IJQK INTERNATIONAL JOURNAL OF AL-QURAN AND KNOWLEDGE

# VALIDITY AND RELIABILITY OF THE HIGHER-ORDER THINKING SKILLS KNOWLEDGE INSTRUMENT FOR *IBADAH* SECTION IN ISLAMIC EDUCATION : EXPLORATORY FACTOR ANALYSIS (EFA)

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*Received: 15th November 2022* *Accepted: 25th December 2022* *Published: 31st December 2022*

***ABSTRACT***

*Higher-order thinking skills (HOTS) is a significant agenda in the Malaysian Education Development Plan (PPPM) 2013-2025. It involved all subjects including Islamic Education (IE) in the Secondary Schools Standard Curriculum (KSSM). However, research related to the construction of HOTS instruments in IE is yet to be implemented. Hence, this study aims to identify the validity and reliability of the instrument to measure the HOTS knowledge among students in the Lower-Level KSSM, particularly in the Ibadah section in IE. This study uses a quantitative analysis method, and the instrument consists of a modified questionnaire. Content validity and face validity tests were conducted using a construct that has been determined and validated by seven experts. Exploratory Factor Analysis (EFA) was conducted through a pilot study involving 110 respondents in Terengganu. The data is analyzed according to EFA with Bartlett's sphericity test, sampling adequacy test by Kaiser-Meyer-Olkin (KMO), and item reliability testing through Cronbach's Alpha value using SPSS version 25. The result produced a three-factor model of students' HOTS knowledge which are in purification, prayer, and fasting. The result shows Bartlet's Test (P < 0.05) and the value for the measurement of sampling adequacy from Kaiser- Meyer-Olkin (KMO) > 0.6. Meanwhile, the measurement of the reliability in Cronbach's Alpha shows a value (> 0.70). This shows a high level of validity and reliability of this instrument which could be continually researched. This study is anticipated to assist students with excellent HOTS comprehension to understand the concept of worship as a reflection of existential knowledge.*

***Keywords:*** *Higher-Order Thinking Skills (HOTS), Islamic Education, Ibadah section, validity and reliability and Exploratory Factor Analysis (EFA)*

## INTRODUCTION

Intellect and thinking are inseparable in human life. The thinking process encourages desire or will and further progressed as a practice. It will then generate a person's behavior or morals. In Islam, al-Quran repeatedly encourages humans to think through the words *tafakkur*, *tadabbur*, *nazar*, and *bassar*. It also commands humans to reason an argument with evidence and *dalil*. In

fact, the content of the al-Quran urges people to learn from any historical events as a lesson. Itis mentioned in al-Quran:

"Indeed, in the creation of the heavens and the earth and the alternation of the day and night there are signs for people of reason. They are those who remember Allah while standing, sitting,and lying on their sides, and reflect on the creation of the heavens and the earth and pray, "Our Lord! You have not created all of this without purpose. Glory be to You! Protect us from the torment of the Fire." (Ali-Imran, 3:190-191).

These elements show that higher-order thinking skills already exist with the Quranic revelation. In fact, the verses of the Quran prove that anyone with hearing, vision and heart capacity is capable order thinking skills.

The thinking process involves mental processes such as reasoning, problem-solving, planning, comparing, contrasting, classifying, etc. The human ability to exercise mental skills constructs various thinking skills including HOTS. Everyone could think optimally regardless of age. Therefore, it is considered insufficient for students to be content with a minimal level of thinking when they are capable of optimal thinking. In fact, thinking is the most crucial element for an orderly, systematic education foundation that is impactful for humans (Hamka, 2017; Ibn Khathir, 1986; Wahbah Zuhaily, 2009).

According to Brookhart (2010), HOTS is the ability to comprehend and analyze something to understand one's thoughts and that of others. HOTS is also defined as a mental exercise to interpret, study, or manipulate information to solve problems that cannot be solved through the routine application of existing knowledge (Ministry of Education Malaysia, 2014; Newmann, 1992; Rajendran, 2008). Rosnani (2012) states that HOTS is the students' thinking ability to interpret thoughts from the teaching-learning process to solve problems, make decisions, reasoning ability, and critically grounded it to the current setting.

In the context of Islamic Education, the mastery of higher-order thinking skills allows students to translate Islamic principles and teachings into the real-life context and strengthen their beliefs as Muslims (Rosnani, Suhailah, & Juhasni Adila, 2014; Sidek Baba, 2009; Suhailah, 2009; Zakir, 1989). Therefore, the practice of basing rational actions on Islamic knowledge and values will form commendable morals among Muslims (Mohd Zaidi, 2013). On the other hand, a weak implementation of this approach will only cause the teachings of Islam to remain as daily rituals with less impact (Wan Mohd Zahid, 1993). Accordingly, an instrument to measure students' knowledge of HOTS is crucial to be constructed and applied in Islamic Education specially for *ibadah* section. Hence, this study are specifically to construct and measure the validity and reliability of the questionnaire instrument of HOTS knowledge among students in the *Ibadah* section of Islamic Education KSSM.

## RESEARCH OBJECTIVE

The objective of this study is specifically to determine the validity and reliability of the student's HOTS knowledge instrument in the Lower-Level KSSM in the Ibadah section of Islamic Education.

## LITERATURE RESEARCH

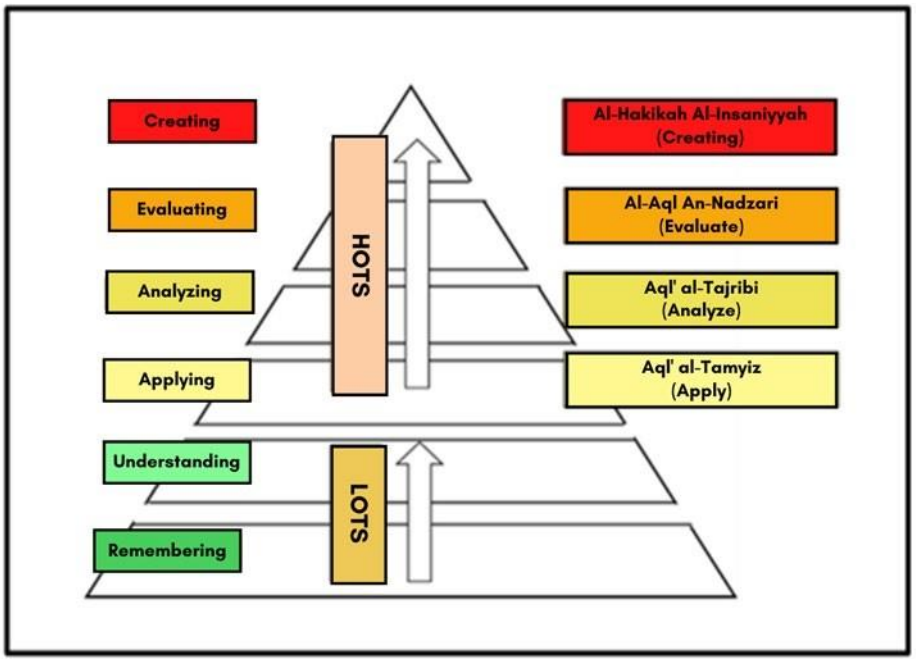
In the era of globalization, the main agenda of world education is to produce a critical-minded student. In the context of education in Malaysia, KB started in the early 1990s. Creative and critical thinking skills (KBKK) are applied in the Integrated Primary School Curriculum (KBSR) and Integrated Secondary School Curriculum (KBSM) systems. The HOTS approachis the main agenda in the Malaysian Education Development Plan (PPPM) 2013-2025 throughthe Primary School Standard Curriculum (KSSR) and the Secondary School Standard Curriculum (KSSM) (Ministry of Education Malaysia, 2013). HOTS policy changes and emphasis are implemented in all subjects including Islamic Education (IE) of KSSM. The implementation of the HOTS policy in PPPM (2013-2025) through KSSR and KSSM in IE, especially in the Ibadah section, aims to produce students who adopt the Islamic way of life through religious reflection (Wan Ahmad, Maimun Aqasha, & Md.Isa, 2016). To realize this goal, the HOTS element in the learning and teaching process of Islamic Education at school needs to be optimized according to the student's actual capacity.

HOTS focused on the highest level in Bloom's Taxonomy revised by Anderson and Krathwohl (2001) which is applying, analyzing, evaluating, and creating. This theory underlies this study as the basis for the application of HOTS in the national education system. This paper also combines the HOTS in the theory of Bloom's Taxonomy revised by Anderson (2001) with the high-level thinking model of Ibnu Khaldun (1993). It can be emphasized that every element of thinking that uses reason needs to rely on the Oneness of God, the reflection of lives, and the ability to comprehend every event. According to Anderson et al. (2001), applying means the ability of a person to do or carry out a certain procedure in each situation. For example, students can transfer and adapt the knowledge learned in KSSM in the Ibadah section to different situations based on conceptual similarities.

Whereas, breaking down the available information into smaller structures and identifying how these smaller structures are interrelated with each other refers to the level of analysis. For example, students can separate information or knowledge from the Lower-Level KSSM in Ibadah section into smaller parts to better understand and relate that information based on the results obtained. Assessment level is the process of using existing knowledge, skills, and values to formulate decisions and be able to impart clear evidence. In the context of the study, evaluating means that students can state the justification for each statement in the Lower-Level KSSM in the Ibadah section. Finally, the process of generating new ideas and inventions based on knowledge, skills, and values based on the teacher's guidance is the level of evaluation to ensure that students can generate new ideas with a comprehensive understanding of Lower-Level KSSM in the Ibadah section.

Meanwhile, according to Ibn Khaldun in the book al-Muqaddimah, human thinking has four levels, namely applying *(‘Aql Tamyiz*), analyzing *(‘Aql al-Tajribi*), evaluating (‘*Aql an-Nazari*) and creating (*al-Hakikah Insaniyah*) (Ibrahim, 2015; Mohd Syaubari & Ahmad Yunus, 2017; Mohd Yusof, 2012). The first stage is the human intellect in understanding something beyond the universe. In this stage, individuals can use the available knowledge intellectually and rationally to take the right action. If linked to the concept of HOTS, it has a connection with the level of applying thought (Muhammad Talhah & Ahmad Marzuki, 2020). For the second level, the ability to think can provide humans with all the ideas and behaviors needed between humans and their environment. It requires many actions and practices to gain a variety of experiences to take wisdom and goodness from every incident. This is related to the analysis level in the HOTS hierarchy.

Next, the third level is the ability to think by using knowledge and being able to make comparisons and combinations between some knowledge to produce new knowledge. This level is equal to the assessing level in the HOTS hierarchy. Finally, the fourth stage is to give an impression of something that exists according to various bits of intelligence, differences, and causes. With the ability to think at this level, humans can achieve perfection in their truth and become intellectual people with a pure soul or (*al-hakikah al-insaniyyah*) as the creative level in the HOTS hierarchy levels. Based on Ibn Khaldun's theory of thinking skills, he emphasized that every function of the mind needs to be associated with divine elements and wisdom. This is to determine that every human action that emanates from thoughts is in line with actions that are sanctioned by Allah SWT. If observed, these four levels are on higher-order thinking skills (HOTS) sourced from Bloom's taxonomy (1956) modified by Anderson, Lorin., Krathwohl, & Airasian (2001). Figure 1 shows the difference in the level of thinking skills between Ibn Khaldun and Lorin Anderson'srevision of Bloom's Taxonomy:




Figures 1: The correlation in the level of thinking skills between Ibn Khaldun and Lorin Anderson's revision of Bloom's Taxonomy.

Through figure 1, the four levels of high-level thinking according to Ibn Khaldun are in the higher-order thinking skills (HOTS) proposed by Bloom (1956) and modified by Anderson et al. (2001).

Next, Islamic Education sets the foundation of *Ibadah* as the main mission of human creation. This includes the relationship between man and God (*hablul min Allah*) and the relationship between man and man (*hablul minnas*). The mission of human creation is clearly stated through the words of Allah SWT which means:

"*I did not create jinn and humans except to worship Me.*" (Surah al-Dhariyat 27: 56).

If religious knowledge teaches people to know Allah SWT, knowledge of *Ibadah* educates people on how to worship, obey and connect with Allah. Hence, Islamic Education in KSSM is

made a core subject with the most hours allocated to the Teaching and Learning (PdP) process which is a minimum of 128 hours per year (Malaysian Education Ministry, 2016). This allocation is sufficient for students to acquire the concept of Ibadah in Islam as well as practice it.

For the *Ibadah* section in Lower-Level KSSM (Form 1 – 3), the discussion covers the basics of Ibadah in Islam for students' orientation. Table 1 shows the module of the *Ibadah* chapter for Lower-Level Secondary Schools based on Islamic Education in Standard Document for Curriculum and Assessment (DSKP):

Table 1: Module of the Ibadah chapter for Lower-Level KSSM

| Form | Title |
|---|---|
| **Form 1** | • Concept of Ibadah and types of Islamic laws<br>• Concept of Taharah (Najis, Istinjak, Wuduk and Mandatory Bath)<br>• Prayer |
| **Form 2** | • Congregational prayer<br>• Friday prayer<br>• Tayammun<br>• Rukhsah in prayer<br>• Fasting<br>• Sunnah prayer |
| **Form 3** | • The concept of fardu ain and fardu kifayah<br>• Funeral management<br>• Zakat<br>• Sunnah prayers |

However, this study focuses on the basic worship of purification, prayer, and fasting since it needs to be mastered, practiced, and understood by students before other aspects of worship since purification worship is a prerequisite for an *Ibadah* in Islam. Through any form of prayer, one can protect a person from reprehensible traits if executed with the appropriate concept (al-Quran 29:45). Next, fasting can subjugate bad traits and habits to good morals as well as train patience and withstanding hardships. Meanwhile, zakat is not focused on this study because it is not yet able to be performed by a student.

Next, the HOTS element is clearly stated in the DSKP, IE section of *Ibadah* where students need to "*be able to evaluate an idea logically and rationally to make appropriate judgments using reasonable reasons and evidence*". At the end of the lesson, it is contained in the KSSM Ibadah Education DSKP to ensure that "*students can explain differences, explain wisdom and correlate it to life*". Through DSKP, students not only know and understand the facts in the Islamic education curriculum but also analyze, evaluate critically, comment and draw conclusions. If this process takes place continuously, *Ibadah* education not only provides an understanding of jurisprudence but also encourages students to practice and reflect on their lives (Kementerian Pendidikan Malaysia, 2015). Finally, this could also produce students who are not only knowledgeable and skilled but also Muslims with esteemed faith and noble morals (Muhammad Talhah & Siti Nur Hadis, 2020).

For example, higher-order thinking is needed to understand the wisdom behind every practice and act of worship that is obligatory in Islam, such as the demands of *istinsyaq* and *istinsyar* in ablution. The practice of *istinsyaq* and *istinsyar* in ablution is to ensure that Muslims are always clean and free from viruses and germs found in the nose and respiratory tract. Ultimately, students could relate this concept to the current issue of *Coronavirus*@Covid-19 or influenza.

This epidemic is contagious and spreads through fluids from the mouth or nose. Therefore, *istinsyaq* and *istinsyar* are one of the most effective ways to avoid viral infection through inserting water into the nose which is practiced in ablution. It can be observed that the knowledge of HOTS among students is very important to ensure that they understand the relationship and correlation with learning. In the context of worship, this knowledge of HOTS could ensure that students not only understand the concept of worship but also apply the concept in their daily lives. Accordingly, an instrument to measure students' knowledge of HOTS is crucial to be constructed and applied in Islamic Education.

Previous studies have shown that there are several instruments related to students' higher-order thinking skills in Islamic Education that were constructed by previous researchers. A study by Tuan Rahayu, Mohd Aderi, & Mohd Isa (2017) has developed an instrument to measure the level of students' HOTS knowledge in the subject of Tasawwur Islam. Next, the study of Siti Fatimah, Nurul Ilyana, & Siti Nur Hidayah (2018) developed an instrument to measure the knowledge of HOTS among students of religious schools on Fiqh-related terms and Fiqh propositions. The study by Mohamad Maliki, Maimun Aqsha, & Mohd Aderi (2018) measured the level of analytical thinking skills of students in Islamic Education, particularly in the Aqidah section at National Secondary Schools. While Norhaslina & Adibah (2018) have measured students' abilities in answering HOTS questions in Islamic Education. However, those studies do not state in detail the source of the instrument and the content validity and reliability of the instrument. Accordingly, this study has developed and modified an existing instrument to measure the students' knowledge of HOTS in the Ibadah section of Islamic Education, focusing on purifying worship, prayer, and fasting to be applied in this study. This instrument was constructed through a literature review as well as adapting the theory and model of HOTS. The HOTS theory brought by Bloom modified by Lorin Anderson (1900) and Ibn Khaldun's high-level thinking model as well as the HOTS model of the Curriculum Development Division, MOE (2014) has been used in this study according to the objectives that have been set. The knowledge instrument of HOTS among students in Islamic Education allows students to evaluate and further recognize their high-level thinking ability. Therefore, this study is necessary as an effort to build an instrument that provides students and teachers the opportunity to evaluate HOTS in Islamic Education.

## METHODOLOGY

The research methodology in this paper is divided into four aspects, namely (i) research design, (ii) research instruments, (iii) content validity, and (iv) population and sample.

## RESEARCH DESIGN

This study was carried out using a quantitative approach through a descriptive survey that only involved aspects of the validity and reliability of the instrument of HOTS knowledge among students in Islamic Education, particularly the *Ibadah* section, KSSM. Survey research is used to measure items, validity, and reliability of research instruments through data analysis obtained (Mohd Faizal Nizam Lee & Wei, 2017).

## RESEARCH INSTRUMENTS

A literature review related to HOTS in Lower-Level KSSM, *Ibadah* section of Islamic Education was conducted to determine concepts, constructs, and items that are the important elements in the instrument construct of students' HOTS knowledge among students in Lower-Level KSSM, particularly *Ibadah* section of Islamic Education. Next, each concept and construct identified is researched based on several theories, models, and research frameworks as well as MoE policies. Among them i) the HOTS theory brought by Bloom modified by Lorin Anderson (1900) and Ibn Khaldun's high-level thinking model (1993), ii) students' HOTS knowledge instruments in Islamic Tasawwur (Tuan Rahayu et al., 2017) and Fiqh and Usul Fiqh (Siti Fatimah et al., 2018).

As a result of in-depth research, three main components of the students' HOTS knowledge were formed in the Lower-Level KSSM in the *Ibadah* section of Islamic Education, which are HOTS knowledge in purification, prayer, and fasting. This study focuses on these acts of worship since they need to be mastered, practiced, and comprehended by students before other aspects of worship. In the beginning, a total of 30 items were constructed in the HOTS knowledge construct with a breakdown into 3 dimensions along with a specific number of items, namely purification worship (10 items), prayer worship (11 items), and fasting worship (9 items). A interval scale of 1 to 10 is used based on the level of agreement (1 = Strongly Disagree and 10 = Strongly Agree) as a measure of evaluation by respondents.

### Content Validity

Validity is one of the important elements of an instrument. Validity means the ability to measure what is supposed to be measured (Field, 2018) and a precise validation process will guarantee instruments that are defensible, accurate, appropriate, and meaningful (Furr, 2014; Ghazali, Darussalam & Sufean, 2016) In fact, without good validity, the psychometric characteristics of an instrumentwill be of poor quality even though the instrument has high reliability (DeVellis, 2017; Furr, 2014).

### Field Experts Assessment

The instrument constructed in this study was tested for face validity and content validity. This study has also referred to two experts in the field of Islamic Education, two experts in the field of Islamic Education HOTS, one expert in the field of language, and one expert in the field of measurement methodology. The experts are among the academics from local higher education institutes and the National HOTS Outstanding Teacher in Islamic Education HOTS. This paper has set aside inappropriate items according to the expert's opinion and made improvements to items that need to be amended. Table 2 shows the distribution of students' HOTS knowledge construct items in the Islamic Education KSSM, particularly the Ibadah section after experts' evaluation and confirmation.

Table 2: Item Distribution After Experts' Validation

| Dimention | Item's Number/Original | Item's Number Improved/Modified | No.Item Removed |
|---|---|---|---|
| Ibadat bersuci | 1,2,3,4,5,6,7,8,9,10 | 3 | 1 |
| Ibadat solat | 11,12,13,14,15,16,17,181 9,20,21 | 12,17,18 | 11,21 |

| | | | |
|---|---|---|---|
| Ibadat puasa | 22,23,24,25,26,27,28,293 0 | 24,27,29,30 | 22,23 |
| Jumlah Item | 30 | | 5 |

Through table 2, the overall distribution of the students' HOTS knowledge construct items in the Islamic Education KSSM, particularly the Ibadah section that were successfully maintained is 25 items that include purification worship (9 items), prayer worship (9 items) and fasting worship (7 items).

**Pre-Test**

After going through the validation process of the evaluator, a pre-test was conducted. A pre-test is a test conducted on certain respondents to detect unclear items or the respondent's misunderstanding of the questionnaire items. This test is important to identify the instructions and questionnaire items that are understandable and comprehendible with easy use of language for the sample to understand before the pilot study is conducted. This study used the face-to-face method with the respondents to examine the problems that arose clearly. A total of 30 students are involved in this pre-test which is sufficient for the research (Perneger,T.V, Courvoisier, & Hudelson, 2015).

The comments and suggestions provided by the respondents in this study are used as a guide to improve items that are vague or difficult for students to understand. The level of readability and understanding of the questionnaire items is shown in table 3.

Table 3: Modify Questionnaire Items Based on Pretest

| No. Item | Original Item | Modified Item |
|---|---|---|
| B07 | I can summarize the advantages of ablution from ahealth point of view. | I can retell the benefits of ablution for health. |
| B12 | I can show how to do all aspects of prayer correctly | I can show how to do all the pillars of prayer correctly |

## POPULATION AND SAMPLING

The study population consisted of Form 3 students in a National Secondary School (SMK), Terengganu that followed the KSSM curriculum. The main purpose of selecting Form 3 students in this study is because they are identified as having followed the learning process in Islamic Education of KSSR and KSSM for nine years. In addition to that, the selection of respondents is also because they have reached the age of puberty or mukallaf and are accountable for religious responsibilities. This motivation is important and relevant to the objectives of the study. A pilot study was conducted involving a sample size of 110 SMK students in the Besut district since they met the population criteria selected in this study. According to Hair, J. F., Black, W. C., Babin, B. J., & Anderson (2013), pilot testing procedures can improve the validity and quality of research instruments. The researcher used Exploratory Factor Analysis (EFA) to explore and evaluate the items in measuring the construct.

## RESEARCH FINDINGS

A pilot study was conducted involving a sample size of 110 SMK students in the Besut district because they met the population criteria selected in this study. According to Hair, J. F., Black, W. C., Babin, B. J., & Anderson (2013), pilot test procedures can improve the validity and

quality of research instruments. The researcher used Exploratory Factor Analysis (EFA) to explore and evaluate items in measuring constructs and Cronbach Alpha coefficient values to determine the level of instrument reliability.

## EXPLORATORY FACTOR ANALYSIS(EFA) OF HOTS KNOWLEDGE CONSTRUCTS

According to Hoque & Awang (2016), it is necessary for a researcher that adapts an instrument that has been constructed by previous researchers and modifies the argument to fit the current study to re-run the EFA procedure. Thus, this study has conducted EFA on the items to measure the construct considering the recommendations by Hoque et al. (2016). The EFA results are explained based on the mean value for each construct item, Kaiser Meyer-Okin (KMO) and Bartlett's Test results, Component, and Total Variance Explained (TVE) results, and the reliability of the instruments used. The knowledge construct of HOTS students in the Islamic Education, KSSM, particularly the Ibadah section uses 25 items and is labeled IC1 to IC9, IS1 to IS9, and IP1 to IP7. Next, the use of an interval scale for measuring the items is between 1 to 10.

a) Mean Value for Each Item

Table 4 below shows the values for the mean score and standard deviation obtained from the items found in the HOTS knowledge construct.

Table 4: Descriptive Analysis of Each Item for HOTS Knowledge Construct

| Item | Mean | Standard Deviation | Number of Items (N) |
|---|---|---|---|
| IC1 | 6.01 | 1.694 | 110 |
| IC2 | 6.40 | 1.542 | 110 |
| IC3 | 6.14 | 1.646 | 110 |
| IC4 | 6.97 | 1.680 | 110 |
| IC5 | 6.58 | 1.737 | 110 |
| IC6 | 7.49 | 1.647 | 110 |
| IC7 | 6.53 | 1.583 | 110 |
| IC8 | 7.92 | 1.476 | 110 |
| IC9 | 6.69 | 1.715 | 110 |
| IS1 | 6.74 | 1.448 | 110 |
| IS2 | 6.87 | 1.567 | 110 |
| IS3 | 6.88 | 1.482 | 110 |
| IS4 | 6.53 | 1.569 | 110 |
| IS5 | 6.63 | 1.577 | 110 |
| IS6 | 7.10 | 1.412 | 110 |
| IS7 | 6.25 | 1.518 | 110 |
| IS8 | 6.38 | 1.719 | 110 |
| IS9 | 7.30 | 1.463 | 110 |

| | | | |
|---|---|---|---|
| IP1 | 7.24 | 1.501 | 110 |
| IP2 | 7.61 | 1.545 | 110 |
| IP3 | 7.00 | 1.509 | 110 |
| IP4 | 6.78 | 1.645 | 110 |
| IP5 | 6.93 | 1.511 | 110 |
| IP6 | 7.75 | 1.632 | 110 |
| IP7 | 7.07 | 1.548 | 110 |

b) Kaiser-Meyer-Okin (KMO) results and Bartlett's Test

Table 5 below shows Bartlett's Test results that are significant for P values less than 0.05 (P < 0.05). Next, the value for measuring sampling adequacy from Kaiser-Meyer-Olkin (KMO) is 0.945. The value obtained has exceeded the minimum limit value of 0.6 and the achievement of both of these tests (Bartlet's test is equally significant and KMO value > 0.6), indicating thatthe data used in this study is appropriate according to the EFA procedure (Hoque et al., 2016).

Table 5: Analysis of Bartlet's and KMO Tests for HOTS Knowledge Construct

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | 0.945 |
| Approx. Chi-Square | | 3735.654 |
| Bartlett’s Test of Sphericity | df | 300 |
| | Sig. | 0.000 |

c) Results of Total Variance Explained and Components

The percentage value for the measurement of a construct for all the items used is based on the total explained variance (TVE). Table 6 below explains the TVE in detail based on the HOTS knowledge construct. The value of the total explained variance of the HOTS knowledge construct is 80.626 percent, and this value exceeds the minimum value set at 60% (Hoque et al., 2016).

Table 6: Total Variance Explained for HOTS Knowledge Construct

| Component | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|
| | Total | % Of Variance | Cumulative % | Total | % Of Variance | Cumulative % |
| 1 | 17.879 | 71.518 | 71.518 | 8.116 | 32.466 | 32.466 |
| 2 | 1.448 | 5.792 | 77.310 | 6.587 | 26.348 | 58.813 |
| 3 | 0.829 | 3.316 | 80.626 | 5.453 | 21.813 | 80.626 |

Extraction Method: Principal Component Analysis.

Based on Table 6 above, the results of the study show that there are three (3) components for the HOTS knowledge construct. The factor loading value must exceed the minimum value limit (0.6) to identify the items that are selected to use for the three components. If the factor loading value is less than 0.6, then the item needs to be removed from the study. This is because the items no longer contribute to the measurement of the construct (Hoque et al., 2016).

Table 7 below shows the overall factor loading values for the three (3) components in the HOTS knowledge construct.

Table 7: Factor Loading Values for the Three Components of HOTS Knowledge Construct

| Component | | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| IC1 | | | 0.861 |
| IC2 | | | 0.858 |
| IC3 | | | 0.811 |
| IC4 | | | 0.797 |
| IC5 | | | 0.707 |
| IC6 | | | 0.792 |
| IC7 | | This item is removed | |
| IC8 | | | 0.839 |
| IC9 | | | 0.839 |
| IS1 | 0.734 | | |
| IS2 | | This item is removed | |
| IS3 | 0.756 | | |
| IS4 | 0.755 | | |
| IS5 | 0.747 | | |
| IS6 | | This item is removed | |
| IS7 | 0.771 | | |
| IS8 | 0.788 | | |
| IS9 | 0.753 | | |
| IP1 | | 0.725 | |
| IP2 | | 0.821 | |
| IP3 | | 0.750 | |
| IP4 | | 0.721 | |
| IP5 | | 0.711 | |
| IP6 | | 0.749 | |
| IP7 | | 0.719 | |

## Results Of Reliability

After the validity measurement is completed, the measurement of the reliability value needs to be executed on the items used in the study. The reliability of an item is crucial to ensure the consistency of the instrument used and produce accurate as well as consistent findings. The determination of reliability of all these items was measured through Cronbach's Alpha internal consistency method. According to (Hopkins, 1998) a minimum value of 0.90 is a score for items that have good reliability. While according to Hoque et al. (2016), Cronbach's Alpha value that can be adopted in the study must exceed the minimum value limit of 0.7. Table 8 below explains the actual value of Cronbach's Alpha for the HOTS construct based on HOTS knowledge for the three (3) components that have been produced.

Table 8: Cronbach's Alpha for Student HOTS Knowledge Construct

| Components | Number ofItems | *Cronbach'sAlpha* |
|---|---|---|
| Purification Worship | 8 | 0.946 |
| Prayer Worship | 7 | 0.950 |
| Fasting Worship | 7 | 0.958 |
| **The overall Cronbach's Alpha value for the knowledge instrument** | **22** | **0.971** |

The overall Cronbach's Alpha for the knowledge instrument of HOTS among students in the Lower-Level KSSM in Islamic Education, particularly the Ibadah section is 0.971. This shows that this assessment instrument has a high-reliability value.

## Summary Of EFA Findings

Based on the EFA analysis achieved, it was found that 3 items were set aside in the knowledge variable of students' HOTS in Lower-Level KSSM in Islamic Education, particularly the Ibadah section. The overall summary of EFA findings and Cronbach's Alpha coefficient values are shown in table 9.

Table 9: Summary of EFA Findings

| Construct/ Dimension | Findings | Item | RemovedItem | Cronbach's Alpha Value |
|---|---|---|---|---|
| | BeforeEFA | AfterEFA | | |
| HOTS Knowledge Construct | KMO = 0.945<br>Bartlet's Test = significant <0.05<br>*Total variance explained Value*= 80.626<br>*Factor loading* value for all items = > 0.6 | | | |
| Purification | 9 | 8 | 1 | 0.946 |

| | | | | |
|---|---|---|---|---|
| Worship Dimension | | | | |
| Prayer Worship Dimension | 9 | 7 | 2 | 0.950 |
| Fasting Worship Dimension | 7 | 7 | - | 0.958 |
| Total | 25 | 22 | 3 | |

Overall, the total number of items for the students' HOTS knowledge construct in Lower-Level KSSM in the Ibadah section of Islamic Education before EFA was 25 items, while the total number of items after EFA was 22 items. Three items were excluded during the EFA analysis.

## CONCLUSION AND RECOMMENDATIONS

The primary purpose of this study is to measure the validity and reliability of the items in the HOTS knowledge questionnaire instrument of students in the Lower-Level KSSM, Ibadah section of Islamic Education. The construction of this instrument aims to identify students' HOTS mastery in Ibadah learning. Instrument validity is important for researchers to ensure that a questionnaire is suitable as a measuring tool for the population. Meanwhile, Cronbach's Alpha tests the consistency of an instrument. This instrument is built and adapted from several theories, models, and research frameworks as well as KPM policies. This study is a pilot study involving 110 samples consisting of secondary school students in the Besut district. Based on the results obtained from various psychometric tests, expert evaluation, content validity, and Cronbach's Alpha reliability value, a total of 8 question items were removed. While the remaining 22 items of the question can be used as an instrument to measure the students' HOTS knowledge in the Lower-Level KSSM, Ibadah section of Islamic Education. This study has proven that this instrument has high validity and reliability. It is also suitable for use on a sample of secondary school students in Malaysia in the future.

Next, this study has several study limitations. First, it only involves high school students in the Besut district with a small amount of data since it is a pilot study. Accordingly, this study should be continued to a larger population with a more optimal amount of data to ensure that overviews can extracted from the findings. Secondly, this study only involves one research methodology, which is quantitative research. Therefore, it is suggested that mixed-method research can be continued to ensure that the research findings are increased in value. In any case, students' HOTS knowledge instruments in Islamic Education, especially the Ibadah section should be developed since students and teachers can assess students' HOTS knowledge. Finally, it is withutmost hope that this instrument can benefit students and teachers to evaluate and further understand HOTS in Islamic Education.

## REFERENCES


Abdul Malik Karim Amrullah (Hamka). (2017). *Tafsir Al-Azhar*. Kuala Lumpur : PTS Publishing House.

Anderson, Lorin., Krathwohl, & Airasian, D. &. (2001). *A Taxonomy For Learning, Teaching, And Assessing: A Revision Of Bloom's Taxonomy Of Educational Objectives.* New York: Pearson, Allyn & Bacon.

Brookhart, S. (2010). *How To Assess Higher-Order thinking Skills in Your Classroom*. ASCD Alexandria Virginia USA.

DeVellis, R. F. (2017). *Scale Development Theory and Applications. 4th Ed.* London: SAGE Publication Inc.

Field, A. (2018). Discovering Statistics Using IBM SPSS Statistics. 5th Ed. In *Meaningful Student Involvement: Guide to Students as Partners in School Change. Olympia, WA: Common Action.* London: Sage Publications Ltd.

Furr, R. . (2014). *Scale Construction and Psychometrics for Social and Personality Psychology*. London: SAGE Publications Inc.

Ghazali, Darussalam & Sufean, H. (2016). *Metodologi Penyelidikan Dalam Pendidikan: Amalan Dan Analisis Kajian.* Kuala Lumpur: Penerbit Universiti Malaya.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2013). *Multivariate Data Analysis: Pearson New International Edition*. Pearson Higher Ed.

Hopkins, K. (1998). *Educational and Psychological Measurement & Evaluation. Ed Ke-2. n*. Boston: Allyn & Bacon.

Hoque, A. S. M. &, & Awang, Z. (2016). *The Exploratory Factor Analysis (EFA) of Entrepreneurial MarketingSscale - Development and Validation*. In Tourism Conference, 22 No Title.

Ibnu Khaldun. (1993). *Mukadimah Ibn Khaldun. Terj.Dewan Bahasa dan Pustaka* . Selangor: Dewan Bahasa dan Pustaka.

Ibn Khathir. (1986). *Tafsir al Quran al Azhim*. Dar al Makrifa Beirut.

Ibrahim, A. B. (2015). *Falsafah Ibnu Khaldun: Falsafah dan Klasifikasi Ilmu.* Kuala Lumpur: Institut Terjemahan dan Buku Negara.

Kementerian Pendidikan Malaysia. (2015). *KSSM Pendidikan Islam Dokumen Standard Kurikulum Dan Pentaksiran Tingkatan 1*. Kementerian Pendidikan Malaysia.

Kementerian Pendidikan Malaysia. (2013). *Pelan Pembangunan Pendidikan Malaysia 2013-2025* (Vol. 27).

Kementerian Pendidikan Malaysia. (2014). *Konsep Kemahiran Berfiir Aras Tinggi (KBAT)*.

Kementerian Pendidikan Malaysia. (2016). *Buku penerangan Kurikulum Standard Sekolah Menengah (KSSM)*.

Mohd Faizal Nizam Lee, A. &, & Wei, L. T. (2017). *Kesahan Dan Kebolehpercayaan Instrumen Penilaian Kendiri Pembelajaran Geometri Tingkatan Satu.* Malaysian Journal of Learning and Instruction, 14(1), 211–2655

Mohamad Maliki, A., Maimun Aqsha, L., & Mohd Aderi, C. N. (2018). *Keberkesanan Pengajaran Kurikulum Akidah Dalam Pendidikan Islam Berasaskan Kemahiran Berfikir Analitikal di Sekolah Menengah*. ASEAN Comparative Education Research Journal on Islam and Civilization (ACER-J), *2*(1), 15–34.

Mohd Syaubari, O., & Ahmad Yunus, K. (2017). *Isu dan Permasalahan (PDP) Pelaksanaan Kemahiran Berfikir Aras Tinggi (KBAT) Dalam Amalan Pengajaran Guru Menurut Pandangan Ibn Kh aldun*. Journal of Human Capital Develpoment, *10*(1), 1–18.

Mohd Yusof, O. (2012). *Isu-Isu Dalam Ilmu dan Pemikiran.* Kajang: Aras Mega (M) Sdn. Bhd.

Mohd Zaidi, I. (2013). *Kerangka Aqal-Naqal dan Pelan Pembangunan Pendidikan Malaysia 2013-2025: Beberapa Catatan Pemerhatian Awal.* Seminar Pemerkasaan Pengajaran Agama Islam Di Malaysia: Menilai Cabaran Semasa Guru Pendidikan Islam. Anjuran

*IKIM Dan KPM, 24-25 Sept.*
Muhammad Talhah, A., & Ahmad Marzuki, M. (2020). *Konsep Kemahiran Berfikir Aras Tinggi (KBAT) Menurut Ibnu Khaldun dalam Konteks Pengajaran Dan Pemudahcaraan( PdPc )*.Jurnal Dunia Pendidikan,*2*(2), 146–157.
Muhammad Talhah, A., & Siti Nur Hadis, A. R. (2020). *Innovation in Teaching and Facilitation:Challenges of Islamic education teachers*. Test Engineering and Management, *83*(May), 3913–3918.
Newmann, F. . (1992). *Student Engagement and Achievement in American Secondary Schools*. Teachers College Press, Amsterdam.
Norhaslina, A., & Adibah, A. L. (2018). *Students' Ability in Answering Higher Order Thinking Skills (HOTS) Questions in Islamic Education Subject*. Advanced Science, *24*(1), 479–481.
Perneger,T.V, Courvoisier, D., & Hudelson, P. M. & A. A. . (2015). *Sample Size for Pre-Tests of Questionnaires*. No Title, Qual Life.
Rajendran, N. S. (2008). *Teaching & Acquiring Higher-Order Thinking Skills; Theory & Practice.* Universiti Pendidikan Sultan Idris: Perak.
Rosnani, H. (2012). *Memenuhi Aspirasi Kemahiran Berfikir dalam Pelan Pembangunan Pendidikan Malaysia 2013-2025 Menerusi Inkuiri dan Pedagogi Filosofiyyah Dalam Kalangan Guru*. KK Seminar MEDC Institusi UIA.
Rosnani, H., Suhailah, H., & Juhasni Adila, J. (2014). *The Hikmah (Wisdom) Program: A Philosophical inquiry for the teaching of Islamic education in Malaysia*. Muslim Education in the 21st Century. New York: Routledge, 125–141.
Sidek Baba. (2009). *Fikir Dan Zikir*. Dewan Bahasa Dan Pustaka Kuala Lumpur.
Siti Fatimah, K., Nurul Ilyana, M. A., & Siti Nur Hidayah, A. (2018). *Pengetahuan Pelajar Aliran Agama Dalam Menerapkan Kemahiran Berfikir Aras Tinggi (KBAT) Terhadap Istilah Berkaitan Fiqh dan Usul Fiqh: Satu Kajian Awal*. Journal of Advanced Researchin Social and Behavioural Sciences, *10*(1), 50–65.
Suhailah, H. (2009). *The Praxis Of Teaching Thinking: A Case Study About Student-Teachers' Experiences In The Malaysian Classrooms*. The International Journal of Learning, 117– 126.
Tuan Rahayu, T. L., Mohd Aderi, C. N., & Mohd Isa, H. (2017). *Pengetahuan, Sikap dan Kesediaan Murid Terhadap Kemahiran Berfikir Aras Tinggi (KBAT) Dalam Mata Pelajaran Tasawwur Islam*. Tinta Artikulasi Membina Ummah, *3*(1), 15–28.
Wahbah Zuhaily. (2009). *Tafsir Al-Munir Fil Aqidah Wasy-Syari'ah Wal Manhaj (Cetakan ke 10).* Beirut: Lebanon Darul Fikr.
Wan Ahmad, W. I., Maimun Aqasha, L., & Md.Isa, H. (2016). *Kesediaan Guru Pendidikan Islam Sekolah Rendah Di Selangor terhadap Penerapan KBAT Dalam Pengajaran Dan Pembelajaran.* Journal of Advanced Research in Applied Sciences and Engineering Technology ISSN, *3*(1), 79–92.
Wan Mohd Zahid, M. N. (1993). *Wawasan Pendidikan Agenda Pengisian.* Nurin Enterprise Kuala Lumpur.
Zakir, B. (1989). *Pendidikan Islam Tradisional: Tujuan dan maksudnya. Dlm. Husain, S. S & Ashraf, S. A. (pnyt.). Krisis dalam Pendidikan Islam. Terj. Maso'od Abdul Rashid.* Dewan Bahasa Dan Pustaka Kuala Lumpur.