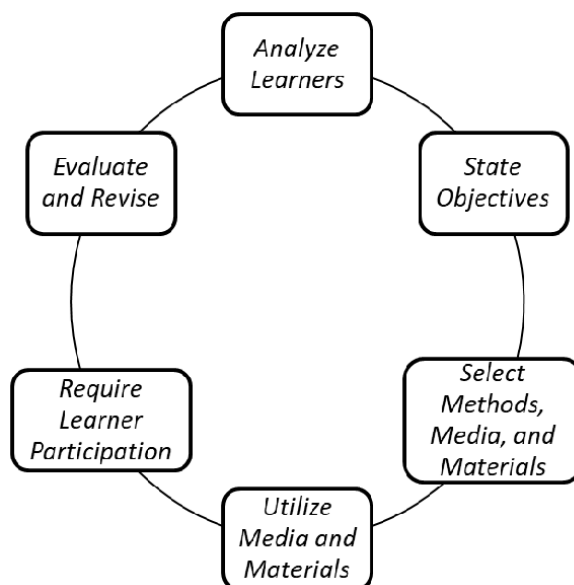


Figure 2. Stages of the ASSURE Model

First, analyze learners. The first step that teachers must take in developing learning media is to find and analyze student characteristics. The main goal of analyzing student characteristics is to find out what students need to learn and how they can maximize their level of knowledge. Three factors are used to assess students: general characteristics, specific entry abilities, and learning style.

Second, state objectives. Goals are statements about what one wants to achieve, not how students will achieve it. Formulating the knowledge, skills, and attitudes that students are expected to have after participating in Islamic Religious Education learning activities requires a clear understanding of who is learning, what students must do as a result of learning, the conditions in which the activities are carried out, and the expected level of achievement.

Third, select methods, media, and materials. Models – the choice of learning approach must be adjusted to the learning objectives and standards. Students' learning styles and their motivation must also be considered, because both can ultimately support learning. The ARCS model can be used in learning strategies. This model can help which strategies can build Attention (students' attention), Relevant (related to needs and goals), Confident (learning design can help students understand what they are learning) and Satisfaction (students' satisfaction with their efforts to learn).

Media – Based on Smaldino's media and technology criteria, the media and technology used in this learning planning are learning media that involve the environment around students, be it artificial, natural or social. Materials – every

material that will be delivered by the teacher must be adapted to the environment. This is a task and challenge for teachers to develop learning media. Teachers must be sensitive to what material can be presented through media selection in their learning activities, so that students feel at home, happy and not bored while learning.

Fourth, utilize media and materials. The learning paradigm has changed from teacher-centered to student-centered. This change makes students more able to use the material independently and in small groups rather than just listening to the teacher's conventional presentation. Teachers must follow the "5Ps" when using environment-based materials and media: preview the materials (examine teaching materials), prepare the materials (prepare teaching materials), prepare the environment (prepare the environment), prepare the learners (prepare the learners), provide the learning experience (determine the learning experience).

Fifth, require learner participation. Learning activities will be better with educators who encourage active student participation. Trying things in a fun way is what is called learning. With this method, the teacher must find a way for students to act according to the plan in making learning media. When students actively remember or apply some ideas, it is recommended that they create a mental schema (Wang, 2012).

Sixth, evaluate and revise. After implementing the learning, an evaluation needs to be carried out to determine the impact and effectiveness of using the media in learning activities. This evaluation must include an evaluation of the process and results to get a complete picture. The impact of the media and techniques used in the learning process is part of the process that you want to know. However, from the results, what we want to assess is whether the goals or competencies set by the students have been achieved.

Instructional Media Development Procedures and Models - 4D

The flow of learning device development (instructional development) was designed by Thiagarajan, Semmel, and Semmel (1974). The 4D model is basically aimed at teacher training for children with special needs and emphasizes the development of teaching materials. Children with special needs are children with disabilities. As the name suggests, the 4D model consists of four main stages: Define, Design, Develop and Disseminate.



Figure 3. 4D Model Stages

First, define – At this stage, actions are taken to establish and determine development conditions. This stage is often referred to as needs analysis in other

models. There must be a different analysis for each product. Analysis of development needs, product development requirements that suit user needs, and selecting the appropriate research and development (R&D) model for product development are carried out in this definition. Analysis can be carried out by analyzing literature or preliminary research.

Front-end analysis (initial and final analysis). At this stage, the teacher carries out an initial diagnosis to improve the efficiency and effectiveness of learning and carries out initial analysis to identify basic problems in development. In addition, facts and solution options emerge to make it easier to determine the initial steps for development. Learner analysis (student analysis). In the early stages of planning, student analysis is very important. This analysis was carried out by looking at the characteristics of the students; This is done by considering the characteristics, abilities and experiences of students, both as a group and individually. At this stage, things such as students' abilities, their motivation to learn, their background experiences, and so on are studied.

Task analysis (task analysis). At this stage, the teacher analyzes the main tasks that students must carry out to achieve minimum competency. Task analysis consists of assessing Core Competencies (KI) and Basic Competencies (KD) related to the material to be studied. Concept analysis (concept/material analysis). Concept analysis is created in a learning concept map, which will later be used to achieve certain competencies by identifying and systematically arranging the main components of learning material. This concept map is used to determine the content of the material to be taught and to organize the steps that will be carried out rationally.

Specifying instructional objectives (specific instructional objectives). Analysis of learning objectives is carried out to measure learning achievement. This is done using material and curriculum analysis. Researchers can determine what studies will be presented, create a grid of questions, and finally determine how much the learning objectives have been achieved by writing the learning objectives. Using operational verbs, write the learning objectives and expected changes in behavior after learning (Rochmad, 2012).

Second, design – the design stage begins with solving problems from the definition stage. The aim of the design stage is to create learning tools. Thiagarajan (1974) divides design into four stages, each of which includes: constructing criterion-referenced test, media selection, format selection, and initial design.

Constructing Criterion-Referenced Test (preparation of benchmark reference tests). Preparing a benchmark test is a process that connects the definition stage with the design stage (Thiagarajan, 1974: 7). Specifications of learning objectives and student analysis are used as a basis for creating learning outcome test grids. The tests created are adapted to different levels of cognitive abilities.

Media Selection, media are selected to suit concept and task analysis, target user characteristics, and deployment plans with various media features. This helps students achieve basic competencies. Format Selection, in developing this learning tool, the choice of format is intended to design or plan the learning content, as well as the choice of strategies, approaches, learning methods and learning resources. The format chosen must meet the standards of being interesting, easy, and helpful. Initial Design (initial design), all learning tools that must be prepared before the trial is carried out are part of the initial design. It also includes a variety of structured learning activities, such as reading texts, interviews, and trying out various learning skills through teaching practice.

Researchers create a prototype or initial product design at the design stage. This stage is used in developing teaching materials to adapt modules or textbooks to the content framework resulting from curriculum and material analysis. In developing learning models, this stage is filled with activities to create a conceptual framework for learning models and tools (materials, media and evaluation tools) and carry out simulations on the use of learning models and tools on a small scale. The product design (model, textbook, etc.) must be validated before proceeding to the next stage. The product design is validated by colleagues, for example teachers or lecturers from the same field of study or expertise. Peer validation results determine whether the product design needs to be improved according to the validator's suggestions.

Third, develop – the development stage consists of two actions, namely: expert assessment and development test. The expert assessment method validates or evaluates the suitability of a product design. In this activity, experts in the field carry out evaluations. The learning materials and designs that have been made are improved with the suggestions given. Product development trials on real subjects are known as development trials. This trial collects information about responses, comments, or comments from target users of the product. The test results are used to develop new products. Once the product is improved, it is tested again until it produces effective results.

In the context of developing learning models, development activities are carried out with the following steps: validation of the model by experts/experts; revision based on input from experts during validation; limited trials in classroom learning, according to the real situations that will be faced; revise the model based on trial results; and implementation of the model in a wider area.

During the implementation process, the effectiveness of the developed models and tools is tested. Experiments or Classroom Action Research can be used to test the effectiveness of learning. This can be done by measuring students' pre and post abilities. If the student's abilities are better than before, then the learning model created is also considered effective (Thiagarajan, 1974).

Fourth, disseminate – at this point, devices that have been developed on a larger scale are used. Products that have been revised during the development stage are then applied to their actual purpose in the validation testing stage. Measuring the achievement of objectives is carried out during implementation. This measurement is carried out to find out how effective the product being made is. Goals that have not been achieved must be explained and solutions must be explained. This process consists of four stages, namely: validation testing, packaging, diffusion and adoption.

The final activity of the development stage is packaging, diffusion and adoption. This process is carried out to ensure that the product can be used by other people. A guidebook for implementing the learning model can be created to package the learning model. Once a book is printed, it is distributed so that people can understand it or adopt it. In the process of developing teaching materials, the dissemination stage is carried out by distributing teaching materials in limited quantities to teachers and students. The purpose of this distribution is to get responses and feedback on the material that has been created. Printing and marketing of learning materials will only be carried out after the response from target users of the materials has been good.

Instructional Media Development Procedures and Models – Hanafin & Peck

Hannafin and Peck's learning design model consists of three stages: needs analysis stage, design stage, development and implementation stages (Hannafin & Peck, 1988). In this model, assessment and repetition must occur at every stage. This is because this model focuses more on the product.

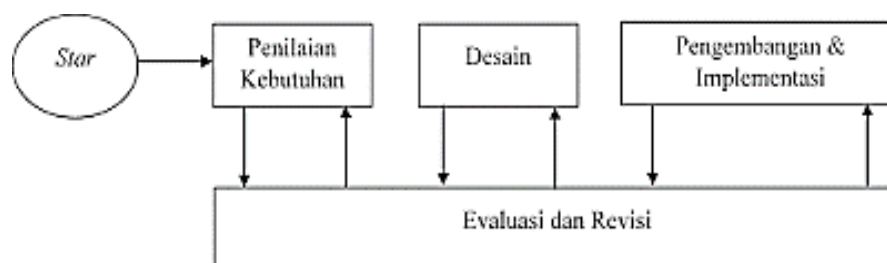


Figure 4. Stages of the Hannafin & Peck Model

Needs analysis is the first stage of the Hannafin and Peck model. This phase is needed to determine what is needed to create learning media. This needs analysis includes the goals and objectives of learning media, knowledge and skills required by the target group, equipment and learning media needs. After all needs are identified, Hannafin and Peck (1988) emphasize that an evaluation of the results must be carried out before continuing development to the design phase. This is the second phase of Hannafin and Peck's model. During this phase, the information obtained from the analysis phase is transferred to documents that will be used for the purpose of creating learning media.

The design phase, according to Hannafin and Peck (1988), aims to find and document the best method to achieve the goal of creating the media. One of the documents created during this phase is a storyboard that orders teaching activities based on lesson needs and learning media objectives collected during the needs analysis phase. Development and implementation is the third stage of the Hannafin and Peck model. According to Hannafin and Peck (1988), tasks performed at this stage include creating flow diagrams, conducting tests, and conducting formative and summative assessments. A flow diagram that can help the process of creating learning media will be created based on the storyboard document. This phase involves assessment and testing to evaluate the smoothness of the resulting media, such as link continuity.

Instructional Media Development Procedures and Models - PIE

During the learning process, the PIE model is a learning model that combines technology and media ideas. According to Patmanthara (2012), there is evidence that the use of the PIE model in multimedia learning can improve learning outcomes, learning consistency and higher memory strength. Based on this assumption, it can be seen that using the PIE model helps students in the learning process.

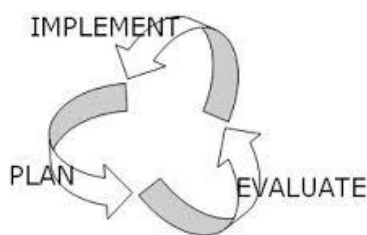


Figure 5. PIE Model Stages

PIE model learning is carried out in three stages, according to Timothy et al. (Yaumi, 2017). Planning is the process of identifying student learning needs. At this stage, produce a lesson plan summary of the learning experience that directs the learning objectives.

Then, planning is implemented, taking into account learning barriers and obstacles. Lastly, evaluation is the process of evaluating how effective the use of media and technology is in learning (Yaumi, 2017).

Instructional Media Development Procedures and Models - Roblyer

This model is also known as the technology integration planning model (TIP) or technology integration planning model which is used as a learning medium. Five stages comprise the Roblyer model.

This model is also called the TIP (Technology Integration Planning) model which is used as a learning medium. The Roblyer model has five phases, namely as follows. Determining relative advantages, namely determining advantages in using

media and technology in learning. Determining objectives, namely the process of determining the abilities, skills and knowledge that students will learn as well as determining assessment instruments in learning.

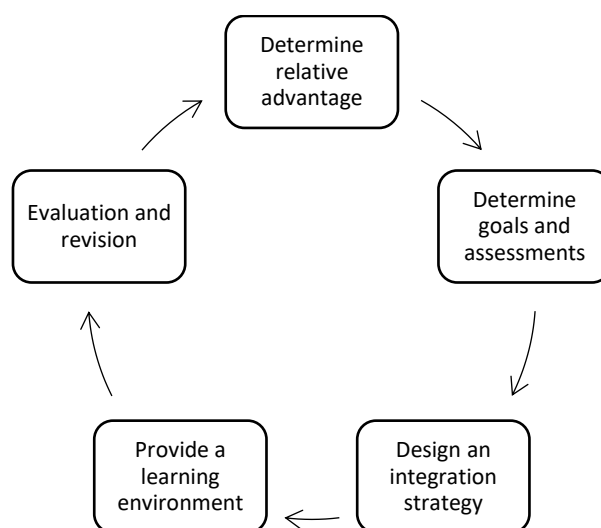


Figure 6. Roblyer Model Stages

Designing an integration strategy, namely the process of determining teaching strategies and other teaching activities in order to adapt to student needs. Providing a learning environment, namely the process of managing learning places, facilities used for implementing learning technology. Evaluate and revise, namely the assessment process carried out on the application of learning media to determine the effectiveness of the learning media.

Instructional Media Development Procedures and Models - Dick & Carey

To create effective, efficient and interesting learning programs, the learning system design model proposed by Dick and Carey (2005) in Muthmainnah, et al (2002) has long been used. One of the classic books in the field of learning system design that they wrote is *The Systematic Design of Instruction*. Analysis, design, development, implementation, and evaluation are the basic components of learning system design, which are based on the models they create. Gagne developed this learning system design model based on the concepts of learning conditions and main work (Muthmainnah, 2022).

The first edition began with a learning systems approach and activist theory which emphasized student responses to the stimuli presented in the first edition. In subsequent editions, Dick included cognitive elements and perspectives on learning and learning processes. Theory and research findings are not the only sources that contribute to the development of this learning system design model. Real experience in the field also contributes. To implement this learning system design model, a systematic and comprehensive process is needed. This process is needed to create a

learning system design that is able to overcome learning problems in the most effective way.

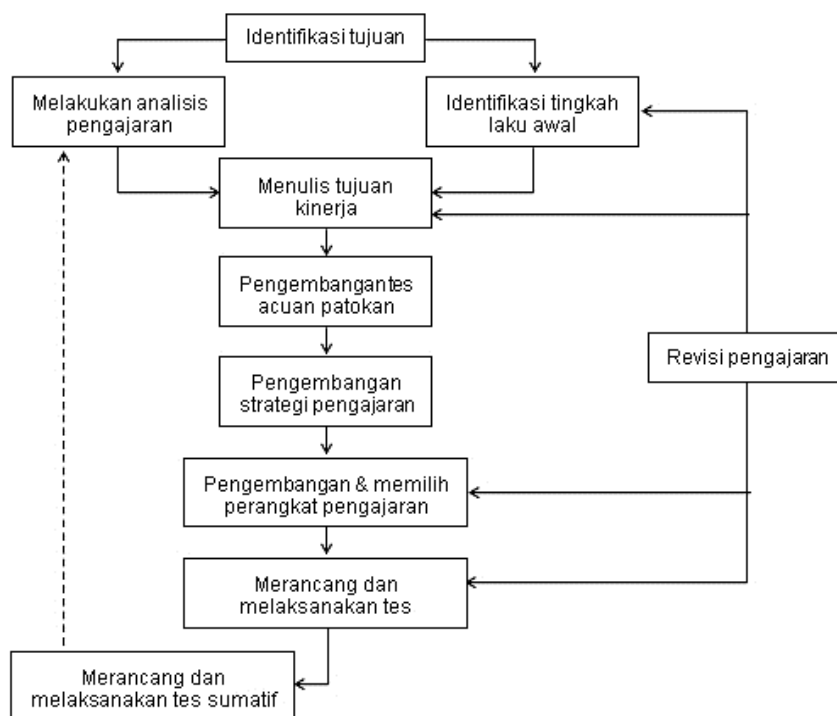


Figure 7. Stages of the Dick & Carey Model

One of the main steps of the learning system design model described by Dick et al. consist of: conduct instructional analysis, identify learning objectives, formulate specific learning objectives, analyze student characteristics and learning context, develop learning strategies, develop assessment instruments, formulate specific learning objectives, design and develop summative evaluation, revise the learning program, and design and develop formative evaluation,

This development model is widely used in computer-based learning programs and multimedia programs, many of which are created using design models. For Dick et al. very detailed and in-depth in the analysis and evaluation steps.

Instructional Media Development Procedures and Models – Smith & Ragan

Patricia L. Smith and Tillman J. Ragan (2003) in Muthmainnah, et al (2022) suggest this learning system design model, which is popular among students and professionals who tend to use cognitive learning theory. Almost every step and procedure in this learning system design model focuses on creating learning strategies. The learning model proposed by Smith and Lagan consists of several main steps and procedures, including: learning environment analysis, analysis of student characteristics, analysis of learning tasks, test assignments, determine learning strategies, and producing learning programs.

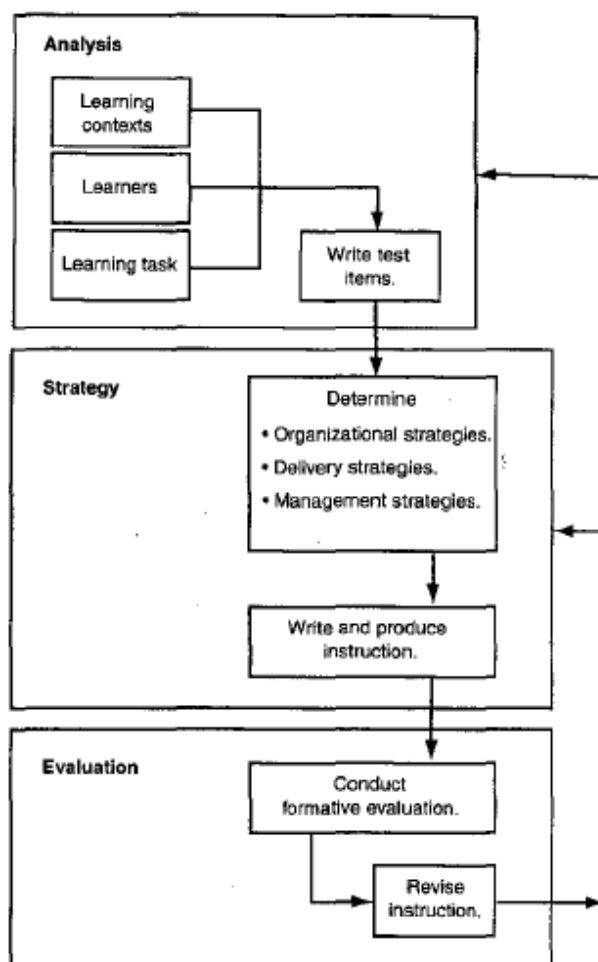


Figure 8. Smith and Ragan Model Stages

Learning environment analysis is the process of determining what is necessary for the learning process as well as the environment in which the program is implemented. Learning problems are identified through the analysis stage of this model.

Analysis of student characteristics – student characteristics analysis involves activities or processes to identify and determine the characteristics of students who participate in a designed learning program. Characteristics of students who participate in learning programs include their socio-economic conditions, mastery of material or subjects, and their learning styles. Adal, visual, and kinesthetic learning styles fall into this category. Students who use a visual learning style can use vision to acquire knowledge and skills easily. In other words, students who use a visual learning style can learn to read and see for themselves easily. In contrast, students who use an auditory learning style can easily understand material and topics through auditory learning. One of the characteristics of the auditory learning style is that students prefer to read aloud, study, and discuss in groups when studying. Students

who use a kinesthetic learning style also often use the material they study. During the activity, you may learn a lot.

Analysis of learning tasks – learning task analysis, also referred to as task analysis, is the step taken to determine a task description and the steps a person must take to achieve the level of ability to complete a particular task. Teachers must conduct this task analysis to determine the specific learning objectives students need to achieve the level of ability to complete the task. In most cases, these specific learning objectives are arranged in a hierarchical or hierarchical order.

Test assignments – test are conducted to evaluate whether the learning program helps students achieve their abilities or specified learning goals. In order for a written exam to be used to assess a student's ability to achieve learning goals, the exam must be valid and reliable.

Determine learning strategies – learning strategies are used to manage learning programs designed to help students learn effectively. In this case, learning strategies can be defined as plans that must be carried out by instructors to help students achieve the best learning outcomes.

Producing learning programs – producing a learning program means a process or activity that translates a learning system design into teaching materials or learning programs. The learning program is the result of the learning system design and includes objectives, competencies, methods, media, strategies, content and evaluation of learning outcomes.

Each model of using learning media has advantages and disadvantages. So that the desired results can be achieved precisely, it is important to pay attention to the phases and mechanisms of using the learning model. To make decisions about the use of learning media, it is important to know and pay attention to the student's condition.

CONCLUSION

Based on several learning media selection procedures and development models above, it can be concluded that the outline of learning media development procedures consists of three main steps, namely: (1) planning, namely analyzing the conditions and needs of learning components, such as: applicable curriculum, facilities and learning environment, competencies and characteristics of media users, (2) design, namely analyzing and formulating the required learning media designs, such as: analyzing types of adaptive media, formulating media storyboards, preparing materials and assessment instruments, (3) development, namely activities to realize media designs learning through development or programming activities, and (4) evaluation, namely carrying out ongoing evaluations involving experts and target

users to provide an assessment of the quality of learning media. The learning media development models are as follows: ADDIE, ASSURE, 4D, PIE, Roblyer, Hannafi & Peck, Dick & Carey, and Smith & Ragan.

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