



# Model for Evaluating Learning Resources for Effective Instruction

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**ABSTRAK.** The increasingly sophisticated development of technology and information has encouraged the emergence of diverse learning resources. Learning resources in the form of digital teaching materials such as e-books and videos are growing at an extraordinary rate. On the one hand, this condition provides many choices for teachers to use in learning. However, on the other hand, many learning resources that are developed do not go through an adequate evaluation process, so many of them are not suitable for use in learning. This is due to the unavailability of a guide on how to evaluate learning resources that are well standardized. Therefore, this study offers a systemic and systematic learning resource evaluation model, especially in the context of the learning resource development process. This evaluation model is formulated in six main questions, namely 1) what is the purpose of the evaluation carried out, 2) what is the object of the evaluation, 3) who will evaluate, 4) what evaluation techniques will be used, 5) what evaluation instruments will be used, 6) how to analyze the data and follow up. The answers to these six questions are mapped in a table that illustrates the strong relationships between elements. If learning resource developers follow the map in the table in the learning resource development process, they will obtain appropriate and effective learning resources. This evaluation model has been reviewed, and scrutinized by media evaluation experts, and has also been discussed in focus group discussion forums. As a follow-up to the results of developing this evaluation model, several instruments will be designed to evaluate some learning resources more specifically.

Keywords: Evaluation model, learning resources, learning, systemic, systematic, instrument

## A. Introduction

The rapid development of information and communication technology has been utilized to develop various learning resources. Currently, the number and types of learning resources are increasing and varied. Books as one learning resource type are proliferating in print and digital (e-book) forms. In Indonesia, in just five years, namely 2015-2020, there were 404,037 book titles published by 8,969 publishers (Hanna Meinita, 2022). Meanwhile, data from Ikapi, in 2017, 62,719 titles were published; in 2018, 78,881 titles were published; and in 2019, 93,630 titles were published, consisting of commercial and non-commercial books (ooh! I demi Indonesia, 2023). Even more impressive is the number of books published on a global scale. Dean Talbot (2022) reports that around 4 million books are published each year, both published through traditional publishers and independently published. Kindle Publishers 2022 have published 12.25 million eBooks and around 71,000 audiobooks were published throughout 2020 (Dean Talbot, 2022). In addition to books, another learning resource currently in fantastic numbers is videos, which are incredibly open and circulating on YouTube and TikTok. A professor from the University of Massachusetts Amherst, Ethan Zuckerman, estimates that the number of videos circulating on YouTube until December 4, 2023, is 13.3 billion and will continue to grow because videos uploaded to YouTube reach 3.7 million videos every day, which supplied by 15 million content creators (Muninder Adavelli, 2023).

The vast number of videos and books provide a plethora of learning resources. This allows students and lecturers to use it for learning inside and outside the classroom (Alpert & Hodkinson, 2019). However, many YouTube books and videos are problematic. Many YouTube videos contain inaccurate, low-quality information and conceptual errors (Uslu et al., 2023); (Singh et al., 2023); (Tutan & Kaya, 2023), especially those uploaded by non-professional individuals (Kiss et al., 2023); likewise, books, many of which are published without going through the correct process (Hanna Meinita, 2022). Kulgemeyer has paid

attention to the quality of teaching materials in the form of videos by developing a framework for developing compelling science explanation videos. This was done because he argued that compelling science explanation videos were still lacking. (Kulgemeyer, 2020). In addition, learning resources that have also received attention are Web-based learning resources. However, in this case, many developers need to apply clear criteria to validate the truth of the information therein so that it cannot be used for educational purposes (Swati et al., 2024). This condition can be caused by developing learning resources that need to go through an adequate evaluation to measure and assess the quality of each element that is part of the learning resource. The need for comprehensive evaluation criteria is urgent and cannot be overstated.

Several researchers have developed criteria and instruments to evaluate specific learning resources. Marczak has proposed e-book evaluation criteria covering three aspects: layout and design, content and functionality, reading devices, file formats, and distribution (Mariusz Marczak, 2013). Meanwhile, research conducted by Şahin (2021) formulated several criteria to evaluate different course materials and textbooks for each school level. His study showed that "visual richness" was the main criterion at all levels, with elementary school teachers preferring fun and up-to-date materials. In contrast, middle school teachers focused on age-appropriateness and entertainment. Although the priorities are different at the high school level, there are similar criteria, namely to consider the age, gender, level, interests, and goals of students in choosing textbooks (ŞAHİN, 2021). Likewise, Bartholomew (2022) succeeded in formulating different criteria for choosing learning materials to improve student performance. Based on his research on 631 teachers and business students from public high schools, it was concluded that selecting appropriate learning materials can improve student performance by considering learning objectives and learning environments (Bartholomew, 2022). In addition to conventional learning resources, evaluative research has been widely conducted on digital learning resources. Among them are web-based learning resources, such as Massive Online Open Courses (MOOC). This type of learning resource also has a vast number. Therefore, Nie has developed a sophisticated, accurate, low-cost MOOC diagnostic evaluation method to obtain appropriate and effective teaching materials (Yanjiao Nie et al., 2023). Likewise, Julia analyzed 50 MOOCs to identify best practices for providing formative feedback and interaction at various levels of complexity and learning activities. The results show that formative feedback and interaction can be provided through various formats, such as quizzes, peer feedback, and simulations (Julia et al., 2021). Kant studied the components of learning strategies as one form of learning resource. Kant's research focuses on formulating criteria for selecting a learning management system (LMS) strategy. The results of his research show that the large number of LMSs on the market, including open source LMSs, makes choosing the suitable LMS essential, considering aspects of cost, quality, use, capacity, budget, priority, and objectives (Kant et al., 2021).

Other evaluative research was conducted to obtain learning resources for the learning process. This research was conducted by Agufana (2018) by surveying 168 secondary school teachers in Kenya. The results showed that in choosing learning resources, one should refer to and consider learning objectives, syllabus coverage level, student age, and study topics (Agufana, 2018). The same thing is the research conducted by Thi (2020) to develop criteria and assessment scales to evaluate e-learning programs. The criteria and assessment scales help preschool teachers design more effective e-learning (Thi et al., 2020).

Meanwhile, Thalmann (2014) has developed criteria for adapting the learning process to individual materials and needs. 13 adaptation criteria represent various needs (Thalmann,

2014). Sherman has also developed criteria for evaluating learning resources in the context of programs and professional development in adult education. His efforts were made by developing a framework to assess the feasibility and suitability of learning resources. The selection and development criteria were made through a field research approach by identifying 20 criteria in four categories: general content suitability, design and delivery suitability, research-based quality, and ease of adoption/adaptation (Renee Sherman, 2003). On a broader scale, evaluating the quality of education has also been carried out by developing a negentropy calculation method as an integral information index that can predict learning outcomes (Andryushkova, 2020). The studies above generally evaluate specific learning resources, and research still needs to produce steps or procedures for evaluating learning resources comprehensively, especially in developing learning resources.

## **B. Methodology**

The goal of this study is to create an evaluation model for developing learning resources. The research was conducted using the research and development (R&D) approach. This aligns with the R&D concept proposed by Borg & Gall (1983), which emphasizes that R&D produces not only material objects like textbooks and learning films, but also processes and procedures (Meredith D. Gall, 2003). The model used in this study is the Thiagarajan 4D development model, which stands for Define, Design, Develop, and Disseminate. During the define stage, relevant concepts for the model were studied and formulated. In the design stage, the evaluation model was designed based on previous theoretical and conceptual studies. During the develop stage, the evaluation model design was validated through interviews with experts, peer review, and focus group discussions. The dissemination stage has not been implemented, as it is awaiting the results of the summative evaluation.

## **C. Research Results**

At the define stage, a synthesis of several core concepts related to the model to be developed is produced. This synthesis, which includes the objectives and types of evaluation, types of learning resources, respondents to the evaluation process, evaluation techniques, evaluation instruments, data analysis techniques, and follow-up of evaluation results, is a crucial step in the development of a robust learning resource evaluation model.

In general, the objectives of evaluating learning resources can be identified into two objectives: to trace the weaknesses and deficiencies of the learning resources being evaluated to be followed up with revisions and to decide to "use" or "reject" the learning resources being evaluated. In other words, this second objective is to determine the feasibility and effectiveness of the learning resources being evaluated. These two objectives are in line with the types of evaluation, namely formative evaluation (Gordon et al., 2014), (Elwy et al., 2020) and summative (Bin Mubayrik, 2020).

The evaluation object is also part of what is studied and synthesized. From the study's results, four evaluation objects were formulated: the development of learning resources, the feasibility of learning resources, the effectiveness of learning resources, and the utilization of learning resources (Judy Davies et al., 2008). The concept of learning resources itself includes materials, people, settings (environments), tools, techniques, and messages. Materials as learning resources (Thalmann, 2014) are anything that contains a message to be learned by students, either in print or digital form, either in the form of artificial objects or original objects, either intentionally developed (by design) or already existing in the environment (by utilization). Learning resources included in the category of people (Zwitter & Gstrein, 2020), (Menant et al., 2021) are those who have and master specific knowledge

and skills that can be transferred to students. As a learning resource, the setting (environment) (Bartholomew, 2022) is the facilities and infrastructure that support the learning process to run smoothly and effectively. The environment can be a physical environment (nature) or a social environment. Tools (Keengwe et al., 2012) are all objects that can be used to help display messages stored in manual and electronic materials. Techniques as learning resources (Cheng et al., 2019) are all activities and procedures used to stimulate and facilitate student learning. Meanwhile, messages as learning resources are all information and learning materials presented and studied by students in order to master the competencies that have been set.

People who are expected to be able to evaluate learning resources are experts, such as learning experts, media experts, material experts, language experts, and users of learning resources. These experts, with their extensive knowledge and experience in the disciplines that are their fields of expertise, play a pivotal role in the evaluation process (Stahnke & Blömeke, 2021), (Seidel et al., 2021). At the same time, users will benefit from using the learning resources.

Various techniques are employed for evaluating learning resources, each serving a specific purpose. Interviews are conducted during the development process of learning resources, providing insights into the resource's creation. Questionnaires, in the form of a value scale, are distributed as tools for expert judgment in testing the feasibility and utilization of learning resources. Experiments, on the other hand, are used to test the effectiveness of learning resources.

In line with evaluation techniques, evaluation instruments used to evaluate learning resources include interview guidelines, questionnaires, and tests. Interview guidelines can be open or closed. At the same time, the questionnaire used is in the form of a value scale. The test instrument, an objective test or essay, is used for pre-test and post-test in experimental activities. At the design stage, a draft of the learning resource evaluation model is obtained as a table containing the learning resource evaluation components. This table is constructed based on the literature review results conducted at the defined stage. The following is a table of the learning resource evaluation model.

**TABEL 1.** Draft-1 Learning Resources Evaluation Model

| Purpose    | Summative                | Eligibility             | Formative               |         |        |                                |                           |  |
|------------|--------------------------|-------------------------|-------------------------|---------|--------|--------------------------------|---------------------------|--|
| Object     | Learning Resources       | Learning Resources      | Learning Resources      |         |        |                                |                           |  |
| Evaluator  | User                     | Expert                  | Expert                  |         | User   |                                |                           |  |
|            |                          | Media   Content         | Media                   | Content | 1 to 1 | Small Group                    | Field Trial               |  |
| Technique  | Judgment                 | Judgment                | Interview               |         |        | Distribution of Questionnaires | Experiment                |  |
| Instrument | Rating Scale             | Rating Scale            | Interview Guidance      |         |        | Questioner                     | Test                      |  |
| Analysis   | Quantitative Descriptive | Statistics              | Qualitative Descriptive |         |        | Statistics                     | t-test<br>N-Gain Score    |  |
| Follow Up  | Used/ Rejected           | Eligible/<br>Uneligible | Revised                 |         |        |                                | Effective/<br>Ineffective |  |

During the development of draft-1, it underwent evaluation and discussions through various methods, including peer evaluation and focus group discussions (FGD). After reviewing the results of the evaluation and discussions, revisions were made to several contents and structures. The revised contents included the evaluation objectives and the addition of evaluation-type components. Similarly, changes were made to the structure, reordering it from summative, feasibility, and formative evaluation to formative and summative, with feasibility

categorized as an objective. As a result, the final table of the learning resource evaluation model produced is as follows:

TABLE 2. Learning Resource Evaluation Model

| Type                     | Formative                                       |    |     |        |                                   |                                |                             |    |     | Summative                   |
|--------------------------|-------------------------------------------------|----|-----|--------|-----------------------------------|--------------------------------|-----------------------------|----|-----|-----------------------------|
| Purpose                  | Development                                     |    |     |        |                                   | Effectiveness Test             | Feasibility Test            |    |     | Utilization                 |
| Object                   | Learning Resources                              |    |     |        |                                   | Learning Resources             | Learning Resources          |    |     | Learning Resources          |
| Evaluator                | Expert                                          |    |     | User   |                                   | User                           | Expert                      |    |     | User                        |
|                          | Md                                              | Ct | Ins | 1 to 1 | Small Group                       | Field Trial                    | Md                          | Ct | Ins |                             |
| Technique                | Interview/<br>Distribution of<br>Questionnaires |    |     |        | Distribution of<br>Questionnaires | Experiment/<br>difference test | Judgment                    |    |     | Judgment                    |
| Instrument               | Interview Guidance                              |    |     |        | Questioner                        | Learning<br>Outcome Test       | Rating Scale                |    |     | Rating Scale                |
| Analysis                 | Qualitative Descriptive                         |    |     |        | Quantitative<br>Descriptive       | t-tst<br>N-Gain Score          | Quantitative<br>Descriptive |    |     | Quantitative<br>Descriptive |
| Conclusion/<br>Follow Up | Revised                                         |    |     |        |                                   | Effective/<br>Ineffective      | Eligible/<br>Uneligible     |    |     | Used/ Rejected              |

Notes: Md = Media; Ct = Content; Ins = Instructional

**D. Discussion**

The learning resource evaluation model is a table that outlines eight questions for systematically evaluating learning resources. These questions include: 1) what type of evaluation will be conducted, 2) what is the purpose, 3) what are the objects, 4) who will be the evaluator, 5) what technique will be used, 6) what instrument is suitable for use, 7) how to analyze it, and 8) what are the conclusions/follow-ups. These aspects are consistent with the views of Gary R. Morrison et al. regarding Steps in Planning Formative Evaluations (Morrison et al., 2013). Formative evaluation aims to identify shortcomings and weaknesses in developing learning resources, while summative evaluation is performed to assess the quality of developed learning resources. This distinction is also noted in the book "Instructional Development for Training Teachers of Exceptional Children: A Sourcebook" by Thiagarajan et al. (Sivasailam Thiagarajan et al., 1974). This concept is further supported by Panchal (ALKA C. PANCHAL, 2020) and Elwy (Elwy et al., 2020).

In the context of formative evaluation, the purpose of the evaluation is carried out in the development process to obtain better learning resources to improve effective learning. This is expressed by Martin Tessmer, who stated that formative evaluation can be used to improve the effectiveness of learning (Tessmer, 1993). In addition, the evaluation aims to test the feasibility and effectiveness of the learning resources that have been developed. The results of this assessment are essential for deciding whether the development of learning resources is successful or not. Meanwhile, in the context of summative evaluation, the purpose is to determine whether the learning resources can be used for learning activities (Ishaq et al., 2020), (Bin Mubayrik, 2020). Components that are the objects of evaluation are learning resources (Gomis et al., 2023), which include materials (Yang & Qi, 2022), people, environment, tools, techniques, and messages. The learning resources evaluated formatively are learning resources in the development process and are tested for their feasibility and effectiveness. Learning resources in the form of materials, tools, and techniques are learning resources that are very likely to be evaluated formatively (Sudakova et al., 2022).

Meanwhile, learning resources in the form of people, environments, and messages are evaluated through summative evaluation (Bin Mubayrik, 2020). Two groups of people can be used as evaluators in the learning resource evaluation process: experts and users. Those who are classified as experts (Sreedharan et al., 2022) have extensive knowledge and experience, which is characterized by a high academic background and long-standing experience in the field of science they are studying. The areas of expertise required in evaluating learning resources are material, learning media, learning experts, and language experts. Meanwhile, those categorized as users will utilize the learning resources being evaluated. In this case, it depends on the context of the place where the learning resource will be used. If the learning resource will be used in the context of learning at school, those classified as users are teachers and students.

Meanwhile, the users are instructors and training participants if the context is in a training institution. Evaluation techniques that can be used in the learning resource evaluation process are interviews (Poblete et al., 2020), observation (Bin-Tahir et al., 2017), questionnaire distribution (Zhang & Zhu, 2020), expert judgment (Cabero-Almenara et al., 2020), and experiments (Jones & Watty, 2010). Interview techniques are used in formative evaluations, especially at the development stage. This is because interviews are used to dig up detailed information about the condition of the learning resources being evaluated. Observation techniques are used to see user reactions when they use the learning resources being evaluated. The results of this observation are followed up with interviews to confirm user reactions when testing the learning resources. In other words, observation techniques are used during product trials.

Meanwhile, questionnaire distribution is carried out to determine user perceptions and assessments of various aspects and attributes of the learning resources being evaluated. Through this technique, the evaluator will be asked to make an assessment (judgment) on the aspects of the learning resources being evaluated. The results are used to test the feasibility of the learning resources. The experiment tests the learning resources' effectiveness by looking at the difference in learning outcomes before (pretest) and after (post-test) using the evaluated learning resources.

The instruments used in evaluating learning resources are in line with the chosen technique, namely interview guidelines (Irving Seidman, 2019), observation guidelines (Michael Angrosino, 2007), value scales (Yousef et al., 2021), learning outcome test questions (Sharma Test, 2022). Interview and observation guidelines consist of two types, namely open and closed interview and observation guidelines. The value scale and test instruments must be well-validated. For this reason, it is necessary to conduct a trial first and test their validity and reliability. Analysis of evaluation data depends on the type of data collected and the purpose of the evaluation. Data obtained from interviews and observations are qualitative (Herbert et al. Rubin, 2011) and are used to improve the evaluated learning resources. Therefore, the data obtained is presented in a qualitative descriptive manner. Various criticisms and inputs are described in detail to describe the parts of the learning resources that need to be revised. The data obtained through the value scale is quantitative (Dwyer & Walsh, 2020) and is analyzed using statistical analysis (quantitative descriptive) to obtain a final score that will be consulted with previously established criteria.

The data obtained through tests, as a series of experimental activities, are analyzed using the t-test and N-Gain Score. The conclusions drawn from the evaluation activities are not just theoretical findings, but they have practical implications. For activities aimed at development, the conclusions are in the form of descriptions of aspects of learning resources that are still lacking, leading to necessary revisions. For feasibility testing, the conclusion is a practical decision on whether or not the learning resource is feasible for use.

The final step in the evaluation process is the effectiveness analysis, which determines whether the learning resource is effective or not. The follow-up to this analysis is straightforward. If the learning resource is deemed both feasible and effective, it can be recommended for use in learning activities. Conversely, if the conclusion is that the resource is not feasible or ineffective, it is not recommended for use.

## **E. Conclusion**

The research has led to the development of a comprehensive model for evaluating learning resources. This model, presented as a table, provides in-depth insights into the crucial elements to consider during an evaluation. It meticulously addresses the key aspects of both formative and summative evaluations through a series of 7 essential questions, including the evaluation's purpose, the objects under evaluation, the evaluator, the techniques and instruments to be used, the method of analysis, and the conclusions/follow-up actions. This model is an invaluable tool for learning resource developers and users alike, empowering them to make informed decisions and ensure the quality and effectiveness of learning resources.

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