

Research Article

Rasch Analysis of Students' Emotional Intelligence; Implications for Vocational Education

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Abstract.

Examining the emotional condition of vocational students is essential due to this population having a greater capacity to deal with academic difficulties and challenges. Students with good emotional intelligence have positive academic outcomes and future careers. Hence, this preliminary study was set out to explore and investigate emotional intelligence among vocational students in public schools. A total of 173 vocational students from Kupang City - Indonesia participated. The data were collected online using measurement instrument 13 items with validity ranging from 0.811 to 0.894 and reliability of .891. Using Rasch model analysis with Winsteps Version 37.3 software, this study finds that the level of students' emotional intelligence in vocational public schools is in the medium category (57.80%) with an average respondents' logit value of 0.87 (SD=0.56). Evaluated based on aspect, positive affective, emotion-other, happy emotions, and emotions-own are the dominant aspects that agree with students. This indicates that they have good abilities in this aspect. However, emotional and nonverbal emotions require further attention. This aspect has limited agreement from students, which shows that their abilities are still poor in this aspect. This study provides evidence-based recommendations for the development of more effective vocational education programs concerning promoting emotional intelligence among students.

Keywords: emotional intelligence, vocational school, students outcome, rasch model

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1. Introduction

Emotional intelligence is an important aspect of students' mental and physical growth [1,2]. In the educational setting, active development of emotional intelligence is necessary because it correlates with the subjective well-being of students [3–6]. Students who have good emotional intelligence will be working together [7] and demonstrate stronger problem-solving skills in academic activities [8]. In academic activities, the role of emotional intelligence potential to encourage enthusiasm of students in their academic activities which can prevent failure related to academic fatigue [9,10]. Emotional

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intelligence has a positive and significant association with the motivation, performance, and academic achievement of students at school [11-17].

Emotional intelligence refers to an individual's capacity to understand, process, and regulate emotions to respond well to emotionally stimulating situations [18]. According to [12], emotional intelligence includes a series of abilities and competencies that have an impact on an individual's ability to overcome various pressures and demands. It represents a personal asset consisting of skills that aid the efficient processing and application of emotional information to regulate cognition and behaviour [20]. Emotions are individual mental responses to environmental assessments, including cognitive, conative, and behavioural aspects. Feedback mechanisms convey information that stimulates behaviour and action in a specific context, providing information about the individual and other people [21]. Students who have a high level of emotional intelligence can control their emotions, allowing them to make the right decisions regarding possible actions, based on their understanding of the situation [22].

Although the importance of emotional intelligence is widely recognized, in-depth and focused research on how emotional intelligence can be measured and developed specifically in the context of vocational education is limited. Previous studies on emotional intelligence have tended to focus on general education [23–26] and have tried to measure and understand emotional intelligence in students across different educational contexts. This research gap is important to note as vocational students experience different educational experiences compared to mainstream education. Vocational students are more practical and skill-oriented, which may require different emotional competencies.

The current study uses the Rasch approach to map and measure emotional intelligence appropriately in the context of vocational education. The Rasch method offers the advantage of overcoming classic problems in psychometric measurement, such as differences in difficulty between items and response variation, thus providing more accurate and reliable results [27]. The Rasch method has become a highly trusted methodological approach in the field of psychometrics to measure complex constructs with high accuracy and reliability [28]. Previous research has shown that Rasch Analysis can provide more sensitive and accurate measurements to assist teachers and policymakers in designing more targeted and effective educational interventions [29–31]. By applying this approach, this study will not only fill the knowledge gap on emotional intelligence measurement in the context of vocational education but also provide useful insights for educators and practitioners in developing interventions that can improve

students' emotional intelligence. Therefore, this study aims to examine the emotional intelligence of vocational students in public schools using Rasch model analysis as part of efforts to enhance the quality of vocational education.

2. Method

In this section, we present the population and sample, measurement instrument, procedures, and analysis data as follows:

2.1. Population and Sample

The population in this study is vocational students in public schools in Kupang City - Indonesia. To determine the sample clusters, the range of the population was considered, and clustering was executed based on schools (refer to Table 1). Therefore, detailed information on the number of samples in each cluster is presented below:

TABLE 1: Research Sampling Clustering.

Cluster	Location (Sub-District)	Participant
SMK Negeri 1 Kupang	Oebobo	61
SMK Negeri 2 Kupang	Kota Lama	12
SMK Negeri 3 Kupang	Kelapa Lima	40
SMK Negeri 6 Kupang	Kelapa Lima	37
SMK Negeri 7 Kupang	Alak	23
Total		173

2.2. Measurement Instrument

In this study, we used a measurement instrument with a theoretical framework by Jonker & Vosloo [32] for assessing emotional intelligence. Based on psychometric evidence, 13 items were generated, and these achieved good levels of validity, ranging from .811 to .894. The instrument also demonstrated strong reliability (.891). This instrument measures aspects of emotional intelligence including aspects of positive affective, happy emotions, emotion-other, emotions-own, non-verbal emotions, and

emotional management. The 5-point Likert scale measurement model used with alternative options includes “strongly agree”, “agree”, “neither”, “disagree” and “strongly disagree”.

2.3. Procedures

All of these research activities have gained ethical approval from the Ethical Committee of the Public Health Faculty at Universitas Nusa Cendana, under the number 2023066-KEPK. School counsellors assist in distributing online instruments to students through the WhatsApp application following the principal's permission. Participant anonymity is maintained and only participants who completely respond to measurement instruments are included in the data analysis.

2.4. Analysis Data

The data in this study were analyzed using the Rasch Analysis model. This analysis model has principle analysis and interpretation of people's fully reflects the principle of item analysis [28]. Furthermore, this Rasch model interprets responses that can be changed to give measurements [29]. Emotional intelligence measurement instruments are analyzed to interpret the emotional condition of students in the form of logit values. Furthermore, the results of using this analytical model can guide the development of surveys, questionnaires, rating scales, and tests as well as analyze the function and improve the accuracy of measurement instruments [27] related to emotional intelligence. Winsteps Version 37.3 software is used in all of the analysis processes [33].

3. Result and Discussion

3.1. Level of Students' Emotional Intelligence

The objectives of this study focus on exploring and investigating students' emotional intelligence in vocational schools using the Rasch analysis model. Table 2 describes a statistical summary of students' responses to measurement instruments related to emotional intelligence. The data show that the average student response was at a logit value of 0.87 with a standard deviation of 0.56 and a separation index of person of 1.03. Person reliability shows a Cronbach alpha KR-20 value of 0.59 which indicates that the

quality of respondents is moderate in response to the measurement instrument. The logit measurement value started from -.99 to 2.88.

TABLE 2: Summary Statistic of Students' Emotional Intelligence.

Category	Measure (Logit)	Measure (Rescaling Logit 0-100)
Mean	.87	48.19
S.D.	.56	14.52
Max	2.88	99.91
Min	-.99	.04
Separation Index Person	1.03	-
Person Reliability (Cronbach Alpha (KR-20))	.59	-

Note. S.D.=Standard Deviation; Max=Maximum; Min=Minimum

Table 3 describes the distribution of students' emotional intelligence data with logit rescaling (0-100) classified into five categories. The classification of students' emotional intelligence data is following Table 3 below:

TABLE 3: Frequency Distribution of Students' Emotional Intelligence with Logit (0-100) Values.

Interval (Logit 100)	Frequency	Total (%)	Categories
80.01 – 100	7	4.05	Very High
60.01 – 80.00	24	13.87	High
40.01 – 60.00	100	57.80	Acceptable
20.01 – 40.00	37	21.39	Poor
0.00 – 20.00	5	2.89	Very Poor

Note. (N=173)

Based on the data in Table 3 above, it is known that most students are in the acceptable category (57.80%). The percentages in the poor and very poor categories (>20%) are higher compared to the high and very high categories. In Figure 1, can be seen the distribution of data for each student related to their emotional intelligence condition based on logit values (0-100). Most data move in the range of 40 to 60 logit values. Furthermore, the condition of emotional intelligence of these students can also be seen in Figure 3 which presents the distribution of data between people and items. This curve data presentation provides information that the level of ability of students to respond to the measurement instrument used is higher than the level of difficulty of the item. This data presentation reinforces the finding that in general the emotional intelligence condition of vocational high school students is categorized as acceptable.

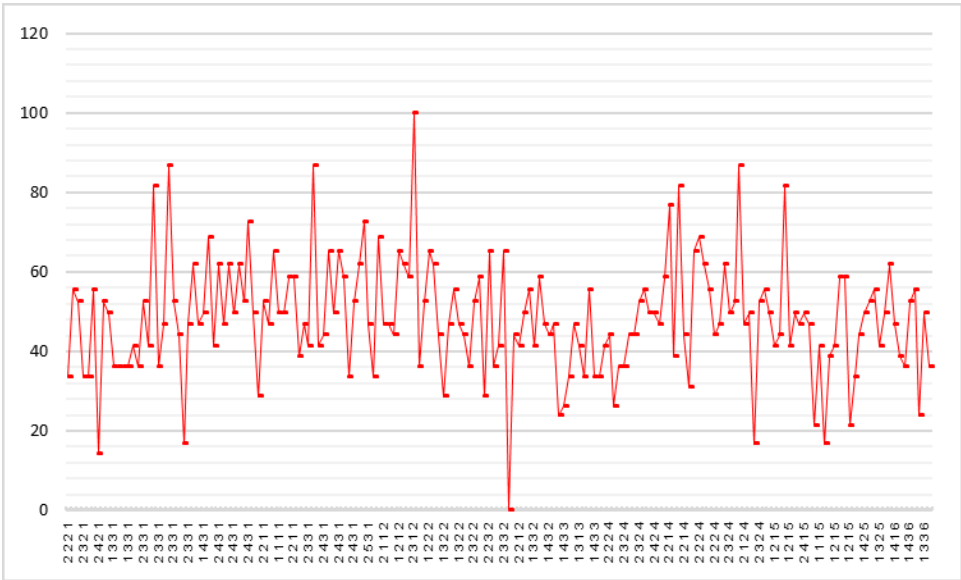


Figure 1: Students' Emotional Intelligence with Logit (0-100) Values.

3.2. Aspect on Students' Emotional Intelligence

The data explains that the overall condition of students in vocational schools is categorized as moderate or acceptable. How the pattern of student response to the measurement instrument items used can provide information about their condition more specifically. Figure 2 describes the distribution of student responses to instrument items. It can be noted that items in the aspects of EOT, EO, HE, and PA received responses that were considered easy to approve. Thus, students are indicated to have a good ability to understand self-emotions and the emotional conditions of others which are part of the aspect of emotional intelligence.

Although the overall emotional intelligence condition of vocational high school students is described in the aspects of EOT, EO, HE, and PA, for the NV and EM aspects for most students it is difficult to get item statement approval. This data informs that the emotional intelligence of vocational learners is still weak in further understanding emotions in non-verbal forms and personal emotional management. Some items that measure this aspect are presented in Table 4.

The results of the investigation found that improved skills related to emotional intelligence are necessary for vocational students. Educational practitioners can provide assistance based on both individual and school. One of these developments can be done through a psychological approach [34] by school counsellors. Integration in the learning process is also necessary, such as social-emotional learning [35]. This is attributed to the balance between practice and theory, interaction, and guidance that

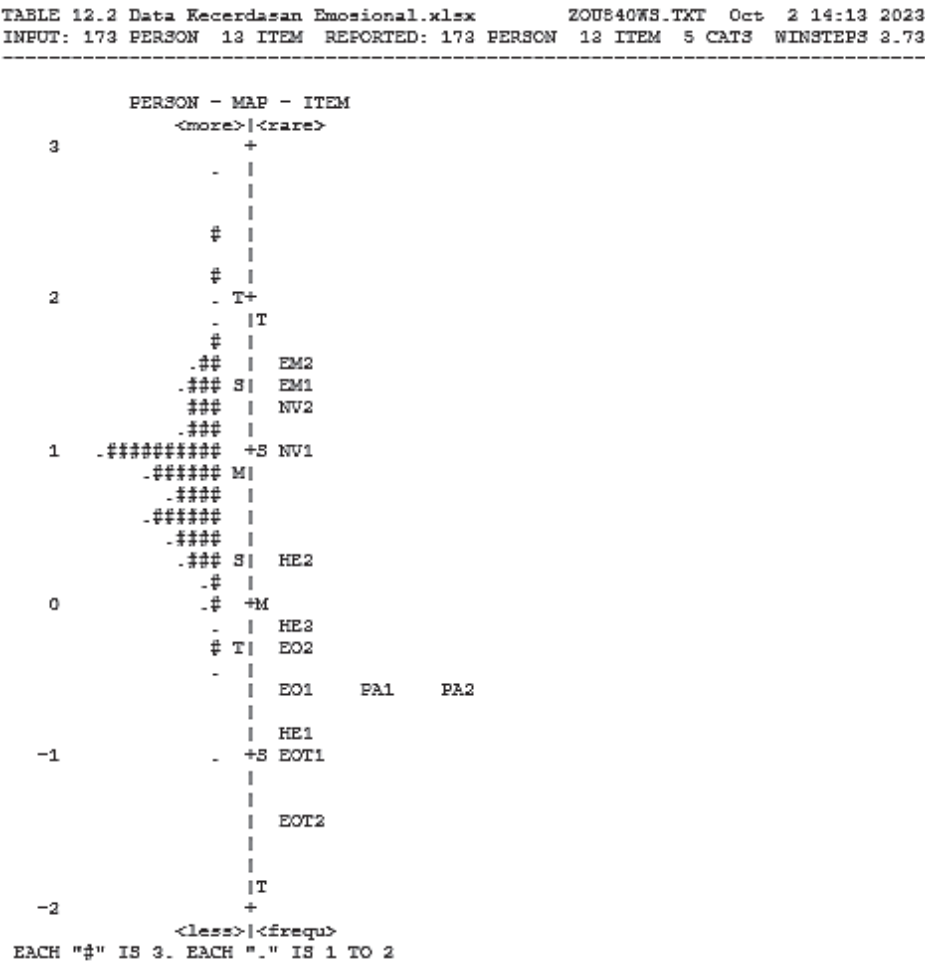


Figure 2: Person to Item Wright Map.

TABLE 4: Example of Item Measurement.

Items	Measure	Infit		Outfit		PT-Measure	
		MNSQ	ZSTD	MNSQ	ZSTD	CORR.	EXP
It's hard to restore a positive mood when my negative feelings get out of control	1.64	1.17	1.7	1.46	4.0	.27	.46
When I was faced with academic challenges, my feelings were difficult to control over long periods	1.42	1.14	1.5	1.43	3.9	.23	.47
Difficulty knowing the meaning/content of messages from body movements (non-verbal) sent by others	1.26	1.22	2.2	1.39	3.7	.33	.47

students need [36] that characterize learning in vocational schools. More comprehensive mentoring efforts related to emotional intelligence among students are predicted to be an important part of efforts to improve the quality of education [26]. Furthermore,

emotional intelligence is also associated with student success in carrying out academic activities in the form of professional practice [25].

4. Conclusion

The emotional intelligence among students in vocational schools is in the medium category. The investigation of each student resulted in several students being categorized as poor and very poor. More specifically, based on aspects of emotional intelligence measurement, both aspects of non-verbal emotions and emotional management need attention. School programs that lead to the development of these two aspects are our recommendations to pay attention to policymakers in vocational schools.

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