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EVALUATION OF THE IMPLEMENTATION OF SCHOOL EXAMS USING THE BRINKERHOFF MODEL IN PHYSICS SUBJECTS IN SENIOR HIGH SCHOOL

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Abstract: School exam is one of the benchmarks of student learning outcomes as a test that is expected to provide information on the ability of students that can be used to consider and describe the achievement of students, especially in physics subjects. This study aims to describe the suitability of fixed vs. emergent design, formative vs. summative design, experimental design, and quasi-experimental vs. natural inquiry evaluation of the implementation of school exams in physics subjects in high school. This research uses the Brinkerhoff evaluation model proposed by Robert O. Brinkerhoff. The method used in this research is quantitative, and this type of research is evaluative. The data collection technique used a questionnaire, supported by observation and documentation, and a literature study to give meaning to the research results. The results showed that overall the organization of school exams in physics subjects in high school was very good. In the fixed vs. emergent design component, a total average of 95% is obtained from the teacher's perspective and 87% from the student's perspective, which is very good. Furthermore, for the formative vs. summative design component, a total average of 94% was obtained from the teacher's perspective and 88% from the student's perspective, which was in the excellent category. Then the experimental design and quasi-experimental vs. natural inquiry obtained a total average of 96% in the teacher's perspective and 88% in the student's perspective, which is in the excellent category. Thus, the implementation of school exams in physics subjects in high school is very good, but further research needs to be carried out to analyze, maintain, and at the same time improve what is lacking in terms of organizing school exams, starting from the preparation, implementation, and closing stages.

Keywords: *Evaluation, Brinkerhoff Model, Physics*

INTRODUCTION

Education has a very important role in improving human resources. Therefore the field of education must be developed continuously following the times. This situation is in line with Law No. 20 of 2003 concerning the National Education System (Sisdiknas) that "Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious, spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves, society, nation, and state ."So education can be a place to develop the potential in each individual because, without education, humans will not be able to achieve a better standard of living. From the above definition, there is a very important and noble meaning and purpose, covering all aspects of humanizing humans. To achieve these educational goals, efforts, and support from various educational components are needed, which are interrelated and influence each other [1].

Education is an important and effective tool for regulating norms, enforcing work ethics, and creating positive community values. Education is also part of the instrument to build and nurture the nation's personality, national identity, and national identity. Education can be a strategic means to build shared awareness as citizens by strengthening social ties and continuing to respect the diversity of cultures, races, ethnicities, and religions to strengthen national integrity [2].

The most important part of a country's ongoing life is education, where a person can receive knowledge and skills through education. One way to receive an education is through school, and one way to find out the results of the education provided is through school exams [3].

School exams are a routine that is carried out to measure the teaching and learning process, whether students can receive the material taught, and whether the teacher can provide the material properly and correctly. School exams can be said to be a frightening "threat"; this is because, in school exams, the material tested is much more than during the national exam. The results of the National Examination are no longer the determinant of student graduation in taking the final exam. Schools have 100% authority in determining student graduation [4].

Evaluation is an examination (structured investigation as a benefit or usefulness) based on certain standards. (A Joint Committee on a for Evaluation) [5]. Evaluation is the basis for making decisions, formulating policies and subsequent programs, and deciding whether to continue, improve or stop [6]. Learning evaluation is an

activity that must be carried out with better management. Evaluation is a systematic exploration, research, investigation, or examination of the value of an object [7]. As for the evaluation model, namely Brinkerhoff, which consists of three types of designs, namely, fixed vs. emergent design, formative vs. summative design, experimental design, and quasi-experimental vs. natural inquiry, this model states that if the process is happening, the evaluator can conduct interviews with the people involved [8].

Physics is one of the science subjects that can foster the ability to think analytically, inductively, and deductively in analyzing natural behavior whose application can be found in everyday life. The analysis can be in the form of knowledge consisting of facts, concepts, formulas, principles, laws, theories, and models [9].

Physics learning objectives can be achieved if the problems in physics learning can be adequately resolved. Many factors cause the low learning of physics, among others: dense curriculum, learning media that is less effective, the material in the textbook being perceived as too difficult to follow, inadequate laboratory, inappropriate use of learning media chosen by the teacher, the tendency of students in learning physics memorize formulas given by the teacher without mastering the essential concepts of physics from experience encountered in everyday life, less optimal and lack of alignment of the students themselves or conventional nature, where students are not much involved in the learning process, and the teacher mostly dominates class activities, and in doing the tasks given by the teacher, students tend to imitate their friends' work rather than doing it themselves [10].

The problem that is often faced in learning is that when learning takes place, students do not understand physics lessons because students are lazy to learn, students do not want to ask questions, and do not have curiosity or curiosity about the subject matter taught by the teacher so that some students do not understand the content of the subject matter, this is due to students not thinking so that it impacts on student learning outcomes, especially on understanding the concept of student learning. Based on interviews with subject teachers, only 10% of all students like physics lessons [11].

Learning outcomes are related to learning activities because learning activities are a process. Learning outcomes consist of all psychological domains. Occurs as a result or impact of students' experience and learning process in the classroom at school. Learning outcomes have an important role in the learning process because they will channel information to the teacher about students' progress in achieving their learning goals through further teaching and learning activities [12]. Learning outcomes are a change obtained after experiencing the learning process, and good learning outcomes are obtained from a good learning process [13]. Learning outcomes as a measurement and assessment of learning activities or learning processes are expressed in symbols, letters, or sentences that tell the results that students have achieved at certain levels, therefore, students should be able to obtain learning outcomes that are in accordance with the standards set or according to minimum completeness, but in reality, not all students can achieve maximum learning outcomes [14]. Learning outcomes are a guiding tool that guides students to get the desired results and is also a treatment of what is expected, known, understood, and can be moved by the learner after completing a learning process [15]. Learning outcomes are abilities that can be done, a value or result after gaining understanding and learning experience and showing knowledge, skills, and attitudes [16].

From the problems that have been mentioned, it will certainly have an impact on the exam, especially on the physics school exam. Therefore, there is a need for evaluation. In this case, the evaluation uses the "Brinkerhoff Model," where this evaluation combines the same elements, such as other evaluators, but in their own composition and version. From this explanation, it can be concluded that the Brinkerhoff model is comprehensive as an aspect of an improvement-oriented educational model.

Based on the description above, the problem formulation in this study is how the fixed vs. emergent design, formative vs. summative design, experimental design, and quasi-experimental vs. natural inquiry Brinkerhoff model of physics subject evaluation and student learning outcomes in physics subjects.

RESEARCH METHODS

The approach method used in this research is an evaluative approach. Evaluative research demands requirements that must be met, namely the existence of criteria or standards used as a comparison for the data obtained after the data is obtained and is the real condition of the object under study. The research sites were SMA Muhammadiyah Batudaa, SMA Negeri 1 Dungaliyo, SMA Negeri 1 Bongomeme, SMA Negeri 1 Tibawa, and SMA 1 Limboto Barat.

In this study, the data used is in the form of information about the variables and indicators of the study, such as data on the implementation of school exams. Besides that, data in the form of facts, information, or information is also very necessary in supporting the evaluation of school exams. From these data, we can find out the comparison between what is expected and what has happened in the implementation of the physics

subject school exam using the Brinkerhoff model so that it can facilitate researchers in collecting data related to the objectives of this study.

The data source referred to in the research is the subject from which the data can be obtained and has clear information on how to take the data and how the data is processed in this study using questionnaire guidelines. The questionnaire is a data collection technique that gives respondents a set of questions in writing to answer. The use of questionnaires is intended to obtain information that is more relevant to the research objectives, as well as the main instrument for capturing primary data regarding the suitability of the implementation, which includes three aspects of evaluation in the Brinkerhoff model, namely fixed vs. emergent design, this design can be defined as the preparatory stage of the Brinkerhoff evaluation model that supports the evaluation of the implementation of the physics subject school exam, namely the existence of a school exam committee, the availability of exam materials, the determination of exam supervisors, and the rules for conducting the exam. Next is the formative vs. summative design. This stage is the implementation stage which includes the presence of the exam organizing committee and examinees, the presence of supervisors who lead the exam, supervision of the exam completion, examination of test scores, and processing of school exam scores. Then the procedure for experimental and quasi-experimental designs vs. natural inquiry. This stage is the closing stage which includes the determination of graduation and issuance of certificates, and reporting on school exam administration activities.

The following table shows the score ranges for the school exam administration evaluation criteria.

Table 1. Evaluation Predicate Score Range

Percentage of Achievement	Scale Score	Interpretation
81-100	5	Very Good
61-80%	4	Good
41-60%	3	Fair
21-40%	2	Poor
0-20	1	Very Poor

Table 1 is a table that shows the scoring for each indicator against the evaluation criteria for organizing school exams [17].

RESULTS AND DISCUSSION

The description of the implementation of school examinations using the Brinkerhoff model from the teachers' perspective can be seen in the following Table 2.

Table 2 shows that the preparation stage (fixed vs emergent design) of the school exam evaluation has an average score of 95% which is within the excellent criteria.

Table 3 indicates that the implementation stage (formative Vs. summative design) of the physics school exam evaluation has an average score of 94% which is on very good criteria.

Table 4 shows that the closing stage (Experimental design and quasi-experimental vs natural inquiry) of the physics school exam evaluation has an average score of 96% which is on very good criteria.

The achievement of the conclusion of the school exam evaluation using the Brinkerhoff model in physics subjects from the teacher's perspective can be seen in Table 5.

Table 2. Outcome focus of the preparatory phase (fixed vs. emergent design)

NO	Aspects Measured	Average Score	Criteria
1	Establish the school exam committee	96%	Very Good
2	Prepare the school exam tools	96%	Very Good
3	Providing school exam facilities	96%	Very Good
4	Determining the exam proctor	94%	Very Good
5	Order of exam implementation	95%	Very Good
Achievement of fixed vs. emergent design score		95%	Very Good

Table 3. Outcome focus of design implementation stage (formative vs. summative)

NO	Aspects Measured	Average Score	Criteria
1	Attendance	95%	Very Good
2	The supervisor leads the exam	95%	Very Good
3	Examination finish supervision	93%	Very Good
4	Examination of school exams	92%	Very Good
5	Management of school exam results	93%	Very Good
Formative vs. summative design outcomes		94%	Very Good

Table 4. Outcome focus of the concluding stage of experimental and quasi-experimental designs vs. natural inquiry

NO	Aspects Measured	Average Score	Criteria
1	Establish the school exam committee	95%	Very Good
2	Setting up school exam tools	96%	Very Good
Achievements of experimental and quasi-experimental vs. natural inquiry designs		96%	Very Good

Table 5. Conclusion of evaluation of school exam administration using the Brinkerhoff model in physics subjects

NO	Aspects Measured	Average Score	Criteria
1	Fixed vs. emergent design	95%	Very Good
2	Formative vs summative design	94%	Very Good
3	Experimental and quasi-experimental designs vs. natural inquiry	96%	Very Good
	Average Score	95%	Very Good

Table 6. Outcome focus of preparation, implementation, and closing stages

NO	Aspects Measured	Average Score	Criteria
Fixed vs. emergent design		87%	Very Good
1	Exam Equipment	89%	Very Good
2	Examinee rules	86%	Very Good
Formative vs. summative design		88%	Very Good
1	Attendance	88%	Very Good
2	Test-taking readiness	88%	Very Good
3	Test completion	88%	Very Good
Experimental and quasi-experimental vs. natural inquiry design		88%	Very Good
1	Graduation	88%	Very Good

Table 7. Conclusion of School Exam Evaluation Using the Brinkerhoff Model in Physics Subjects

NO	Aspects Measured	Average Score	Criteria
1	Fixed vs. emergent design	87%	Very Good
2	Formative vs. summative design	88%	Very Good
3	Experimental and quasi-experimental designs vs. natural inquiry	88%	Very Good
	Average score	88%	Very Good

Table 5 shows the average score of all components of the school exam evaluation using the Brinkerhoff model in physics subjects is 95% with a very good category. It shows that the implementation of school exams in Gorontalo province has been carried out very well.

From the student's perspective, the description of the implementation of school examinations using the Brinkerhoff model can be seen as follows.

Table 6 indicates that the preparation stage (fixed vs emergent design) of the physics subject school exam evaluation has an average score of 87% which is on very good criteria. For the Implementation stage (formative vs. summative design), the physics subject school exam evaluation has an average score of 88% which is on very good criteria. And for the closing stage (experimental and quasi-experimental designs vs. natural inquiry), the physics school exam evaluation has an average score of 88%, which is a very good criterion.

The achievement of the conclusion of the school exam evaluation using the Brinkerhoff model in physics subjects from the student's perspective can be seen in Table 7.

Table 7 shows the average score of all components of the school exam evaluation using the Brinkerhoff model in physics subjects is 88%, with a very good category. It shows that the implementation of the school exam has been carried out very well.

Based on the research results have been described with the acquisition of percentages and average scores obtained from 38 question instruments for teachers and 19 question instruments for students from the model approach

used. In this case, they are using the Brinkerhoff evaluation model. The Brinkerhoff evaluation model has three types of designs, including fixed vs. emergent design, formative vs. summative design, experimental design, and quasi-experimental vs. natural inquiry. This design is used to measure the evaluation of school exam administration using the Brinkerhoff model in physics subjects. The evaluation instrument is decomposed as a questionnaire sheet presented in the google form. The answers of teachers and students in the questionnaire have been analyzed based on data analysis techniques formulated in this study.

The results of data analysis obtained for the evaluation of the implementation of school exams in physics subjects from the perspective of teachers contained in the preparation stage (fixed vs. emergent design) some criteria are measured, namely determining the school exam committee, preparing exam devices, providing exam facilities, determining exam supervisors and exam implementation rules. The five criteria have several indicators. The criteria for determining the school exam committee have been done very well by the teacher. It can be seen in the indicator of participating in the committee meeting. Each exam committee member signs the integrity fact to organize activities honestly and prepare a supervisor schedule, and the score is 96%. For the criteria for preparing the exam device it has been done very well by the teacher. It can be seen in the indicators of compiling a grid of questions and preparing answer sheets with a score of 97% for the criteria for providing school exam facilities. It has been done very well by the teacher. It can be seen in the indicators of providing a safe and proper room for conducting exams, and each exam room is supervised by a supervisor with a score of 96%. For the determination of the exam supervisor, it has been done well by the teacher. It can be seen in the indicator that the principal has been appointed as the room supervisor with a score of 96%. And for the exam supervisor discipline, the highest score is obtained; namely, the indicator that the supervisor supervises the implementation of the exam seriously does not interfere with the implementation of the exam and is not allowed to explain the question material to the examinees with a score of 95%. Although it has been implemented well, one indicator has a low score, namely the indicator that the exam supervisor is not allowed to carry a communication device, with a score of 87%. This needs to be considered during the exam that the supervisor is not allowed to carry a communication device so that the supervisor's focus is centered on the examinee because the supervisor's role is very important [18].

The results of data analysis at the implementation stage (formative vs. summative design) in the teacher's perspective there are five criteria measured, namely attendance, supervisors leading the exam, supervision after the exam, and checking test scores, and these five criteria have several indicators. The attendance criteria it has been carried out by the teacher very well. This can be seen in the indicator of the supervisor inviting examinees into the room with a score of 96%. The teacher carried out the criteria for supervisors leading the exam very well. This can be seen in the indicator of the supervisor distributing questions and answer sheets and guiding the filling of the participant's identity with a score of 96%. The criteria for supervising the completion of the exam have been carried out well by the teacher. This can be seen in the indicator that the supervisor submits the answer sheet and question paper to the exam organizer accompanied by the minutes of the exam with a score of 97%. The criteria for checking the results of the school exam it has been carried out well by the teacher. This can be seen in the indicator that the examination is carried out objectively, with a score of 95%. However, there is an indicator that the examination of the exam results is carried out at school with a score of 92%. Still, two teachers sometimes answer in terms of checking the exam results at school, and this needs to be considered by the party responsible for the implementation of the exam. And for the criteria for scoring school exam scores have been done well. This can be seen in the indicator of school exam scores stated in the range of 0 to 100, with the accuracy of a number behind the comma with a score of 94%[19].

The results of data analysis at the closing stage (experimental design and quasi-experimental vs. natural inquiry) from the teacher's perspective have two measured criteria: the determination of graduation/submission of licenses and reporting on school exam activities. Both criteria have several indicators. For the criterion of determining graduation, it has been done well. This can be seen in the indicator that the blank is national and is provided by the Provincial Education Office and distributed to schools through the Regency / City with a score of 95%. And for the criteria for reporting school exam activities, it has been carried out well by teachers. This can be seen in the indicator of submitting school exam reports to the Provincial Education Office with a score of 96%[20].

From the description that has been explained obtained from the three stages of the evaluation of the Brinkehoff model in physics subjects in the perspective of each design teacher has an average score of fixed vs. emergent design with a score of 95%, formative vs. summative design with a score of 94% and experimental and quasi-experimental vs. natural inquiry design with a score of 96%. So that the final score of the three

design stages is 95% which is in the very good category.

The following are the results of data analysis from the perspective of students in the preparation stage (fixed vs. emergent design) of evaluating the implementation of school exams in physics subjects, and there are two criteria measured, namely Preparing school exam equipment and exam participant rules. Both criteria have several indicators. The criteria for school exam equipment it has been carried out by students well. This can be seen in the indicator that students prepare school exam equipment such as stationery and examinee cards with a score of 89%. This shows that students' enthusiasm when taking school exams is very well prepared. And for the criteria for the order of examinees have been implemented well. This can be seen in the indicator that students are not allowed to bring communication devices, with a score of 88%. However, several students answered sometimes in the indicator of students entering the room 5 minutes before the exam, so the score obtained was 85%[21].

The results of data analysis from the perspective of students at the implementation stage (formative vs. summative design) evaluation of the implementation of the physics subject school exam there are three criteria, namely, the presence of students' readiness to take the exam and finish taking the exam, each criterion has several indicators. For the criteria for the presence of students, it has been implemented by students well, this can be seen in the indicators of students using participant cards and sitting according to participant numbers with a score of 89%[22-24]. The criteria for readiness to take the exam it has been carried out by students well. This is evidenced by the indicator of students filling out the attendance list with a score of 94% and students working on questions when the exam bell starts with a score of 90%. Even though it has been implemented well, there are indicators with statements of students who sometimes answer, namely the indicator of students not leaving the room after working on questions with a score of 85%. This needs attention from the supervisors so that students are allowed to leave only when the exam bell indicates that the exam work has been completed. And for the criteria for completing the exam it has been carried out well by students. This can be seen in the indicator that students submit the answer sheet to the supervisor with a score of 90%[25].

The results of data analysis from the perspective of students at the closing stage (experimental design and quasi-experimental vs. natural inquiry) evaluation of the implementation of the physics subject school exam there are criteria, namely the graduation of students has been done well by students this can be seen in the indicator that students have met the graduation criteria set by the education unit based on the acquisition of school scores with a score of 88%[26-27].

From the description that has been described obtained from the three stages of the evaluation of the Brinkehoff model in physics subjects from the perspective of students, each design has an average score of fixed vs. emergent design with a score of 87%, formative vs. summative design with a score of 88% and experimental and quasi-experimental vs. natural inquiry designs with a score of 88%. So that the final score of the three design stages is 88% which is in the very good category.

CONCLUSION

Based on the results of research and discussion, it can be concluded that the evaluation of the implementation of school exams using the Brinkerhoff model in physics subjects in high school is very good, with a score of 95% in the perspective of teachers and 88% in the perspective of students who are in the very good category.

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