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RESEARCH AND DEVELOPMENT: AS THE PRIMARY ALTERNATIVE TO EDUCATIONAL RESEARCH DESIGN FRAMEWORKS

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Abstract: A model for better educational practices is being developed as a result of the expansion of educational research as a branch of science, according to the researchers working in this area. Research and Development (R&D) Method is one of the best model designs. This study employs a descriptive qualitative research methodology that depicts the scenario as it relates to an indicator or the current status of the findings in the field. In this study, the methods for gathering data and information were interviewing, and documenting studies of the necessary data sources. This article presents a number of models for development research, including the Borg and Gall Development model, the Sadiman Development model, the ADDIE Development model, the Dick and Carey Development model, and the Data Center for Education and Culture Information Technology of Ministry of National Education

Keywords: *Research and Development, Alternatives Research, Research Design*

INTRODUCTION

Research is a crucial activity that a researcher engages in to solve or evaluate a problem with the intention of coming up with a solution. This scientific investigation also has the significance of being a crucial and fundamental tool in the advancement of science and technology. The goal of scientific research is often to discover the truth, and it is conducted in a structured, methodical, methodological, and consistent manner. It involves a process, starting with data analysis and ending with data construction.

The scientific research described here is a collection of ongoing observations that are also accumulated in order to produce a number of theories that can explain and even predict a variety of observed occurrences (Salmaa, 2022). Based on KBBI, research has two definitions: first, a thorough examination or investigation; and second, the methodical and impartial gathering, processing, analysis, and presentation of facts in order to address a

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challenge or test a theory in order to establish general principles (Arti Kata Teliti - Kamus Besar Bahasa Indonesia (KBBI) Online, n.d.).

In general, research can be defined as an activity done to uncover the truth that is done in a structured, systematic, methodological, and consistent manner. The motivation for research is curiosity. The results' reliability and accuracy must also be taken into consideration. Sanapiah Faisal defines scientific research as an activity in which an issue is examined utilizing the scientific method in a structured and methodical manner to discover new knowledge that can be trusted for its accuracy regarding the social reality. research is an effort to discover, advance, and test the veracity of information. It is conducted using scientific procedures (Faisal, 1989) (Hadi & MA, 2011).

Sugiyono claims that the study methodology is essentially a scientific means to gather data for specified uses (Sugiyono, 2008). Based on this, the scientific method, data, goal, and usability are the four keywords that require consideration. Cooper and Emory make the assumption that research is a procedure or activity in an organized study that seeks to produce knowledge to address issues (Emory & Cooper, 1991).

After talking about various things about the meaning of scientific research, starting from the general understanding and also according to the opinion of experts, the authors are also pleased to convey that scientific research certainly has certain goals which can benefit humans and the surrounding environment. A study project undoubtedly includes objectives that must be met as well as advantages for both writers and readers. We must conduct the best research conceivable to guarantee that both can be accomplished.

Research objectives are directional statements for your research. It can also help you decide what information and data you will acquire from the research. as outlined in Research Methods: Principles and Practice by Unggul Purwohedi, PhD ("Pengertian, Contoh, Serta Perbedaan Tujuan dan Manfaat Penelitian," 2022). The final place someone wants to go is their destination. Therefore, having a defined objective is essential; else, the research will be a complete waste of time, effort, and resources. In other words, a research's foundation is its purpose. A researcher's curiosity about a topic frequently sparks the aim, which then turns into a kind of desire to pique that curiosity.

The formulation of a sentence expressing the existence of a result or how something will be acquired after the investigation is complete is the goal of the research. The study will be able to accomplish the research goals, which have already been outlined in the research proposal and research report (Abdhul, 2022). As a result, the study objectives need to be stated succinctly while yet stating what is intended to be accomplished. Furthermore, in order to frame the research process, the research objectives must depend on how the problem is formulated and be related to the identity of the difficulties encountered during the investigation.

Each study has a different set of research goals, taking into account the various variations across studies, including contexts, issues, methodologies, formulations of the problems, and so forth. Therefore, there is no doubt that the research objectives are distinct from one another. Typically, research objectives are

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expressed as a statement that starts with a term that both the reader and the general audience are interested in learning more about. A mission statement involving the identification of variables, demographic, as well as attitudes toward the research is then included.

The final objective of the research must be clear to the researcher from the outset. This is necessary to prevent researchers from becoming lost in the middle of the road. The three common categories of research objectives, namely general objectives, theoretical objectives, and practical objectives, can therefore be known as a starting point for the first stage. There are others who contend that the general and specific objectives of this research are classified into two categories.

Here is a description of the three types of research objectives. general objectives: Research goals that are general in character and have a wide reach are known as general objectives. Three general goals that are frequently employed in research are as follows: to learn something new or make a discovery; to demonstrate, test, or confirm what is true or what is already known; and to expand on prior understanding. theoretical objectives: The goal of research, according to theory, is an attempt made by researchers to learn something. Unfortunately, the researchers frequently are unable to apply this theoretical understanding. practical objectives: Finding and pursuing knowledge that can be immediately applied in the researcher's life is the practical goal. In this instance, practical goals are broken down into three categories: development, verification, and exploratory goals (“Pengertian, Contoh, Serta Perbedaan Tujuan dan Manfaat Penelitian,” 2022)

The two categories of research aims are described (Abdhul, 2022). the general objectives: The general objective is the overarching goal that the researcher hopes to accomplish with the study. The following are typical broad objectives found in research: to demonstrate or examine the accuracy of different body of knowledge; to learn something new or make a discovery and All research must essentially have a definite objective in order to advance knowledge in an already established scientific topic. Specific objectives, however, are more precise objectives. Utilizing operational language for this specific purpose makes it easier to achieve. The overall aims are basically explained by the specific objectives. The following are typical goals for a study: Creating a study involves researchers coming up with various theories about particular scientific viewpoints in order to carry out the investigation more generally. Finally, the study is used to address issues that arise; The goal of the research is to explore the topic or issue being looked at; as a way to look for and learn about varied knowledge that may be employed immediately in daily life, or what is also known as applied research and testing or confirming a subject or issue whose findings may support particular theories or viewpoints or may even lead to the rejection of those findings.

According to some professionals, the research aims can be split into: Exploratory research is study that looks for previously undiscovered knowledge; Verification research tries to put an existing theory to the test. so that a study's findings can either refute or support preexisting theories or knowledge; and Research that aims to advance already-conducted research is referred to as development (karyatulisku, 2017).

We must consider the problem formula in the past in order to create research objectives. Choosing the most appropriate operational term to address the formulation of the current problem (examples of operational words: Identify, Describe, Measure, Analyze, Compare, etc.).

METHODS

This study employs a descriptive qualitative research methodology that depicts the scenario as it relates to an indicator or the current status of the findings in the field. According to Bogdan dan Taylor (Moleong, 2013, p. 3), a qualitative research process is one that generates descriptive data from people or observed behaviors as written or spoken words. In this study, the methods for gathering data and information were interviewing, and documenting studies of the necessary data sources.

As stated by Nasution (Nasution, 1988), "Many strategies can be used to collect data, including; interviews, observations, and documentation." Interviews are information collection tools by asking a number of questions verbally to be responded verbally as well. Interviews for qualitative research differ slightly from interviews for other purposes, such as hiring new employees, admitting new students, or even doing quantitative research.

In qualitative research, interviews are purposeful dialogues that begin with some open-ended inquiries. Research interviews can be informal or formal and go beyond simple talks. Although there are some guidelines for switching or control by one or both participants in every conversation, the guidelines for research interviews are stricter. Asymmetric interactions must be recognized since, unlike casual conversation, research interviews only seek information from one side. Researchers frequently use interviews to learn about participants' emotions, opinions, and thoughts (Rachmawati, 2007, p. 3). An exhaustive reference on observation as a method of data collecting in qualitative research may be found in Lisa M. Given's Sage Encyclopedia of Qualitative Research Methods. When the interview approach has been used in a qualitative study, the data gathered will verbally reflect the ideas and opinions of the people interviewed. When data for a qualitative study additionally includes an analysis of the subject and object of study's behavior and context, the data will be better and more reliable. The observation approach is more suitable for use for this purpose.

RESULTS AND DISCUSSIONS

A development undoubtedly takes work to complete. For the business to succeed, more work must be put in. A variety of tactics must be used as well. For instance, with the introduction of numerous new products. It is unquestionably necessary to do research and development to create innovations in products and services. A corporation engages in research and development (R&D) when it innovates to develop a new good or service. You can copy this strategy so that the goods and services successfully astound the general public.

The field of research and development has made significant advancements recently. A sort of research called research and development can bridge the gap between basic and applied research. Research and development is frequently seen as a procedure or set of procedures to create a new product or enhance an already existing one. The term "product" in this context refers to something that can be either hardware (books, modules, learning aids for the classroom and lab), or software (programs for data processing, classroom learning, libraries, or labs), or other types of education, learning training, guidance, evaluation, management, etc.).

Instead of testing a theory, research and development focuses on creating a useful product for educational use (Gay, 1980). Development research is a procedure used to create and assess educational goods, according to Borg and Gall (Borg & Gall, 1983, p. 772). The processes of this

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process, known as the R&D cycle, include researching research findings relevant to the product to be developed, creating a product based on these discoveries, field testing the product in the environment where it will eventually be used, and updating it to address any flaws. discovered at the test submission step. This cycle is continued in more rigorous R&D projects until data from field tests show that the product achieves the specified behavioral objectives.

Research and development (R&D) is the process used to create and accredit educational products. The steps of this process, which are frequently referred to as the R&D cycle, include reviewing research findings relevant to the product that is being developed, creating a product based on these findings, field testing the product in the environment where it will eventually be used, and revising it to address any flaws that are discovered. undergoing testing. This cycle is continued in more rigorous R&D projects until data from field tests show that the product achieves the specified behavioral goals.

Development research is described by Seals and Richey (Seels, 1994) as a systematic study of the design, development, and evaluation of learning processes, products, and programs that must satisfy the requirements of validity, applicability, and efficacy. Although in addition to these three requirements, Plomp (1999) added the requirement that an applicant "can exhibit added value."

In contrast, Van den Akker and Plomp (van den Akker, 1999) define development research as having two goals: creating product prototypes and formulating methodological recommendations for creating and assessing product prototypes. According to Richey and Nelson (Richey et al., 2004) there are two different types of development research. The first type focuses on designing and evaluating specific products or programs with the intention of gaining an overview of the development process and researching the factors that support the program's implementation. The evaluation of earlier development projects was the subject of research's second main focus. This second type's goal is to provide an overview of efficient design and evaluation practices.

Considering the aforementioned viewpoints, it can be said that development research is a method used to create and assess educational products. The items generated include instructional materials, media, questions, and learning management systems for teachers.

Research And Development's Targets

The problem to be solved and the details of the model, learning, issue, or gadget that will be created to address the problem are typically included in the development study's purpose. Providing that a development research problem formulation has these two components, the problem has been correctly formulated. As a product's development progresses and developers' capacity to produce items of this nature in the future increases, it may be claimed that the goal of development research is to inform the decision-making process.

The goal of special development research in education is differentiated, in accordance with Akker, based on the creation of curricula, technology and media, lessons and teaching, and didactic teacher education (van den Akker, 1999). Within the curriculum: The purpose is to improve a product's or program's development and the developer's capacity to produce items of this nature in the future by providing information to guide decision-making throughout the development process. In the media and technology: The objective is to enhance the process of instructional design, development, and evaluation based on other particular problem-solving scenarios or broad inspection methods. Under the education and lesson section: The goals are to improve the learning environment's design, establish the curriculum, evaluate the effectiveness of observation and learning, and simultaneously work toward advancing fundamental scientific knowledge.

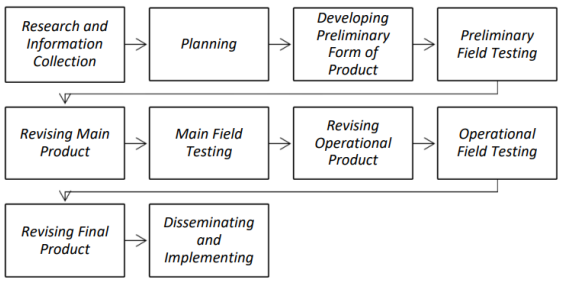
Under the didactic and teacher education part: The objective is to support professional instructors' learning and/or enhance modifications in a particular educational environment. The objective of the didactic section is to create development research as a collaborative, circular process of research and development where the theoretical concepts of the designer provide product development that is tested in a designated classroom, pushing quickly toward theoretical and empirical by discovering the product, the learning process from developers, and instructional theories. There are also many who contend that theories and concepts should be developed, evaluated, verified, and evaluated as tools for theory and tool testing.

Models For Research And Development

There are two different forms of development research based on the several kinds that already exist. Others include: development of tools and media as products and Curriculum-based product creation. A model, which is more practical in nature, is a design that may be used to bring something into reality. The model serves as a tool for facilitating communication, as a manual, as a viewpoint tool for decision-making, or as a planning tool for management tasks.

1. The Development Model of Borg & Gall

In its development stage, the Borg & Gall (Borg & Gall, 1983, p. 775) development model employs a waterfall flow. Through make development easier, the processes from needs analysis to deployment are organized in detail. After individual testing, small group trials, and field trials, the Borg & Gall model underwent revisions.



1) Research and Information Collection

The research is initiated by reviewing pertinent literature, analyzing the need, and developing the framework.

2) Planning

It involves formulating abilities and expertise related to the research topic, formulating stage objectives, designing research steps, and designing the essential feasibility studies.

3) Developing Preliminary Form of Product

The preliminary educational product—referred to as a "trial product" by some—is created in this step by assembling and assessing all of its supplementary materials, as well as its instructions and manuals.

4) Preliminary Field Testing

In order to gather and analyze the data for the following phase, the preliminary product is tested on a small scale with a select group of 3–4 people.

5) Revising Main Products

Using the information gathered in step four, the preliminary/trial product is revised. Depending on the outcomes of the trial product, the change may need to be done more than once. Wilder testing of the revision is now possible.

6) Main Field Testing

This process, which is also known as primary testing, involves testing the improved educational product on a larger scale and with more people (5-15). The qualitative method is frequently used to gather the data. For some items, an experimental study design is required in order to obtain exact feedback and data for the following phase.

7) Revising Operational Products

On the basis of the information gathered in step six, the redesigned product in this phase is revised once more. After that, the product is created as an operational model design that will be tested.

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8) Operational Field Testing

A large number of people (30–40) are involved in the operational model's validation process through interviews, observations, or questionnaires. The data serve as the foundation for the final step of product revision. The goal is to confirm that the model is ready to be used in educational settings without the need for researchers to serve as advisors.

9) Revising Final Product

Eighth-step data is used to totally edit the product before it is released as the finished educational offering.

10) Disseminating and Implementing

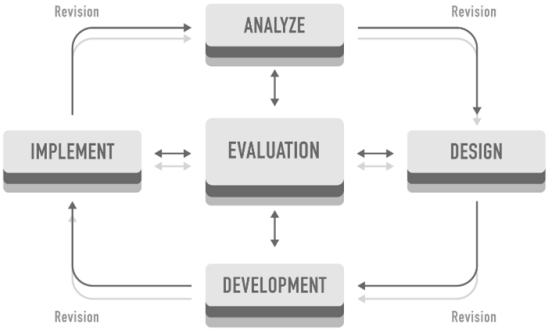
Through seminars, publications, or presentations to relevant stakeholders, the product is disseminated to the general public, particularly in the sphere of education.

2. The Development Model of Sadiman

The following chart illustrates the steps that must be taken while using this kind of model: Needs must be identified, objectives must be set, materials must be developed, assessment instruments must be developed, production must be validated, revision must be made, and finally the media must be ready for usage.

3. The development Model of ADDIE

The five stages of a development process—Analysis, Design, Development, Implementation, and Evaluation—are collectively referred to as Addie. Each stage must be completed according to the ADDIE model's instructions, but with an emphasis on reflection and iteration. You can use the model to get a streamlined, targeted approach that offers feedback for ongoing progress (Quigley, 2019).



1) Analysis

A researcher should conduct an analysis of the current scenario regarding training, knowledge gaps, etc. before producing any material or training tactics. Start by asking a series of questions (who, what, when, where, why, how?) to comprehend the existing circumstance and the training's overall purpose. Later in the process, this has a significant impact on many decisions.

2) Design

When our training plan is finished, we go on to the design phase, where we apply what we learned from the previous phase to inform our decisions. This consists of a strategy, delivery techniques, structure, timeframe, evaluation, and feedback. Making a storyboard or a prototype is the following stage. Making a prototype can help us quickly convey the value of the training to other stakeholders as we design the course curriculum.

3) Development

We can start building the courses at this point. At this point, the prototype and storyboards will serve as our primary guides. Every component of the course should be created to correspond with the design phase. The primary subject matter has already been selected. All the courses need is a little more polish and detail. What we should say is: Course Materials.

4) Implementation

It is appropriate to share our courses with the learner once we have finished them and are confident that

they have been thoroughly tested. How this is really carried out will be influenced by the choices taken during the design phase.

5) Evaluation

The primary objective of ADDIE is to offer a methodical approach for developing training programs. However, it is also a strong model for enhancing how future iterations are made. It's crucial to get feedback or evaluation on every part of the courses so that you can tweak and update the material.

4. The development Model of Dick and Carey

In The Systematic Design of Instruction, Seventh Edition, published in 2009, Walter Dick, Lou Carey, and James O. Carey created the Dick Carey R&D model, a systems approach or procedural approach model. The Dick, Carey, and Carey development model or the Dick and Carey model is then a more appropriate name for this approach.

The procedural model by Dick, and Carey is a study framework that recommends modifying the application of development design concepts to the sequential actions that must be taken. A research model that is focused on a descriptive description of the study stages is the Dick and Carey procedural model. The pre-development, development, and post-development stages make up the majority of the study's stages, which are divided into these three categories.

The 10 steps in the Dick and Carey model are as follows. Each phase has very specific goals and objectives, making it an excellent starting point for new designers to learn additional design approaches. The Dick and Carey model's ten steps exhibit a highly direct and continuous flow from one to the next. In other words, Dick and Carey's system is very succinct, but the information is sound and obvious from one sequence to the next.

5. The Development Model of Data Center for Education and Culture Information Technology of Ministry of National Education

As a government entity involved in the management of communication technology-based educational resources, each government structure has its own strategy for creating educational media.

The procedures taken by a media developer are: (1) examining the curriculum; (2) media identification; (3) script development; (4) production; (5) improvement; (6) tests/trials; and (7) revision, according to the Ministry of National Education. The model offers an overview of the curriculum as a background for media production, which is how it differs from the earlier model in the diagram. Additionally, there is no evaluation procedure used in the stages of improvement that follow the production process.

CONCLUSIONS

Some R&D methods: a method by Borg & Gall, ADDIE method, and others have been widely used and implemented in educational research because of its applicability to specific educational domains. they serve as a template for best practices in education at all levels. Due to the fact that educational researchers occasionally simplify or modify its ten phases for their investigations, it also creates different model alternatives. Several of the alternatives are used in educational settings as well, but few of them are only examples.

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