



## Needs Analysis of Cosmetology Education Student Assessment Instrument on the Development of the Rasch Model Module

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### ABSTRACT

Employing valid and reliable instruments aligned with the student population's characteristics is essential. This study aimed to analyze the requirements of student assessment instruments in the Cosmetology Education study program to support the development of Rasch Model learning modules. The present study comprised 20 students enrolled in the cosmetology education program at Semarang University, who were selected based on purposive sampling. The research data were collected through observation, focus group discussions (FGDs), and documentation using observation sheets, FGD guides, and smartphones. The present study employed the stages of data analysis proposed by Miles and Huberman to analyze the research data obtained. The findings of the analysis demonstrated that the assessment instrument for cosmetology education students needs to be developed to support the Rasch Model module. It is anticipated that lecturers who wish to develop student assessment instruments will consider this research.

## 1. Introduction

Education has been identified as playing a pivotal role in the development of a nation (Nurhasanah et al., 2023; Zainuddin et al., 2020). Education is not merely concerned with the provision of material; it also prioritizes the systematic assessment of learners' development, skills, understanding, and attitudes (Wang et al., 2024). This commitment to evaluation is founded on a set of principles that guide the curriculum. Education has been demonstrated to cultivate and nurture talent, thereby facilitating optimal contributions (Zhang et al., 2020). The education system in Indonesia is characterized by a tripartite structure, encompassing informal, non-formal, and formal pathways. Informal education is a natural phenomenon that occurs in the family environment. Non-formal education encompasses courses or training outside of the school environment. In contrast, formal education is characterized by its structured and tiered nature, as exemplified by institutions such as schools and universities.

Universities are defined as institutions of higher education entrusted with the responsibility of disseminating knowledge and cultivating the character and competencies of their graduates. It is imperative to furnish comprehensive data concerning students' academic achievements, encompassing transcript information specific to their learning accomplishments (Griffiths et al.,

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2022). Within the context of the cosmetology education study program, universities function as centers for developing science, beauty skills, and pedagogical competencies, aiming to produce excellent educators and practitioners in the field of beauty and aesthetics

Higher education has been demonstrated to play a significant role in the economic development of both regions and states (Ding, 2021). Higher education institutions have been identified as pivotal in cultivating competent human resources that can adapt to the demands of contemporary times. The curriculum must be aligned with professional requirements to ensure that college graduates are adequately prepared to enter the workforce. It is imperative that universities that have a vested interest in the success of their students, including those who teach them, find a way to balance classroom learning between theory and work practice with the needs and abilities of their students. A methodology for adjusting theoretical and practical knowledge is to conduct a needs analysis to identify student abilities.

A needs analysis collects various information or data used to describe student learning progress (Tumangger et al., 2022). Furthermore, needs analysis is defined as preliminary research undertaken as the first step in determining the necessity for further study (Handayani & Lestari, 2019). In the domain of learning research and development, the necessity of a thorough needs analysis is paramount. The necessity of a needs analysis in higher education is twofold: firstly, it enables lecturers to ascertain the learning requirements of students; secondly, it facilitates the identification of areas for improvement in the learning process. The necessity of a needs analysis in developing teaching materials, methods, or syllabuses has been demonstrated (Suharti et al., 2020). Consequently, lecturers can create teaching materials, such as material modules in courses, based on needs analysis.

Students must have a firm grasp of the Rasch Model material, which forms a significant component of the research methodology course. The Rasch Model is an instrument item analysis technique used for research or other purposes (Bond et al., 2021; Boone, 2016). The validity and reliability processes that must be fulfilled using the Rasch Model are part of the research methodology. Research methodology equips students with essential skills to explore various disciplines and encourages independent learning and adaptability in a dynamic environment (Artaraz, 2007). Vocational education, including cosmetology education, must demonstrate adaptability and relevance to professional needs by integrating education, industry, and research into its curriculum (Shi et al., 2024). A robust methodological framework is instrumental in facilitating the production of credible research by students, a prerequisite for their academic and professional success (Ojoboh & Igben, 2024). The integration of the Rasch Model module within the research methodology course has been demonstrated to enhance the quality of learning and foster students' learning independence.

Developing a Rasch Model learning module constitutes a phase in the learning implementation process. In addition, lecturers are required to identify, analyze, and evaluate students' comprehension of the Rasch Model module in terms of its development and assimilation during the instructional session. The evaluation process is conducted through assessments; therefore, a comprehensive needs analysis must be undertaken to ascertain the availability of assessment instruments and their relative urgency (Baranovskaya & Shaforostova, 2017). Analyzing needs is fundamental to the decision-making process related to developing assessment instruments (Cahyaningrum et al., 2022). The needs analysis conducted in this study constitutes a form of lecturer effort in determining the development of assessment instruments to measure the extent of student understanding of the Rasch Model module developed.

Assessment constitutes a method for decision-making about student learning performance (Black & Wiliam, 2018). Assessment is also employed to investigate the knowledge and skills that students

possess and learn (Baird et al., 2017). Furthermore, assessment is utilized to evaluate students' abilities. The evaluation results constitute information the lecturer can further analyze to determine whether the lecturer's teaching materials and methods are appropriate (Arikunto, 2018). Assessment can be categorized into two distinct types: formative and summative (Berry & Adamsaon, 2011). Formative assessment is conducted to evaluate students' learning progress, while summative assessment is used to assess students' final performance (Fleer, 2015). The assessment is divided into two categories based on its implementation techniques: tests and non-tests. Non-test assessment techniques use questionnaires, interviews, and observations to obtain the data (Arikunto, 2018). The present research adopts non-test techniques for the development of formative assessment instruments.

The assessment instrument to be developed extends the Rasch Model module development that lecturers have developed. This research supports the decision to develop assessment instruments and indicators used in developing student assessment instruments for Rasch Model modules. The present study, therefore, analyses and answers the following research questions:

1. How is the existence of student assessment instruments to support the development of Rasch Model modules?
2. What factors support the development of student assessment instruments in the development of Rasch Model modules?
3. What factors hinder the implementation of student assessment instruments in the development of Rasch Model modules?

## **2. Methodology**

The present research employed qualitative research methods, utilizing a case study design. Qualitative research methods are those used to explore or understand the meaning of an individual, group, or phenomenon (Creswell & Creswell, 2017; Hardani et al., 2020; Shidiq & Choiri, 2019; Sugiyono, 2019). A case study design was employed as the research method because researchers described the research results based on the data collected.

The present study was conducted at one of the universities in Semarang city that offers a cosmetology department. The research study subjects were comprised of 20 students majoring in cosmetology, who were divided into five groups, each consisting of four individuals. Purposive sampling was utilized as the primary method for determining the sample. Purposive sampling is a technique in which sample criteria are considered following the specific requirements of the research study (Sugiyono, 2019). The students participating in this study are enrolled in research methodology courses.

The research data were collected using a combination of observation, focus group discussion (FGD), and documentation techniques with predetermined groups. FGDs are an effective data collection method for educational research, particularly in curriculum development and pedagogical innovation (Shabina et al., 2024). The present study collected data from observation sheets, discussion guides, and smartphones. The present study employed triangulation as a methodological strategy to ensure the robustness of the data obtained. Triangulation is a strategy used to test the validity of data obtained from various sources, such as observation, interviews, and documentation (Creswell & Creswell, 2017; Hardani et al., 2020; Shidiq & Choiri, 2019).

Initial observations were conducted to identify the requirements for student assessment instruments in the context of Rasch Model module development. Subsequently, focus group discussions (FGDs) were conducted to ascertain the facilitating and hindering factors in implementing the assessment instrument development. Researchers employed unstructured focus group discussions (FGDs) as a data collection method, utilizing a similar set of questions for each student to

ensure the acquisition of the required data. Furthermore, researchers documented the necessary data during the observation and FGD process.

The data obtained were analyzed using the analysis procedure of Miles and Huberman (Cahyaningrum et al., 2022; Miles et al., 2014; Miles & Huberman, 1994; Sugiyono, 2019). Miles and Huberman's qualitative data analysis was conducted during the data collection. The study of the collected data was conducted concurrently with the data collection process, ensuring the saturation of the final data set (Miles & Huberman, 1994; Sugiyono, 2019). The subsequent stages entailed summarising and classifying the research data to simplify the data obtained. Subsequently, the data were presented to interpret the results of the analysis. Finally, the data was verified or concluded in order to answer the research questions.

### **3. Results and Discussions**

The results of this study were based on observations, focus group discussions (FGDs), and documentation with cosmetology education students at Semarang University. The stages of data analysis proposed by Miles and Huberman were utilized to address the research questions, resulting in a simplified yet comprehensive data description and discussion. The following results were derived from the data collected and described according to specific subjects.

#### **A. Model Rasch Module**

##### **1. Students' Knowledge of the Rasch Model**

The Rasch model is not widely known among the student population. Nevertheless, there is considerable interest among students to learn more about this model, especially as they see the potential of the Rasch model in providing more objective and accurate assessments. For those who have encountered the term, their comprehension remains limited, and they seek further elucidation on the application of Rasch models in education, particularly in the context of the Cosmetology Education Programme.

##### **2. Implementation of Rasch Model Module in Cosmetology Education Research Methodology Course**

The utilisation of the Rasch model in the research methodology course was met with considerable enthusiasm by the students, primarily due to its capacity to facilitate objective, transparent and quantifiable assessment. The Rasch model is expected to enable a more equitable and pertinent evaluation of their theoretical understanding and practical research skills. Notwithstanding the concerns regarding the complexity of implementation, students generally anticipate that the Rasch model will enhance the quality of feedback they receive and provide a more comprehensive overview of their progress in research methodology.

##### **3. Expectations of the Rasch Model Module**

The Rasch model module is anticipated to furnish a more objective, transparent, and detailed evaluation of their abilities in the research methodology course. The objective is to obtain more precise feedback regarding their comprehension of methodological concepts and their capacity to apply them in authentic research settings. The Rasch model is expected to facilitate a more comprehensive evaluation of theoretical and practical competencies, including identifying challenges encountered in examinations and research assignments.

#### **B. Assessment Instrument for Rasch Model Modules**

##### **1. Student Experience with Rasch Model Assessment Instruments**

Students have not had direct experience with Rasch model module instruments. Nevertheless, many are interested and hope the Rasch model will be applied in future assessments. Students believe that the Rasch model has the potential to bring accuracy and objectivity to educational

assessments. For some students with previous experience, the Rasch model module proficiency instrument provides a more transparent and data-driven evaluation, which helps understand their proficiency development.

## 2. Current Assessment Instruments

Based on interviews with 20 Cosmetology Education Program students, most felt that the current assessment instrument did not fully reflect their perception of the Rasch model module. In general, they revealed that the existing assessment instruments tend to measure theoretical knowledge and practical skills separately, without considering the difficulty level of the questions or objective assessment.

## 3. Media Implementation of Rasch Model Module Assessment

Students strongly support the development of Rasch model module assessment instruments using Google Forms. They believe this platform will provide convenience in data collection, transparency of assessment, and efficiency in processing assessment results. Despite concerns about limitations in assessing practical skills, most students believe that Google Forms can be an effective tool for more structured, measurable, and objective data-driven assessment.

## 4. Student Suggestions Related to the Development of Rasch Model Module Assessment Instruments

Based on the interview results, the students provided relevant inputs for developing assessment tools in the Rasch model module. They emphasized the importance of assessments that balanced theoretical and practical aspects to reflect the ongoing learning process better. In addition, students hoped that the questions developed would have the right difficulty level and could be adapted to individual abilities. Transparent and flexible assessment, including clear and constructive feedback, is also essential. Overall, students want assessment tools that are more objective and reflect their overall ability, both in terms of conceptual and practical skills.

This study aimed to analyze and respond to the research questions that have been determined regarding the necessity for assessment instruments for cosmetology education students to support the Rasch model module. The following analysis is intended to respond to the research findings.

### 3.1 *The Existence of Student Assessment Instrument on the Rasch Model*

Some students stated they had no formal medium to express their opinions, experiences, or evaluations of the module content and implementation. This suggests a gap between the implementation of learning and student involvement in the module evaluation process. Students felt that their participation in providing feedback was only informal, such as through class discussions or oral comments, without a tool to record their perceptions systematically. This condition suggests that the existence of a tool to assess students' perceptions of the module has not yet become part of a structured learning system. However, such a tool is essential as a means of reflection for lecturers and improvement of the quality of learning.

Amelia developed a non-test evaluation instrument to determine the students' perceptions of the module (Amelia et al., 2020). Furthermore, Yasienta & Nadhirotul developed a perception instrument to identify students' responses regarding the teacher's teaching methods (Yasienta & Nadhirotul, 2015). In addition, Siregar conducted a perception assessment to analyze students' understanding of online learning activities (Siregar, 2022). The assessment instruments developed and used by Amelia, Yasienta, Nadhirotul, and Siregar are assessment instruments that already have good validity and reliability. Still, their application has not yet been found in cosmetology education. Thus, the student assessment instrument of the Rasch model module is still minimally developed, so further research needs to be done by considering the supporting and inhibiting factors for the development and implementation of the Rasch model module assessment instrument.

### 3.2 Supporting Factors

#### a. The Availability of the Rasch Model Module

The Rasch model module developed by the lecturers is a supporting factor in developing student assessment instruments. The available modules have been designed to assist students in enhancing their knowledge and comprehension of the Rasch model. Furthermore, the indicators included in the student assessment instrument can subsequently be aligned with the context of the Rasch model module. Consequently, the student assessment instrument will not extend beyond the specified context, ensuring students can undertake the assessment optimally. The following indicators are associated with student assessment instruments related to the development of Rasch model modules.

**Table 1**  
Indicators of Rasch model module assessment instrument

No	Indicator
1.	Data input to the Rasch model
2.	Analysis and interpretation of item measure data
3.	Analysis and interpretation of item fit data
4.	Analysis and interpretation of person fit data
5.	Analysis and interpretation of person measure data
6.	Analysis and interpretation of Wright map data
7.	Analysis and interpretation of scalogram data

In addition to the modules developed by lecturers, students can increase their knowledge of the Rasch model by reading Rasch model books, such as those produced by Sumintono and Widhiarso (Sumintono & Widhiarso, 2013, 2015). The Rasch model is included in the field of test theory, more specifically in the area of item response theory (Retnawati, 2014). This demonstrates the availability of Rasch model learning resources and their utilization as a reference for developing Rasch model learning indicators and assessment instrument indicators.

#### b. Relevance to Education

The Rasch model is relevant to cosmetology education, particularly in providing an objective, measurable, and fair assessment of students' work practice outcomes. The Rasch model can improve the quality of evaluation in cosmetology education by providing transparency in assessing each skill cosmetology students possess. In line with the findings of Azizah and Wahyuningsih's research, their research evaluates the instruments analyzed by Rasch in measuring students' abilities (Azizah & Wahyuningsih, 2020). Similar to Ngadi's research, the instrument used with the Rasch model can measure students' abilities (Ngadi, 2023). Furthermore, the Rasch model is included in the item response theory and PISA data analysis using the Rasch model (von Davier et al., 2019). Thus, the Rasch model has obvious advantages for education and research.

#### c. Facility

The student assessment instrument to support the development of the Rasch model module will be technology-based, such as Google Forms. Based on the results of the analysis, students can support Google Forms. Google Forms requires the internet and devices to access it; students need the necessary media to complete the assessment. In addition, the university also has internet access that students can use freely.

Other researchers used Google Forms to carry out student assessments about learning (Sufriadi & Zakaria, 2022). In addition, Trisnani developed an assessment instrument and implemented it using Google Forms (Widowati et al., 2024). The results showed a positive response to the use of Google Forms. This indicates that Google Forms is an easy medium for conducting assessments. Therefore, this study suggests using Google Forms to implement student assessment instruments.

### 3.3 Inhibiting Factors

#### a. Students' Knowledge of the Rasch Model

Based on the data, most students still lack knowledge about the Rasch model. This shows that student's readiness for assessment instruments still needs to be improved through the effective implementation of the Rasch model module developed by the lecturers. Furthermore, students are expected to understand the themes and contexts in the assessment tool for the Rasch model module. To overcome this factor, students can learn about the Rasch model from different sources. Pratama's research shows that introductory training on the Rasch model can improve understanding of the Rasch model (Pratama et al., 2024). This can be the first step for students to actively seek information on learning resources.

### 4. Conclusions

A needs analysis of cosmetology education students revealed a paucity of assessment instruments in non-test questionnaires to measure student perceptions. These instruments are not yet available in a form that is appropriate, complete, and relevant to vocational learning needs, especially in the Rasch Model module studied. Students required an instrument to facilitate a more systematic and purposeful representation of their learning experience. The availability of the Rasch Model module has been identified as a key factor in the development of student assessment instruments, thereby ensuring their relevance and effectiveness. The indicators of the assessment instrument to be developed will also be under the Rasch Model module. The focus of the questionnaire can be arranged in a manner conducive to the context. Several strong supporting factors drive the necessity of developing student assessment instruments for the Rasch model module. Considering these findings, it can be concluded that the development of student assessment instruments in the form of non-test questionnaires is required as a step to improve the quality of evaluation of student perceptions of the Rasch Model module developed.

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