The Influence of Cognitive, Affective, and Psychomotor Assessment Based on SPSS and SmartPLS Software on the Effectiveness of Learning Outcomes Evaluation Management at Senior High Schools in Jember Regency

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Abstract: *This study investigates the effects of cognitive, affective, and psychomotor domains on the effectiveness of learning outcome assessment management at senior high schools in Jember Regency, Indonesia. Utilizing a quantitative survey approach, data were collected from 100 teachers through validated questionnaires. Analysis employed SPSS and SmartPLS software, revealing a model with an R^2 of 0.999, indicating excellent explanatory power. Results demonstrated that affective (beta = 0.573) and psychomotor (beta = 0.424) domains significantly positively influence assessment management effectiveness, while cognitive (β = 0.003) shows no significant effect. These findings highlight the prominent roles of emotional and practical skills in assessment management. The integration of SPSS and SmartPLS enhances analytical precision, supporting data-driven decision-making. This research contributes to the development of technology-based assessment models, emphasizing the importance of managing affective and psychomotor domains to improve educational quality.*

Key Words*:* Learning Outcome Assessment, Educational Technology, SPSS, SmartPLS, Assessment Management

Introduction

Education forms the cornerstone of national development, with assessment of learning outcomes serving as an essential tool for measuring student competencies comprehensively. Effective assessment management support educators in evaluating progress and provides an objective overview of instructional success (Sudjana, 2009). In the digital era, technological advancements such as statistical software and data analysis tools offer significant opportunities to enhance assessment systems' efficiency, accuracy, and reliability. Employing these technologies enables more precise data analysis, facilitating improved decision-making processes within educational institutions.consequently, investigating the influence of cognitive, affective, and psychomotor assessments on the effectiveness of assessment management at senior high schools in Jember Regency is both relevant and imperative.

Firstly, the importance of the cognitive domain in assessment is well-established, relating to student' thinking, understanding, and recall of material (Aderson et al., 2001). Accurate measurement of this domain ensures the effectiveness of instructional strategies and

competency achievement. Software such as SPSS streamlines the analysis of cognitive data, supporting timely and objective insights (Field, 2013).

The affective domain encompasses attitudes, motivation, and interest, which are critical for learning success yet often overlooked (Krathwohl, 2002). Bloom (1959) emphasizing its influence on characted development and motivation, which can be assessed efficiently through digital surveys and questionnaires (Tuckman, 2012).

The psychomotor domain involves practical and motor skills, especially relevant in vocational and skills-based education (Simpson, 1972; Harlen & James, 1997). Its assessment benefits from systematic, objective analytical tools such as SmartPLS, which allows for complex modeling of relationships among psychomotor variables (Henseler et al., 2015).

The combination of software tools like SPSS and SmartPLS provides comprehensive analysis, enhancing both efficiency, accuracy and improve precision and reduce human error (McMillan, 2014; Wang et al., 2019). Their integration offers a robust approach for understanding the influence of assessment domains on management effectiveness, which is vital for developing effective evaluation systems.

Innovative Contribution

This research uniquely integrates advanced quantitative analysis techniques using SPSS and SmartPLS in the context of assessment management. Unlike previous studies, validated through sophisticated software analysis, including Partial Least Squares Structural Modeling (PLS-SEM). This approach provides nuanced insights into the complex relationships among assessment variables, offering valuable guidance for future technology-based assessment systems.

Research Questions

1. How does cognitive assessment influence the effectiveness of learning outcome evaluation management at senior high schools in Jember Regency?
2. What is the impact of effective assessment on management effectiveness?
3. How does psychomotor assessment affect management outcomes?
4. Does the use of SPSS and SmartPLS software improve understanding and management of assessment outcomes?

Research Objectives

1. To analyze the effect of cognitive assessment on assessment management effectiveness.
2. To determine the influence of affective assessment on assessment management.
3. To examine the impact of psychomotor assessment on assessment management.
4. To evaluate the role of SPSS and SmartPLS software in enhancing data analysis accuracy and decision-making processes.

Literatur Review

This section comprehensively discusses the theoretical constructs and hypotheses regarding the influence of cognitive, affective, and psychomotor assessments on the efficacy of assessment management at senior high schools, alongside the role of SPSS and SmartPLS software in data analysis accuracy.

Assessment of learning outcomes is vital in education, serving as a basis for instructional improvement and student development (Sudjana, 2009). Effective assessment management enhances educational quality and student achievement (Arikunto, 2009). Nurhadi (2012) underscores that a holistic assessment encompasses cognitive, affective, and psychomotor

domains as primary indicators of student success, guiding the development of comprehensive evaluation systems.

The cognitive domain involves intellectual skills such as thinking and knowledge recall (Anderson et al., 2001). Its measurement targets the mastery of knowledge and intellectual skills (Nitko & Brookhart, 2014). Software tools like SPSS facilitate timely, precise analysis, providing objective insights into student achievement (Field, 2013).

The affective domain encompasses attitudes, motivation, and interest (Krathwohl, 2002). Bloom (1956) emphasizes its significance in fostering motivation and character. Digital surveys and questionnaires enable efficient, reliable measurement of this domain (Tuckman, 2012).

The Psychomotor domain relates to students' practical skills, especially relevant in vocational training (Simpson, 1972; Harlen & James, 1997). Objective assessment strategies, supported by tools like SmartPLS, enable detailed modeling of relationships among skills and outcomes (Hanseler et at., 2015; Hair et al., 2017).

The integration of SPSS and SmartPLS enhances analytical rigor, reduces errors, and accelerates decision-making, supporting effective assessment management (McMillan, 2014; Wang et al., 2019). Prior research validates the effectiveness of these tools in educational data analysis, underscoring their role in facilitating evidence-based decision-making.

Assessment management Effectiveness refers to systematic processes that improve learning quality, transparency, and accountability (Harlen, 2007). The use of advanced software has proven to boost efficiency, accuracy, and transparency in data handling (McMillan, 2014; Eang et al., 2019). Prior research indicates that technology-based assessments motivate students and improve learning outcomes through reliable data (Hattie & Timperley, 2007). Additionally, such tools support profesional development among educators (Suharno, 2016; Krauss et al., 2017). The adoption of technology enhances these processes, but challenges such as infrastructure limitations and resistance to change remain (kirkwood & Price, 2014).

Hypotheses

1. The cognitive assessment positively influences assessment management effectiveness.
2. The affective assessment significantly impacts management effectiveness.
3. The psychomotor assessment has a significant positive effect on assessment management.
4. The application of SPSS and SmartPLS enhances analytical accuracy and management efficiency.

Method

This study employs a quantitative survey method, targeting senior high school teachers involved in assessment activities across Jember Regency. A purposive sample of 100 teachers was selected based on their active engagement and familiarity with assessment tools. Data collection used validated questionnaires measuring cognitive, affective, psychomotor assessments, and management effectiveness. Data analysis involved descriptive statistics, validity testing (using AVE and CFA), reliability testing (Cronbach's alpha > 0.995), and structural equation modeling (SEM) with SPSS and SmartPLS. Model fit was evaluated through R^2 (0.999), SRMR (0.008), and other fit indices. Ethical considerations included informed consent and confidentially.

Result and Discussion

Respondent Profile

The descriptive statistics of the 100 respondents reveal that the respondents predominantly held bachelor's degree (50%), with ages mostly between 31-40 years (35%) and 41-50 years (30%). Most had over six years of teaching experience (35%) and actively engaged in assessment practices, with 65% routinely utilizing SPSS and SmartPLS. Training received by 65% of respondents indicates a high level of technological familiarity, although resource constraints remain (Graham & Misanchuk, 2004; Hattie & Timperley, 2007).

Model Validity and Fit

Table 1: R Square

	R Square	R Square Adjusted
Effective of Learning Outcome Assessment Management	0.999	0.999

The R^2 value of 0.999 indicates the model explains almost all variance in assessment management effectiveness, confirming excellent predictive capacity. Reliability indicates (Cronbach's alpha > 0.995; AVE > 0.98) demonstrate high measurement consistency. The residual SRMR value of 0.008 further confirms model fit.

Path Analysis

Table 2: Path Coefficients and Total Effects

	Effective of Learning Outcome Assessment Management
Cognitive	0.003
Affective	0.573
Psychomotor	0.424

The path coefficients reveal that affective (β = 0.573) and psychomotor (β = 0.424) domains significantly influence assessment management effectiveness, both positively. Conversely, cognitive assessment (β = 0.003) shows no significant direct effect, suggesting its influence may be indirect or mediated through other variables. These findings align with educational theories emphasizing motivation and practical skills as critical for effective assessment practices (Krathwohl, 2002; Anderson et al., 2001). The insignificant influence of cognitive assessment suggests it may exert indirect effects mediated by other factors, hypothesis for future exploration.

Table 3. Hypothesis Testing

No	Research Hypothesis	Independent Variable	Dependent Variable	Analysis Result	Conclusion
1	There is a positive and significant of X1 to the Y in Senior High School in Jember Regency	Cognitive Assessment (X1)	Effectiveness of Learning Outcome Assessment Management (Y)	Beta coefficient = 0.003, not significant.	No significant effect, indirect influence
2	There is a positive and significant of X2 to the Y in Senior High School in Jember Regency	Affective Assessment (X2)	Effectiveness of Learning Outcome Assessment Management (Y)	Beta Coefficient = 0.573, significant	There is a positive and significant effect
3	There is a positive and significant of X3 to the Y in Senior High School in Jember Regency	Psychomotor Assessment (X3)	Effectiveness of Learning Outcome Assessment Management (Y)	Beta coefficient = 0.424, significant	There is a positive and significant effect
4	The use of SPSS and SmartPLS software can improve the accuracy and effectiveness of analysis in managing learning outcome assessment at Senior High School in Jember Regency	Use of SPSS & SmartPLS	Effectiveness of Assessment Management	Based on literature (Hair et al., 2019)	The use of these software supports more accurate and effective data analysis and management.

Based on the hypothesis testing results, several key insights can be drawn regarding the factors influencing the effectiveness of learning outcome assessment in senior high schools in Jember Regency.

The first hypothesis formulated that cognitive assessment positively affects assessment management was not not statistically supported. The beta coefficient of 0.003 indicates an insignificant effect, suggesting that cognitive assessment alone may not directly influence the effectiveness of assessment management in this context. This finding aligns with prior research (e.g., Brown & Smith, 2018) indicating that cognitive assessments, which focus on knowledge recall and understanding, might not directly translate into improved assessment management unless integrated with other assessment types or management strategies.

In contrast, both affective and psychomotor assessment demonstrated significant positive effects on assessment management effectiveness. The affective assessment, with a beta coefficient of 0.573, underscores the substantial role of emotional and attitudinal factors such as motivation and attitudes on assessment management, corroborating theories by Krathwohl et al. (1964) that emphasize the importance of effective domains in educational assessment. Similarly, psychomotor assessments, reflected by a beta coefficient of 0.424, highlight the importance of skill-based evaluations, consistent with the work of Harlen (2007), who advocates for practical and skill assessment to enhance overall educational assessment quality.

Furthermore, the use of advanced software tools like SPSS and SmartPLS has been shown to improve the accuracy and effectiveness of data analysis in assessment management. These tools facilitate sophisticated statistical analyses, as supported by literature (Hair et al., 2019), which emphasizes that propoer application of statistical software enhances data validity and decision-making quality.

The findings suggest that while cognitive assessment may not directly influence assessment management effectiveness, affective and psychomotor assessment play significant roles. Additionally, leveraging analytical software is crucial in optimizing assessment processes. This insights are consistent with existing educational assessment literature, emphasizing a comprehensive approach that incorporates diverse assessment types and robust analytical tools to improve learning outcome evaluations.

Conclusion and Recommendations

Conclusion

The research concludes that affective and psychomotor assessments significantly and positively influence the effectiveness of assessment management in senior high schools in Jember Regency. The cognitive domain, however, does not show a direct significant effect within this model. The combined use of SPSS and SmartPLS enhances analytical accuracy, supporting data-driven decision-making.

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