Item Analysis Of Physics Midterm Assessment Assisted By Bimasoft CBTApplication

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Article Info	ABSTRACT
	This research aims to determine the quality of the Mid-Semester Assessment questions for the Physics subject for the 2023/2024 academic year. This research method is quantitative descriptive analysis. The analysis techniques used are discriminant power analysis and question difficulty level analysis. The exam questions consist of 40 multiple choice items. Technical data collection uses the Bimasoft CBT application with a special template in Microsoft Excel format - Macro Enable Document. The research subjects were class X MIPA 3 students at SMAN 1 Serang City, consisting of 40 students. The research results showed that the item discrimination index showed a good category and the item difficulty index showed a medium category.

INTRODUCTION

The quality of the physics learning system at SMAN 1 Kota Serang continues to be optimized both from the learning model used, the teaching materials applied, and the learning outcomes evaluation system. Previous research related to optimizing the quality of the physics learning system at SMAN 1 Kota Serang has been carried out, such as the application of the Problem Based Learning (PBL) learning model has been carried out to increase student motivation and learning outcomes with a gain value of 0.71 (Utomo, Oktarisa & Denny, 2022). Further research has been conducted related to the development of physics electronic magazine teaching materials (e-magz) based on science literacy with very feasible validation results (Utomo & Oktarisa, 2022). Further research was also conducted with the development of teaching materials in the form of HOTS-based modules and LKPD with an n-gain value of 0.73 including in the high category (Utomo, 2023). Based on the results of these studies, research related to the physics learning evaluation system has not been conducted. So far, teachers only see the final results obtained by students without assessing the tests given to students. Therefore, this research focuses on the physics learning evaluation system by conducting item analysis with the help of CBT applications.

The application of this CBT application has advantages for teachers in terms of assessing physics learning outcomes because it does not need to spend a lot of time correcting questions (Manurung & Rajagukguk, 2018). The implementation of this CBT application in the physics evaluation system also has a practicality aspect of 86.75%

compared to the evaluation system using paper (Pranata, Suyatna & Rosidin, 2020). The results of the next study explain that this CBT application can assist in analyzing the understanding of valid physics concepts (Sekarani, Wiyono & Muslim, 2021). Based on the results of the literature review related to the advantages of applying CBT applications to the physics learning evaluation system, there has not been much research on the analysis of physics items assisted by CBT applications. Therefore, this research focuses on analyzing physics items using the help of CBT applications. In this study, the CBT application applied is the Bimasoft CBT application which is part of the CV. Bintang Media Informatika product.

METHODS

This research uses quantitative descriptive analysis method with experimental method. The research was conducted at SMAN 1 Serang City with the research subject being class X MIPA 3 as many as 40 students. The research was conducted on the implementation of the 2023/2024 Odd Midterm Assessment (PTS) in the Physics subject on September 21, 2023. The physics material tested is magnitude, measurement and vectors. The questions tested were in the form of multiple choice questions totaling 40 items with each having 5 distractors. The data collection technique uses the help of the Bimasoft CBT application which is integrated with a special Microsoft Excel Macro - Enable Document format template. Data processing uses the analysis of differentiating power and difficulty level of questions with assessment criteria as shown in Table 1 and Table 2.

Table 1. Classification scale of item differentiating power

Criteria Scale	Classification
negative	No differentiating power
$0,00 \leq D < 0,20$	Weak
$0,20 \leq D < 0,40$	Fair
$0,40 \leq D < 0,70$	Good
$0,70 \leq D \leq 1,00$	Excellent

Table 2. Index criteria of item difficulty

Criteria Scale	Classification
$0,00 \leq DI < 0,30$	Difficult
$0,30 \leq DI < 0,80$	Medium
$0,80 \leq DI \leq 1,00$	Easy

RESULT AND DISCUSSION

The results of the CBT application integrated template display consist of the identity of the learner number, class identity, full name identity, processing time, number of correct or incorrect answers, identity information on the status of working on the question, and in the far right column is the learner's answer response data. The results of this answer response data are then analyzed based on the index of distinguishing power and difficulty level. The advantage of this Bimasoft CBT

application is that it can provide more effective answer responses because it is more practical, with no need to use paper answer sheets. Another advantage of the Bimasoft CBT application is that it is also more efficient because it is based on a programming system (the data collection process is very fast). However, the disadvantage of the Bimasoft CBT application at this time is that it has not been able to integrate with the item analysis formula so an additional template is needed to analyze the data on the level of difficulty and the index of distinguishing power. In this study, the results of the analysis of the level of difficulty can be shown in Table 3.

Table 3. Result of the difficulty level of midterm assessment item test

Scale	Classification	Total	Percentage
$0,00 \leq DI < 0,30$	Difficult	11	27,5%
$0,30 \leq DI < 0,80$	Medium	28	70%
$0,80 \leq DI \leq 1,00$	Easy	1	2,5%

Based on Table 3, it can be shown that the results of the level of difficulty show interpretation with a difficult question category of 27.5%, a medium question category of 70%, and a question with an easy category of 2.5%. The results of this study also show that questions in the medium category can be archived in the question bank so that they can be used for subsequent exams. The results of the analysis of question items in the difficult category and the easy category, then these question items need to be evaluated and revised again by a team of physics teachers making questions. Therefore, overall the results of the analysis of the level of difficulty of the questions show a good category because the largest proportion is in the index of moderate category questions. The results of this study are relevant to the results of other studies that the level of difficulty of questions in the medium category is a good question to use in the exam (Susanna, Ani & Hamid, 2020).

Table 4. Analysis of item differentiating power

Scale	Classification	Total	Percentage
$D < 0,00$	No differentiating power	6	15%
$0,00 \leq D < 0,20$	Weak	14	35%
$0,20 \leq D < 0,40$	Fair	12	30%
$0,40 \leq D < 0,70$	Good	8	20%
$0,70 \leq D \leq 1,00$	Excellent	0	0%

Based on Table 4, it can be shown that the results of the differentiating power of questions in the weak category are 35%, the sufficient category is 30%, the good category is 20%, the very good category is 0%, and the category of no differentiating power is 15%. These results can be re-categorized into a good category if the majority of percentages are in the category of very good, good, and good enough questions (Sudijono, 2009). Based on the results of this study, the index of the distinguishing power of questions in the good enough category, good category, and very good category has a total percentage of 50%, so these question items can be archived in the question database storage so that later they can be reapplied in the next exams. On the index of the differentiating power of questions in the weak category with a total percentage of 35%, these question items need to be re-evaluated and revised by the

physics teacher team making the questions. Then on the index of discriminating power of questions with a negative value scale, these items need to be removed from the question database or not reused in the next exams. The follow-up process on questions with a negative index discriminating power is also supported by the results of other studies that questions with the no discrimination category are questions that are not suitable for reuse because they cannot differentiate the abilities of students (Hanifah, 2004). The results of other studies relevant to this study show that questions with poor categories (negative differentiating power values) have the best quality of comparison tests, namely high ability students cannot answer the questions while low ability students can answer the questions (Anita, Tyowati & Zuldafrial, 2018).

CONCLUSION

Based on the results of the research conducted, it can be concluded that the CBT Bimasoft application can help retrieve data responses more effectively and efficiently. The results showed that the analysis of the differentiating power of physics questions PTS Odd in 2023-2024 at SMAN 1 Serang City showed a good category and the level of difficulty in the medium category.

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