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**Pilot Study and Data Examination for the Teaching Composition of Higher Order Thinking Skills (HOTS) in the Field of Sirah on Islamic Education Teachers**

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## PILOT STUDY AND DATA EXAMINATION FOR THE TEACHING COMPOSITION OF HIGHER ORDER THINKING SKILLS (HOTs) IN THE FIELD OF SIRAH ON ISLAMIC EDUCATION TEACHERS

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### Abstract

A quality study requires a neat and demanding methodology for a pilot study to be conducted first and a regular examination of the data before an actual study. This paper would like to look at the findings from the pilot study and the results of the data examination on the methodology used in quantitative methods. In this study, the researcher conducted two pilot studies on 63 teachers of Islamic Education (GPI) and then analyzed data examination using SPSS 20.0. A pilot study is an essential thing before doing an actual study. However, examining the data in the pilot study analysis is an equally important matter rarely presented in any of the study articles. Therefore, this paper would like to reveal a little about the examination of data after the pilot study was conducted. The results of this study showed that the mean of the questionnaire was at a high and moderate level. While the test against the examination of the data was at a high internal consistency of the construct, typically scattered, the variables were found to be positive. Thus, actual field research can be carried out optimally.

**Keywords:** *Pilot Study; Data Examination; Higher Order Thinking Skills (HOTs).*



## A. Introduction

A quality study requires an organized methodology that demands a pilot study be conducted first and the data examined before an actual study. Pilot studies are a crucial element of a good study design and provide a strong foundation (Micayla Abtahi & Catherine Battell, 2017). A pilot study does not guarantee success in the main study but increases the likelihood (Edwin R. Van Teijlingen & Hundley, 2001). Pilot studies are commonly used within quantitative (Edwin R. Van Teijlingen & Hundley, 2001). These authors argue that the two main types of pilot studies used in social science are, for the most part, (1) more miniature versions of studies, called feasibility studies, and (2) "the pre-testing or 'trying out of a particular research instrument" (concerning Baker, 1994).

The feasibility study is used to assess the main study's practicalities in its implementation and utility. It often includes an assessment of resources, such as time and costs, for the main study (Gudmundsdottir & Brock-Utne, 2010). The purpose of a pilot study is not simply to declare that it has been conducted or to justify the methods deployed without making any explicit details; instead, it is to identify the necessity of modifying questions or other procedures that do not elicit appropriate responses or enable the researchers to obtain rich data (Gudmundsdottir & Brock-Utne, 2010; Kim, 2010; Malmqvist et al., 2019).

The pilot study is essential for the improvement of the quality and efficiency of the main study. In addition, it is conducted in order to assess the safety of treatment or interventions and recruitment potentials, examine the randomization and blinding process, increase the researchers' experience with the study methods or medicine and interventions, and provide estimates for sample size calculation (In J, 2017). A pilot study is the first step of the entire research protocol and is often a smaller-sized study assisting in the planning and modifying of the main study (Arnold et al., 2009; Thabane et al., 2010).

With the guidance of the pilot study, it was found that a well-conducted pilot study, giving a clear list of aims and objectives within a formal framework,



can encourage methodological rigor and ensure the validity of both the study itself and the methodology applied (Nashwa et al., 2018). Despite the benefits and importance of the pilot study, researchers often are not interested (In J, 2017).

This study would like to see the findings from the pilot study and the results of data examination on the methodology used in a quantitative method. After implementing the pilot study, it is necessary to implement some procedures in the methodological method first before going down to carry out the study in the actual field, such as doing the validity and reliability first. Validity includes constructing validity and content validity. Meanwhile, the reliability of the questionnaire relies on the data collection methods. Among all, the crucial part is the data examination process.

According to Tabachnik & Fidel (2013), six steps must be followed in the data examination process: data loss analysis, isolated data test (outlier), multicollinearity and singularity test, data normality test, standard method bias test, and homoskedasticity test. However, before the whole analysis is carried out, data loss analysis needs to be carried out, which involves several procedures and methods. After carrying out the data examination, it will only involve the data analysis procedures, then conduct an actual study to see the implementation of the teaching composition of HOTS in the Islamic Education teachers (GPI). Studies on the teaching component of higher order thinking skills (HOTS) in the field of Sirah on Islamic education teachers are still few (Syaubari, 2018; Muhammad Talhah, 2021). Therefore, the objectives of this study are to obtain quality results and research results and want to reduce errors before conducting the actual study. Thus, before the data examination is carried out, the pilot study should first obtain the data.

## **B. Pilot Test**

Based on previous studies (Sharifah Nor et al., 2012; A. Rahman et al., 2015), the teaching basis of teachers who integrate these HOTS has a relationship with the implementation process of teaching composition in the classroom. It requires detailed and comprehensive knowledge, understanding, and skills from the GPI. However, the GPI teaching process was not implemented as



prescribed based on monitoring and observation from the board of inspectors and quality assurance (2015). These findings indicate the need for an earlier pilot study. This situation is also reinforced by other studies that show weaknesses in the implementation elements of GPI pedagogy to lose students' interest and, in turn, affect understanding of the prescribed Sirah titles (Ahmad Munawar, 2009; Ab Halim & Muhammad Khairul, 2010; Nor 'Aida et al., 2019; Ilmi Zajuli et al., 2019). Therefore, these existing problems require a more thorough and structured process by conducting a pilot study first.

The pilot study aimed at confirming the level of evaluation of the questionnaire implemented so that the findings contain validity and reliability (Marohaini, 2013). Reliability refers to the consistency or stability of data obtained through data collection (Noraini, 2010). In addition, the level of reliability of the study also depends on the construct and content of each item in the questionnaire. Meanwhile, validity refers to the assessment performed on the suitability of each item in measuring the study construct accurately and performed on test scores (Noraini, 2010).

A pilot study in this study was conducted on 31 samples consisting of Islamic Education teachers (GPI) around the district of Kulai, Johor, to answer the research questionnaire that had been set. This fulfills the same characteristics as this study which involves the whole respondent in Malaysia. This number is sufficient for a study in the social sciences (Creswell, 2009). The study involved 63 samples of GPI, with the first stage of 31 participants involved, which aimed to form a questionnaire construct and then continued with 32 participants for the second stage for analysis using the method of 'factor analysis-Explanatory Factor Analysis (EFA)' (Factor Analysis). This ensures that the instrument's validity level is high, with the details shown in table 1.

*Table 1: Validity of the Instrument against the pilot study*

<b>A Pilot Study</b>	<b>Implementation Process</b>
First Stage	Involving 31 GPIs around the Kulai area. This first stage aims to design, structure, and evaluate the instruments used to coincide with the study construct (Period: July 2019 - August 2019).
Second Stage	Involving 32 GPIs around Kulai and Johor Bahru districts.

<b>A Pilot Study</b>	<b>Implementation Process</b>
	Findings for the second stage were analyzed using factor analysis to determine which items have validity and can be continued for the actual field study (Period: August 2019 - September 2019).

Researchers conducting pilot studies for quantitative methods aim to validate the findings from the instruments produced (Creswell, 2009; Hasnida, 2016). The reliability analysis results for the questionnaire instrument were conducted through a pilot study, as shown in table 2.

*Table 2: Value of Cronbach's Alpha Coefficient*

<b>Aspects</b>	<b>Mean GPI Questionnaire</b>
<b>Beginning of Teaching</b>	0.928
a. Lesson Planning	0.840
b. Teaching Objectives	0.855
c. Induction set	0.910
<b>Teaching Development</b>	0.954
d. Delivery of teaching content	0.835
e. Teaching based on questioning	0.883
f. Enrichment-based teaching	0.863
g. Rehabilitation-based teaching	0.878
h. Use of Educational Resources	0.877
<b>Closing Remarks</b>	0.927
i. Objective reflection	0.847
j. Formulate the content of the lesson	0.858
k. Assessing student comprehension	0.860
<b>Overall Value</b>	<b>0.974</b>

The conclusion from the implementation of the determination of validity and reliability tests for this questionnaire is to ensure that the study in the actual field can be conducted to achieve the study's objectives. As for this pilot study, the mean findings were at high and moderate levels, meaning that the questionnaire was good to conduct. Once these findings are received, the data examination is conducted to ensure the credibility of the findings.

### **C. Method**

This pilot study uses a survey method that adopts a questionnaire as the main instrument. According to Pallant (2010), the survey method is suitable for measuring respondents' views on an issue or topic, the achievement



of a program, as well as attitudes and behaviors of respondents. The study sample selection was based on simple random sampling involving Islamic Education (GPI) teachers who teach in secondary schools in the Kulai district. The study sample was selected based on the large quantity of GPI in the district and easily found during the pandemic phase because the researcher is around the location. The study involved 63 GPI samples, with the first stage of 31 participants involved, which aimed to form a questionnaire construct and then continued with 32 participants for the second stage for analysis using the method of 'factor analysis-Explanatory Factor Analysis (EFA)' (Factor Analysis). This is to ensure that the level of validity of the instrument is high. Given the small number, the researchers set out to use the population in this study (Ahmad Ismail *et al.*, 2016).

The analysis to determine the validity and reliability of this questionnaire aims to meet the criteria to be continued in the actual field study. The reliability of this research instrument refers to the internal stability and consistency of the questionnaire (Uma Sekaran, 1992; Creswell, 2009; Pallant, 2010). To measure the internal consistency of a value construct (CA) should be used as a reference (Cronbach, 1946). Therefore, through this pilot study, the data obtained, collected, measured, and structured the level of reliability using Statistical Testing (CA) through Statistical Packages for Social Science (SPSS) version 22.0 on data examination.

## **D. Result and Discussion**

### **1. Result**

Data review is the most crucial method to ensure the credibility of the study findings. According to Mohd Majid Konting (2005), failure to use effective data collection methods can produce inaccurate, vague information and lead to information overload. After collecting the questionnaire, the need for researchers to examine the data to avoid the effects when analyzing such data is inaccurate; there is bias, and it does not fit the research question (Tabachnik & Fidel, 2013).



This section explains the type and procedures to be followed to prepare and examine data before the analysis is carried out. Before the data is analyzed, the need is to meet three objectives, namely, to get a feel (feel for data), a goodness test (goodness), and to test hypotheses (Syaubari, 2018). Thus, according to Tabachnik & Fidel (2013), six steps must be followed in the data examination process. However, this study will focus on the data normality, common method bias, and homoskedasticity tests.

#### **a. Normality Analysis**

One of the requirements for inferential statistics is the assumption that the data collected are typically distributed (J. Toby Mordkoff, 2016). Through this study, the normality test was implemented on the entire construct for the teacher's teaching implementation composition through a distributed questionnaire. Data normality can be identified either statistically or graphically. Through this study, five tests of data normality were statistically proved through skewness & kurtosis and Kolmogorov & Shapiro Walk. At the same time, data normality was graphically proved through histogram, stem and leaf, and standard probability plot (Normal QQ Plot) (Chua, 2011; Andy Field, 2012; Kim HY, 2013).

If the values of Skewness and Kurtosis are between +1.96 to -1.96, then the data are assumed to be in normal conditions. Table 3.0 shows that the skewness and kurtosis values for the variables in this study (implementation of teaching elements and teaching composition of GPI integrating HOTS) are between 0 to 1 and allow the assumption of normally distributed data. Test the normality of the data through skewness and kurtosis statistics, as shown in table 3.

*Table 3: Data normality test Findings for the Questionnaire*

Element	Skewness		Kurtosis	
	Statistics	Std. error	Statistics	Std. error
GPI teaching composition that integrates HOTS	-.007	.121	-.249	.242



Element	Skewness		Kurtosis	
	Statistics	Std. error	Statistics	Std. error
The beginning	.111	.121	-.538	.242
Progress	-.131	.121	-.077	.242
Closing	-.059	.121	.063	.242

**b. Linearity Analysis**

The linearity test through partial regression plots is implemented through simple regression analysis to see the linear relationship between independent and dependent variables (Viv Bewick et al., 2003). A linearity test was performed by analyzing a Normal P-P Plot through Residual Regression Standardizes based on data on a diagonal straight line from bottom left to top right. If we look at figure 1, it is found that most of the data are above the line, with a few that are outside the diagonal straight line but not remotely, which does not affect the overall deviation from normality. Therefore, the data findings at this stage are seen, and the questionnaire that will be conducted later is in good condition. The next step requires a standard method of bias analysis to ensure that the questionnaire to be conducted on the sample population later tends to answer the same possible answer.

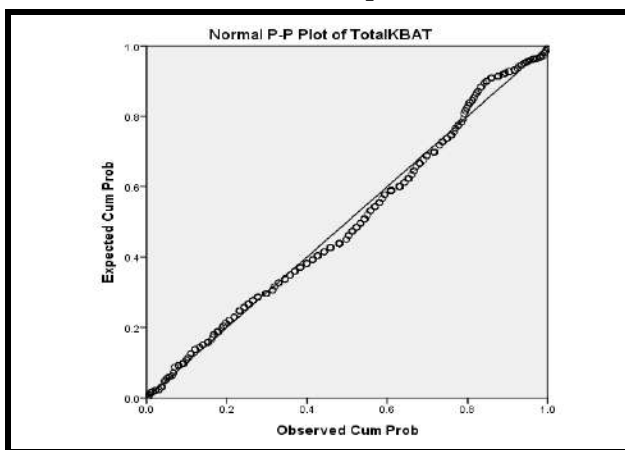


Figure 1: Linearity test.

**c. Common Method Bias Analysis**

Standard method bias analysis (Bagozzi et al., 1991) occurs when it is assumed that the sample answering a question tends to have the same

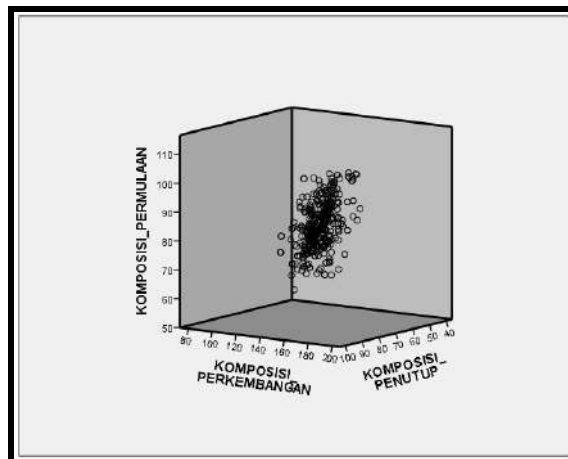


instinct to answer another question for a different scale. This tendency for variance sharing is called standard method variances. According to Bagozzi *et al.* (1991), the method to identify the position of common method bias is implemented through inter-construct correlation; if the correlation between constructs exceeds 0.9, then this common method bias exists.

For this study, this standard method bias test was implemented for the correlation determination test; the study's results found that the whole construct has a correlation between 0.537 to 0.895 and does not exceed 0.9. therefore, this questionnaire is suitable because it does not have a standard bias method. Next, it is necessary to carry out a homoscedasticity test analysis to see if the scatterplots are scattered in clusters or scattered.

#### **d. Homoscedastic Analysis**

The Homoscedasticity test uses the Scatterplot method to determine the value of the assumption of homoscedasticity. Scatterplot analysis determines the visual distribution of the relationship between the variables involved (Moore *et al.*, 2013). Homoscedasticity refers to the assumption that the evidence of a variable has the same level of variance along the distance of the independent variable. If the graph is funnel-shaped, it is proven that heteroskedasticity has a problem (Andy Field, 2012).



*Figure 2: Homoscedasticity test*



Based on Scatterplot, Figure 2.0 shows the relationship between the variables - the variables are found to be positive, and the points are typically and randomly scattered, which satisfies the conditions of homicidal assumptions.

## 2. Discussion

The actual study can be conducted successfully based on the pilot study and data analysis. This is because, in the pilot study stage, the researcher first performed the instrument validation on the pilot study by running it twice. In line with the study conducted by Syaubari & Yusuf (2018), the pilot study conducted twice will make the actual field study more efficient and accurate. The first stage aims to evaluate the instrument to coincide with the study construct. This view aligns with the researcher Rosnia & Mustafa (2021) because the pilot study will build an error-less instrument.

In the second stage, determining the items with high validity and suitability continued for the actual field study. According to the findings from the value of Cronbach's alpha coefficient, a value above 0.70, it is concluded that all questionnaires in this pilot study have high internal consistency of constructs, as suggested by Uma Sekaran (1992); Mohd Majid (2005) and Pallant (2010). Next, proceed with the data examination process. This study focuses on the data normality test, standard method bias test, and homoskedasticity test, all in a reasonable range. In the normality test, the distribution data show typically distributed. The normal distribution makes the actual study possible (Dorothy & Brian, 2018).

Whereas in linearity analysis, most of the data are above the line. This shows that the study results will have a positive effect (Schober *et al.*, 2018). Where as standard method bias analysis found no bias, it is essential for reducing errors in study results (Peter & Ashlea, 2020).

Finally, the homoscedastic analysis showed that the relationship between the variables was positive, and the points were usually scattered. This is supported by the study of Syaubari & Yunus (2018), which showed the findings of the analysis of homocidastysis that are scattered close, and suitable to be carried out in extensive quantity sampling. Ultimately, it shows that this study is suitable to be continued in the actual field of study.

## **E. Conclusion**

A pilot study is essential thing before conducting the actual study. However, examining data against the analysis of pilot studies is also an equally important matter that is rarely presented in any research article. Therefore, this paper would like to reveal a little about the examination of data after the pilot study was conducted. The results of this study showed that the mean of the questionnaire for the pilot study was at a high and moderate level. Meanwhile, the test on the examination of the data was at a high internal consistency of the construct, typically scattered, and the variables were found to be positive. Thus, the actual study can be carried out optimally.

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