THE MEASUREMENT OF PSYCHOMETRIC PROPERTY OF THE MID-TERM TEST QUESTIONS OF QUANTITATIVE RESEARCH METHODOLOGY COURSE FOR EMPLOYEE CLASS STUDENTS’: A RASCH MODEL ANALYSIS

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ABSTRACT

Quantitative research method courses had always been a scourge for students, especially for employee class students. Employee class students were assumed to be students who shared their concentration for work and study and forgot materials taught after leaving a class. I met this when I taught employee class students for a semester. I found that they had a good responsibility for doing the task, but they did not care about the content they wrote in their assignments. This study generally aimed to identify the ability of employee class students for quantitative research method course and test the quantitative research methodology exam questions. The results of the study could be used as a reference in predicting the final grades of students. The researchers also could find out the pattern of students’ answers that were manipulated. This study showed that the five exam questions had high validity and high item reliability, but the students are not consistent in answering the questions. The distribution of items in the five questions was quite good. The students getting high and low scores were balanced with the same percentage, namely 39%.

KEYWORDS

Employee class students, quantitative research methodology, item analysis, RASCH Model

1. INTRODUCTION

The lecture system and curriculum management implemented in a University were the part of external factors influencing the students’ quality. Some private universities organized employee classes where the aim was to accommodate the desires and interests of college students who decided to study while working to support their daily needs or improve their welfare. This also supported their future preparation in facing the 4.0 industrial revolution (Shahroom, & Hussin, 2018).

In organizing the employee classes, the curriculum applied was different compared to regular classes. This was why some people have an assumption that students in the employee class were those who “only needed a certificate of diploma”. In fact, they were not as bad as people's judgment. They always followed the development of the age where the era of digitalization was being echoed. They studied IT and prepared themselves as useful prospective graduates and contributed to the industrial revolution 4.0, especially in the education sector (Hariharasudan & Kot, 2018; Hussin, 2018). In addition, employee class students are considered to have low integrity in the academic field. Academic integrity is influenced by elements of school education, one of
which is a comprehensive collaboration between individuals in the educational environment itself (Ramdan & Prakoso, 2019).

That assumption needed to be upheld so it would not give a bad rating for students taking employee classes. Basically, the opening of the employee class aimed to facilitate students in increasing knowledge in the tertiary level. In addition, this was also one of the supporting developments in the era of the educational revolution 4.0 which carried the theme of "smart industry" (Haron, 2018).

Employee class students were dominated by individuals who had ages ranging from adults to parents. This was the reason why they quickly forgot materials after leaving the class. However, they had some strengths regarding their responsibilities. They finished their assignments on time even though their business was not only in academic sector but also in family and work affairs. However, not all students in the employee class forgot the materials. This was evidenced by the existence of a student in the class who had been 40 years old that were still active in some discussions and were even able to explain some materials to his friends well.

Many students in the employee class had already complained at the beginning of learning in quantitative research methodology class since it was a course that discussed research related to numerical data. As a lecturer, I tried to break the complaint at the beginning of this study by explaining the ease and strengths of quantitative research so they could continue to enjoy this course. Since I was worried about my students’ final grades because their curriculum was different from the regular class, I would like to test the meeting materials 1-6. The result of this study could be a reference to predict the final grade the students would get. Based on the curriculum, employee class students were required to take the final semester exams only, without any mid-term test. Curriculum influenced the educational development (Edi, 2019) so it was important to be planned well.

1.1 Quantitative research method

Quantitative research method was one of research methods that presented data in the form of numbers. One of the characteristics of quantitative research was the data collected could be generalized, the results were objective, and this research connected some variables (Heppner, P Paul; Wampold, Bruce E; Kivlighan, 2008). Basically, quantitative research was classified as cross sectional research in which the research stages were quite short and only observed social changes in a short time. Quantitative research was often considered difficult. If the ease of the results of the analysis could be found, it could be used to generalize all populations. The students would not also find it difficult and made this subject as a scourge in lectures.

1.2 Midterm test questions

The midterm test questions comprised five questions that used some components of several materials for six meetings. The materials in the quantitative research methodology course included types of quantitative research, determining the formulation of research problems, research variables, research hypothesis, sampling technique and research instruments (Source: RPS Metpend Quantitative BK UNINDRA).

1.3 Rasch model analysis

Students' ability to understand quantitative research methodology needed to be analyzed to predict the results of their final semester examination. The ability of each student could be analyzed together and interpreted individually through RASCH modeling analysis. RASCH Modeling Analysis was a very simple analysis in analyzing the ability or performance of individuals in a field. The strength of the RASCH analysis was it did not only pay attention to raw scores, but in assessing the ability of respondents, it also paid attention to the pattern of respondents' answers and
the level of difficulty of the problems (Marfu‘i, Ilfiandra & Nurhudaya, 2018). RASCH Model was a 1-PL analysis model that could be applied to samples whose numbers were not as large as using 2PL or 3PL analysis models (Istiyono, 2014). RASCH modeling analysis could also provide a linear scale with the same interval values. In addition, the estimation of data provided was more precise and it produced replicable measurements (Sumintono & Widhiarso, 2013).

In general, this study aimed to find out the quality of the questions used as the midterm examinations for employee class students, as well as the writer wanted to know and predict the ability of employee class students for quantitative research methodology courses, and analyzed the quality of midterm questions given.

2. METHOD

This research used a descriptive quantitative approach. This research was conducted on employee class students at a private University in Jakarta, Indonesia with a population of 72 students from three classes. The instrument used in this study measured the ability of students on some materials namely the overview of quantitative research in general and the type of quantitative research, research variables, research problems, hypothesis, sampling technique and research instruments.

The research instrument used was Quantitative Research Methodology Quiz. Data was carried out once through tests on the BK student in employee class. The data analysis technique used was RASCH modeling analysis through Winsteps application. The analysis carried out included the ranking analysis of the results of BK students’ midterm test resulted from a scalogram, the validity and reliability of the quiz, the level of the difficulty of the questions and the pattern of students’ answers. The limitation in the analysis of this research was RASCH modeling analysis was 1PL analysis and this analysis had not been widely used in the analysis of academic questions in the social sciences.

3. RESULTS AND DISCUSSION

The results of this study covered item maps, the validity and reliability of tests and the scalogram. In each discussion, it contained some reinforcement with the results of a brief discussion. The results of this study were analyzed using RASCH modeling aimed to find out the quality of the questions written in measuring the understanding and the ability of the employee class students in the quantitative research method material. The following was an explanation in each section.

3.1 Validity and Reliability

Before discussing the quality of the questions, it was necessary to discuss the validity and reliability of midterm exam questions for quantitative research methodology course in employee classes. The following was an overview of the results of the reliability test analysis from using RASCH model analysis.
Based on the picture above, it should be noted that RASCH model analysis analyzed the reliability of questions based on three reviews, including the overall reliability of the test, the reliability of students in answering questions, and the reliability of items of the questions. It could be seen that the overall reliability of the test was in the low category. This was because the reliability of the person compared to the reliability of the items was not comparable so the results were unequal and made the reliability of the test become low at 0.35. While the reliability of the person was only 0.31. However, the reliability of the items showed a high number of 0.91.

**3.2 Item Maps**

These map items explained the reflection of the midterm exam questions in quantitative research methodology course on the ability of employee class students. It could be explained that on the left hand side was the serial number of students who answered the questions, while the right hand side was the question number. The more was illustrated in the picture below.
Based on Figure 2, it could be interpreted that the most difficult problem was number 5 which was about the sampling technique. Students who were able to answer that most difficult question precisely were only nine people out of 72 students who are seen in the left hand section namely number 16, 10, 13, 14, 09, 19, 41, 57, and 72. The easiest question was number 3 regarding the hypothesis and formulation of the research problem. It was seen in the right and bottom section with the frequency of students who were able to answer it very much. The fewer students could answer the questions would be categorized as the most difficult questions.

### 3.3 Scalogram

This scalogram illustrated the results of the analysis of the answer patterns shown by students in the Guttman Scalogram. This scalogram could also be used to predict whether students' answers were the result of cheating or not. The more illustration would be discussed in the image below.

![Figure 3. Scalogram](image)

Based on the results of the scalogram above, the representation of students’ answer patterns were dominated by inconsistent pattern answer. Many students were able to answer the most difficult questions, but they could not answer the easy ones, for example the respondents number...
03, 02, 26, and 67. They got a low score in answering the easiest question, but they got a score of 10 or close to perfect for the most difficult question. It could be predicted that students with numbers 02 and 03 cheated in answering the tests because when working on the chair, they sat together and got the same score. From the data, it could be seen that students with number 16 got the highest score, while students with number 69 got the lowest score. The percentage of students’ score based on the categorization was as follows.

<table>
<thead>
<tr>
<th>No</th>
<th>Categorization</th>
<th>Freq.</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>28</td>
<td>39%</td>
</tr>
<tr>
<td>2</td>
<td>Moderate</td>
<td>16</td>
<td>22%</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>28</td>
<td>39%</td>
</tr>
</tbody>
</table>

Source: Research result, 2019

Based on the table, the frequency of class employee students who had scores in the high and low categories were equally balanced, namely 28 people for each category with the percentage of 39%. This proved that, even though employee class students had low grades in ability to understand quantitative research methodology courses, the number of students with high grades and low grades were balanced.

3.4 Discussion

The low reliability of the test was caused by some students who were not consistent in answering the questions so it affected the person reliability which also had low scores. This needed to be identified based on the criteria of questions constructed through the test validity as follows.

In the picture above, it could be seen that the entire questions in the midterm test in quantitative research methodology courses were valid and could measure the ability of students who take quantitative research methodology courses. The validity criteria in the RASCH analysis could be viewed from the norms of the questions which had a difference of 0.4 <Pr. Measure Corr <0.85, indicating that the questions could be maintained (Sumintono & Widhiarso, 2013). There was only one problem that had Pr. Measure Corr. amounted to 0.39, which was question number 4 that was possible to be revised in order to reach 0.4. Based on the analysis in Figure 2, it was known that the whole questions could be understood well by students and did not cause any misconceptions in answering them. This was reinforced by the theory which explained that the column in measuring the reliability of the test questions needed to be considered by paying attention to the MNSQ Outfit column (0.5 <MNSQ> 1.5) and ZSTD Outfit (-2, 0 <ZSTD> 2.0) along with the norm to Pt. Measure Corr (Sumintono & Widhiarso, 2015).
4. CONCLUSION

Based on the results of this study, it could be concluded that all questions in the midterm test was valid and had low reliability because the person reliability of this test had a low category, while the reliability of the item was in the high category. The employee class students’ scores in understanding quantitative research methodology courses were in the low category, but it could still be balanced with the number of students who had high grades with the same percentage, which was 39% for each. The implication of this study was that the data produced could be a provision for educators to add materials that was less understood, namely sampling techniques. Suggestions for further research were the development of teaching materials in a more modern or digital-based form in delivering quantitative research methodologies was needed so the students were not bored and scary because the course related to numbers.

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