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# The Effectiveness of PISCAYA Learning Media on the Science Learning Outcomes of Fifth Grade Students at MI Mathaliul Huda Kajangan

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**Abstract:**
Learning about the properties of light in grade V at MI Mathaliul Huda Kajangan Blora has relied on lectures without concrete media, which makes abstract concepts hard for students to grasp. This study examined the learning outcomes in Natural and Social Sciences (IPAS) of fifth-grade students taught with PISCAYA (Interactive Demonstrator of Light Properties), a non-digital manipulative medium. A quantitative pre-experimental one-group pre-test post-test design was used with 25 students selected by saturated sampling. Learning outcomes were measured with a 25-item multiple-choice test of higher-order thinking skills (HOTS, levels C4–C6) given before and after the treatment, and a student worksheet (LKPD) guided the experiments. The data were analyzed with descriptive statistics, the paired-sample t-test, Cohen's d, and normalized gain (N-Gain). The mean score rose from 45.12 (SD = 16.79) to 83.36 (SD = 9.71), $t(24) = 15.30$, $p < 0.001$, a mean difference of 38.24 points (95% CI [33.08, 43.40]) with a very large effect size (Cohen's $d = 3.06$). The mean N-Gain was 0.71 (SD = 0.16), in the high category, and the number of students meeting the mastery criterion (KKTP = 70) increased from 2 (8%) to 25 (100%). Because the design had no control group and used identical pre-test and post-test items, the improvement cannot be attributed to PISCAYA alone. The findings suggest that learning with PISCAYA is a promising non-digital alternative for teaching abstract light concepts, especially in schools with limited technological infrastructure, and should be tested further with controlled designs.

## Introduction (مقدمة)

Learning in Natural and Social Sciences (IPAS) at the elementary level, including Islamic elementary schools (Madrasah Ibtidaiyah, MI), aims not only at mastery of scientific concepts and facts but also at students' ability to observe phenomena, relate learning materials to everyday

experiences, and take part actively and meaningfully in learning. In 21st-century education, learning media are no longer limited to visual aids such as pictures and charts; they include any technology or tool that supports instructional communication, from a simple blackboard to virtual reality and interactive multimedia (Tahir, Muhammad, 2025).

teacher-centered and one-way, and they lack media that provide interactive and contextual experiences, which keeps student engagement low. The problem is greater for topics rich in abstract concepts, such as the properties of light, which need visualization and concrete experience to be understood in depth (Wibowo, 2021). At MI Mathaliul Huda Kajangan Blora, the properties of light are still taught by lecture without concrete media, so students struggle to understand these concepts.

Previous studies have addressed this problem mainly with game-based media, most of them digital. A Scratch-based game produced significantly better science learning outcomes than conventional instruction in an experimental comparison (Kusumawati, 2022), and literature reviews concluded that educational games and game-based media improve activity, engagement, and learning outcomes in elementary science (Adinda Wulandari, Nur Alifah, 2022; Aqtoina et al., 2023). Android-based games have been developed for force, the human digestive system, the water cycle, and energy transformation, and were reported to be valid, practical, and associated with better learning outcomes (Hartana, 2022; Indriani, 2024; Mintohari, 2023; Yermiandhoko, 2020). Although these results are encouraging, many of these studies are development research that judges success mainly by validity, practicality, and score gains; they depend on devices and software that not every school has; and digital games typically deliver content and practice through a screen rather than letting students manipulate the phenomenon itself.

Non-digital alternatives have received less attention. A Ludo-based game for IPAS was reported to be feasible and to improve learning outcomes in grade III (Ainnur Ratri Aurora, 2026), and a comparative study found that both digital and non-digital board games improved in-depth knowledge, which suggests that physical media remain educationally relevant (Ariya et al., 2025). Game formats, however, mainly structure practice and competition, and the comparative study concerned board games and digital literacy rather than science concepts. Studies closer to hands-on science learning report that concrete teaching aids improved motivation and outcomes in mathematics (Kuncoro Adi Saputro, 2021), that experimental methods improved IPAS outcomes in grade VI and in a magnet topic in grade IV (Astawan, 2021; Kurniawan et al., 2022), and that a light-properties box (Kosifacay) was a useful aid for mastering science learning (Prasetya, 2022). To the best of our knowledge, these studies relied on classroom action research or qualitative description, dealt with other topics, and did not report effect sizes or use instruments designed to measure higher-order thinking skills (HOTS).

Taken together, three gaps remain. First, evidence on physical, manipulable aids for IPAS at the MI level is still limited and mostly qualitative or based on classroom action research, whereas the larger digital-media literature depends on devices. Second, the studies reviewed here generally did not measure HOTS. Third, to the best of our knowledge, no study has provided an integrated manipulative aid that covers all six properties of light for fifth-grade MI students, and PISCAYA has not been examined in IPAS learning at this level.

To address these gaps, this study examines PISCAYA (Interactive Demonstrator of Light Properties), a non-digital manipulative medium in the form of a 3D box made of styrofoam and thick cardboard covered with black cardboard. The box has six experimental areas, each demonstrating one property of light with simple components: a plastic bottle of water with a straw, black tape, a clear plastic cup, a CD, an obstacle, a plane mirror, and a flashlight as the main light source. Students act as experimenters rather than spectators of a demonstration, and no digital device is needed, so the medium can be used in schools with limited technological

infrastructure. The novelty of this study lies in (1) a physical, non-digital aid that integrates the six properties of light, (2) the use of a 25-item HOTS test (C4–C6) to measure learning outcomes, and (3) its focus on fifth-grade MI students, a context that, to our knowledge, has not been studied before. A quantitative pre-experimental one-group pre-test post-test design was used.

Therefore, this study aims to analyze the effectiveness of the PISCAYA learning medium on the IPAS learning outcomes of fifth-grade MI students on the topic of the properties of light.

## Method (منهج)

### *Research Design*

This study used a quantitative approach with a pre-experimental one-group pre-test post-test design (Sugiyono, 2019). One group was measured twice, before ($O_1$) and after ($O_2$) the treatment (X), without a control group (Table 1). Participants were not randomly assigned to conditions because there was only one class at the grade level studied, which made it impossible to form a control group (Waridi et al., 2025). The study was therefore an intervention study with a within-subject design: all participants received the same treatment, and the pre-test and post-test scores of the same students were compared. With this design, the study can show whether scores changed after the treatment, but it cannot separate the effect of PISCAYA from other influences such as repeated testing, maturation, or the other components of the lesson (see the Limitations in the Discussion).

**Table 1.** Research Design

| $O_1$ | X | $O_2$ |
|---|---|---|
| Pre-test | Treatment | Post-test |

### *Participation and Stting*

The research was conducted at MI Mathaliul Huda Kajangan Blora in July 2026, at the beginning of the first semester of the 2026/2027 academic year. The population comprised all fifth-grade students at the school (N = 25). Because the population was small, saturated sampling was used, so all members of the population were included as the sample (Hutahaean, 2023). The participants were 9 boys and 16 girls. The eligibility criterion was being enrolled as a fifth-grade student at the school during the research period. No students were excluded, and no data were missing at either measurement (N = 25 at the pre-test and post-test).

### *Intervention: the PISCAYA Learning Media*

The treatment was learning with PISCAYA (*Peraga Interaktif Sifat-Sifat Cahaya*, Interactive Demonstrator of Light Properties), a non-digital manipulative medium. PISCAYA is a 3D box made of styrofoam and thick cardboard covered with black cardboard and divided into six experimental areas. Each area is labeled with the property of light it demonstrates and uses simple components, as listed in Table 2. A flashlight was the main light source in all areas. Students placed the components in the six areas, shone the flashlight, observed the phenomena, discussed their observations, and concluded the properties of light.

**Table 2.** Experimental Area of PISCAYA

| Area | Property of light | Component |
|---|---|---|
| 1 | Light can be refracted | Plastic bottle filled with water and a straw |
| 2 | Light can travel in a straight line | Small black tape rolls |
| 3 | Light can penetrate transparent objects | Clear plastic cup |
| 4 | Light can be dispersed | Compact disc (CD) |
| 5 | Light can form shadows | Obstacle (small block) |
| 6 | Light can be reflected | Plane mirror |

***Instrument***

Two instruments were used. The first was a cognitive test of 25 multiple-choice items at the higher-order thinking skills (HOTS) level, used as both the pre-test and the post-test. The second was a Student Worksheet (*Lembar Kerja Peserta Didik*, LKPD) containing six pictures that correspond to the six experimental areas; for each picture, students identified the property of light shown and wrote an explanation. The LKPD guided the experiments and was not analyzed as a separate variable, so learning outcomes were judged only from the pre-test and post-test scores.

The items were written at three levels of the revised Bloom's taxonomy: 12 items at C4 (analyzing), 8 items at C5 (evaluating), and 5 items at C6 (creating), covering the six properties of light. Each item had one keyed answer, and each correct answer scored 4 points, so total scores ranged from 0 to 100. The same 25 items were used in the pre-test and the post-test. Mastery was defined by the Learning Objective Achievement Criterion (*Kriteria Ketercapaian Tujuan Pembelajaran*, KKTP) of 70.

The test, the LKPD, and the PISCAYA medium were examined for content validity through expert judgment by five validators: two lecturers of the Madrasah Ibtidaiyah Teacher Education Program and three teachers of the research school, who judged all three feasible for data collection. Reliability and item statistics were computed with jamovi from the students' post-test answer sheets (N = 25). Reliability, estimated with Cronbach's α (equivalent to the Kuder-Richardson formula 20 for dichotomous items), was 0.46, which is low. Item difficulty (proportion correct) ranged from 0.56 to 0.96 (mean = 0.83); 21 items were easy ($p > 0.70$) and 4 were of medium difficulty. Corrected item-total (item-rest) correlations ranged from −0.34 to 0.37; only 2 of the 25 items reached 0.30, and 5 items (items 9, 16, 19, 22, and 23) had correlations near zero or negative (Appendix Table A1 and A2). These values are reported as a limitation (see the Discussion).

***Procedure***

The treatment was delivered by the researcher in two meetings of 70 minutes each (two lesson periods per meeting). In the first meeting, the students took the pre-test (40 minutes), followed by a classroom explanation of the properties of light (25 minutes); the remaining 5 minutes were used for the opening and reflection.

In the second meeting, the students worked in five groups of five. Using PISCAYA and guided by the LKPD, each group placed the components in the six experimental areas, shone the flashlight, observed the phenomenon, discussed what they saw, identified the property of light, and wrote an explanation (30 minutes). At the end of this activity, the researcher gave a conceptual reinforcement. The meeting closed with the post-test (35 minutes), which used the same items as the pre-test, plus 5 minutes for the opening and reflection. Cognitive learning outcomes were collected through the written test before and after the treatment; student activities during the experiments were observed to monitor the implementation, but no observation data

were analyzed.

***Data Analysis***

The test data were analyzed in three stages. Descriptive and inferential statistics were computed in Jamovi version 2.6.44, and N-Gain in Microsoft Excel. First, descriptive statistics (mean, standard deviation, median, minimum, and maximum) and the number of students meeting the KKTP were calculated. Second, the normalized gain (N-Gain) was calculated for each student with Equation (1) (Hake, 1998), and the individual gains were then averaged:

$$g = (S_{post} - S_{pre}) / (S_{maks} - S_{pre}) \quad (1)$$

Where $S_{post}$ is the post-test score, $S_{pre}$ is the pre-test score, and $S_{maks}$ is the ideal maximum possible score (100). N-Gain expresses the proportion of the possible improvement that a student achieved; for example, g = 0.70 means that the student achieved 70% of the improvement that was possible. Following (Hake, 1998). gains were categorized as high ($g \geq 0.70$), medium ($0.30 \leq g < 0.70$), or low ($g < 0.30$). Hake defined these categories for class-average gains; here they are also applied to individual gains as a descriptive classification.

Third, the Shapiro-Wilk test was applied to the difference scores (post-test minus pre-test), which is the normality assumption of the paired-sample t-test, and the t-test was then used to test the difference between pre-test and post-test scores at a significance level of $\alpha = 0.05$. Effect size was calculated as Cohen's d for paired samples (the mean difference divided by the standard deviation of the differences) and interpreted with (Cohen, 1988) benchmarks of 0.20 (small), 0.50 (medium), and 0.80 (large).

## Result (نتائج)

All 25 students completed the pre-test and the post-test. The mean score increased from 45.12 (SD = 16.79) to 83.36 (SD = 9.71) (Table 3). The number of students meeting the KKTP of 70 rose from 2 (8%) at the pre-test to 25 (100%) at the post-test. Every student improved, by 16 to 64 points and the lowest post-test score (72) equaled the highest pre-test score (72) (Table 4). The smaller standard deviation at the post-test shows that scores became more homogeneous.

**Table 3.** Descriptive statistics of pre-test and post-test scores

| | pre test | post test |
|---|---|---|
| **N** | 25 | 25 |
| **Missing** | 0 | 0 |
| **Mean** | 45.1 | 83.4 |
| **Median** | 44 | 84 |
| **Standard deviation** | 16.8 | 9.71 |
| **Minimum** | 20 | 72 |
| **Maximum** | 72 | 100 |

***Data processed with Jamovi version 2.6.44 on September 21, 2026***

**Table 4.** Pre-test and Post-test Scores of Each Student

| Sample | Pre-Test Score | Post-Test Score |
|---|---|---|
| A-1 | 64 | 96 |
| A-2 | 64 | 92 |
| A-3 | 48 | 84 |
| A-4 | 20 | 84 |
| A-5 | 24 | 72 |
| A-6 | 40 | 76 |
| A-7 | 24 | 72 |
| A-8 | 56 | 96 |
| A-9 | 44 | 72 |
| A-10 | 44 | 76 |
| A-11 | 44 | 76 |
| A-12 | 28 | 84 |
| A-13 | 56 | 84 |
| A-14 | 60 | 76 |
| A-15 | 56 | 84 |
| A-16 | 28 | 72 |
| A-17 | 20 | 84 |
| A-18 | 40 | 72 |
| A-19 | 72 | 96 |
| A-20 | 72 | 100 |
| A-21 | 40 | 84 |
| A-22 | 52 | 84 |
| A-23 | 68 | 100 |
| A-24 | 20 | 72 |
| A-25 | 44 | 96 |

***Data processed with Microsoft Excel version 2608 on September 22, 2026***

The Shapiro-Wilk test showed that the difference scores were approximately normally distributed (W = 0.927, p = 0.075), so the paired-sample t-test was used (Table 5). Post-test scores were significantly higher than pre-test scores, t(24) = 15.30, p < 0.001, with a mean difference of 38.24 points (SE = 2.50; 95% CI [33.08, 43.40]) and a very large effect size (Cohen's d = 3.06) (Table 6).

**Table 5.** Results of the Normality Test (Shapiro-Wilk)

| | | | W | p |
|---|---|---|---|---|
| **pre test** | **-** | **post test** | 0.927 | 0.075 |

Note. A low p-value suggests a violation of the assumption of normality

*Data processed with Jamovi version 2.6.44 on September 21, 2026*

**Table 6.** Results of the Paired Sample T-Test

| | | | | | | | | 95% Confidence Interval | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | statistic | df | p | Mean difference | SE difference | Lower | Upper | | Effect Size |
| pre test | post test | Student's t | -15.3 | 24.0 | <.001 | -38.2 | 2.50 | -43.4 | -33.1 | Cohen's d | -3.06 |

Note. $H_a$ $\mu_{Measure\ 1 - Measure\ 2} \neq 0$

*Data processed with Jamovi version 2.6.44 on September 21, 2026*

The mean individual N-Gain was 0.71 (SD = 0.16, range 0.40–1.00), which is in the high category; on average, students achieved about 71% of the improvement that was possible. Eleven students (44%) had high gains, 14 (56%) had medium gains, and none had a low gain (Table 7). Because Hake's categories were defined for class-average gains, it should be noted that the gain computed from the class means, (83.36 − 45.12) / (100 − 45.12) = 0.697, is just below the high threshold. The gains are therefore best described as medium to high rather than unambiguously high.

**Table 7.** Distribution of N-Gain Categories

| Category | Number of students | Percentage |
|---|---|---|
| High (g > 0.7) | 11 | 44% |
| Medium (0.3 ≤ g ≤ 0.7) | 14 | 56% |
| Low (g < 0.3) | 0 | 0% |

*Data processed with Microsoft Excel version 2608 on September 22, 2026*

Earlier studies on game-based media mostly reported product feasibility or the significance of score differences (Adinda Wulandari, Nur Alifah, 2022; Kusumawati, 2022), and studies on light teaching aids and experiments relied on qualitative description or classroom action research (Astawan, 2021; Prasetya, 2022). The present study adds an effect size, a confidence interval, and N-Gain, obtained with a HOTS-based test from fifth-grade MI students using an aid that integrates six properties of light.

## Discussion (مناقشة)

The main finding is that after learning with PISCAYA, students' scores on the properties of light rose substantially and consistently: every student improved, all 25 reached the mastery criterion, and no student had a low gain. This addresses the objective stated in the Introduction. Because the study had no control group, however, the results show that scores increased after the PISCAYA-based lessons; they do not show that PISCAYA alone caused the increase. The lesson sequence also included a classroom explanation, group work, a worksheet, and conceptual reinforcement by the researcher, and the same test was used twice. PISCAYA is therefore treated in this section as one component of a lesson sequence that was followed by improvement, not as an isolated cause.

The mean individual N-Gain (0.71) is higher than the average gains that (Hake, 1998) reported for interactive-engagement courses (0.48) and traditional courses (0.23). This benchmark is rough: Hake's survey covered introductory university physics with different instruments, and his gains were class averages, whereas the class-level gain here (0.697) lies at the boundary between the medium and high categories. The comparison shows that the gain was large relative to what is commonly reported, not that PISCAYA is better than other methods.

A plausible explanation lies in the nature of the topic and the learners' developmental stage. The properties of light are abstract concepts because light paths are hard to observe under ordinary classroom conditions. Students in fifth grade are generally at the concrete operational stage, in which understanding develops more readily through real objects and direct experience (Aisyapuri et al., 2025). PISCAYA fits this need by presenting each property in a separate experimental area: refraction in a water-filled bottle, dispersion on a CD, reflection in a plane mirror, and shadow formation with an obstacle. The black-lined box may also have helped by reducing external light, so that the flashlight beam was easier to observe and link to the concept being learned, although this mechanism was not tested here.

Comparison with earlier research shows both agreement and differences. For digital game-based media, (Kusumawati, 2022) found a significant advantage of a Scratch-based game over conventional teaching in elementary science, and (Mintohari, 2023) reported a high N-Gain for an Android game on the water cycle with fifth graders. The direction of the present improvement, and its size in terms of N-Gain, are similar, but here it followed learning with no digital device. This matters for schools with limited infrastructure and is consistent with the finding that both digital and non-digital formats improved in-depth knowledge (Ariya et al., 2025). Differences in topic, sample, and instruments, however, prevent a direct comparison of magnitudes.

Studies on experiments and concrete aids point in the same direction (Astawan, 2021) and (Kurniawan et al., 2022) reported better IPAS outcomes with experimental methods (grade VI, and a magnet topic in grade IV), and (Kuncoro Adi Saputro, 2021) found higher motivation and outcomes with concrete teaching aids in mathematics. These studies used classroom action research or a different subject, so they support the present findings without directly confirming them. Unlike them, the present study measured HOTS and reported an effect size and N-Gain. For light specifically, (Prasetya, 2022) described a light-properties box (Kosifacay) through a qualitative phenomenological approach and did not estimate its effect on learning outcomes. The present study complements it with quantitative evidence, but it lacks what a qualitative study can offer, such as students' own accounts of how the medium helped them.

Social interaction offers a second explanation. From a constructivist view, PISCAYA positions students as experimenters who build understanding through interaction with objects and the learning environment (Purnomo et al., 2021). Studies on the implications of Piaget's and Vygotsky's theories also indicate that guidance and interaction with others, including peers, help students reach understanding that they cannot reach alone (Agustyaningrum & Pradanti, 2022). In this study, students worked in groups of five to observe and discuss the experiments, while the LKPD and the researcher's conceptual reinforcement may have acted as scaffolding for drawing conclusions from their own observations. These components cannot be separated from PISCAYA in the present design.

The gains occurred on a HOTS test (C4–C6), which requires analyzing, evaluating, and creating rather than recalling. Direct observation, discussion, and written explanation in the LKPD may have trained these thinking processes. However, item-level data are available only for the post-test, where mean item difficulty was similar across the cognitive levels (C4 = 0.82, C5 = 0.82, C6 = 0.89); without item-level pre-test data, it cannot be determined which level benefited most.

Studies in other subjects point in a similar direction: media use was examined for its effect on students' understanding of funeral jurisprudence (Muhammad Irsyadi Abdillah, Dyah Ayu Fitriana, 2026), and joyful learning was discussed as a strategy to raise cognitive outcomes in Islamic religious education (Hakim et al., 2025). These studies share the idea that media and enjoyable learning environments are pathways to better outcomes, which PISCAYA applies to IPAS through a medium that students can manipulate directly.

The non-digital nature of PISCAYA is of practical value. It is made of styrofoam, cardboard, black cardboard, a plastic bottle, and other inexpensive items, so it can be used in schools with limited technological infrastructure. Research on MI teachers' strategies also highlights the teacher's role in adapting instruction to students' needs and school conditions (Mohamad Samsuddin, Arim Irsyadulloh Albin Jaya, 2026); designing a medium such as PISCAYA can be seen as an example of this role.

Several limitations may have influenced the findings. First, the one-group pre-test post-test design has no control group, so history, maturation, repeated testing, and regression toward the mean cannot be ruled out; students with very low pre-test scores also had the most room to improve. Second, the lesson sequence combined a 25-minute classroom explanation, group work, the LKPD, and conceptual reinforcement, so the effect of PISCAYA cannot be separated from these components. Third, identical items were used in the pre-test and post-test, so memory of the items may have contributed to the gains, and the large within-subject effect size (d = 3.06) is probably an overestimate of the effect of the medium. Fourth, the reliability of the test was low (KR-20 = 0.46), most items were easy for students after the lessons, and five items (items 9, 16, 19, 22, and 23) had item-rest correlations near zero or negative; together with the narrow range of post-test scores, this may have limited the precision of individual scores and the ability of the test to discriminate between students, and its validity otherwise rests on expert judgment alone. These statistics come from the post-test only; no item analysis of the pre-test was carried out. Fifth, the researcher both taught and tested the students, which may introduce researcher effects. Sixth, the sample was 25 students in one class at one school, no delayed post-test was given, and the N-Gain categories applied to individual students are descriptive. The results should therefore be seen as preliminary and not generalized.

Even so, the findings matter for a practical reason. Abstract science concepts are often taught by lecture in schools with few resources, and this study shows that a simple, low-cost medium that lets students experiment themselves was followed by a clear improvement in learning outcomes, including on higher-order questions. The evidence does not show that PISCAYA caused the improvement, but it supports the proposition that manipulative, non-digital media deserve more rigorous testing for other abstract IPAS topics in MI.

## Conclusion (خاتمة)

This study aimed to analyze the effectiveness of the PISCAYA learning medium on the IPAS learning outcomes of fifth-grade MI students on the topic of the properties of light. Students' scores increased significantly after learning with PISCAYA (mean difference = 38.24 points, Cohen's d = 3.06, mean N-Gain = 0.71), and all students reached the mastery criterion. Because the study had no control group, these results suggest, but do not prove, that PISCAYA-based learning is a promising alternative for teaching abstract light concepts in a form that is non-digital, low-cost, and usable where technological infrastructure is limited. The study contributes preliminary quantitative evidence on a physical, integrated manipulative aid for six properties of light, assessed with a HOTS-based test at the MI level. Teachers can adapt the approach to other abstract IPAS topics with easily available materials. Future studies should use quasi-experimental or randomized designs with a control or comparison group, parallel test forms with reliability

and item analysis, and a delayed post-test to measure retention, and should extend PISCAYA to other IPAS topics and schools.

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*Appendix*

**Table A1**. Scale Reliability Statistics

Scale Reliability Statistics

| | Cronbach's α |
|---|---|
| **scale** | 0.459 |

Note. items 'B02', 'B04', 'B06', 'B07', 'B09', 'B12', 'B13', 'B14', 'B15', 'B16', 'B18', 'B19', 'B20', 'B21', 'B22', 'B23', and 'B24' correlate negatively with the total scale and probably should be reversed

***Data processed with Jamovi version 2.6.44 on Noveember 05, 2026***

**Table A2**. Item Reliability statistics

Item Reliability Statistics

| | | | If item dropped |
|---|---|---|---|
| | **Mean** | **Item-rest correlation** | **Cronbach's α** |
| **B01** | 0.640 | 0.17817 | 0.437 |
| **B02** | 0.680 | 0.28333 | 0.411 |
| **B03** | 0.720 | 0.19158 | 0.434 |
| **B04** | 0.880 | 0.32118 | 0.416 |
| **B05** | 0.960 | 0.16415 | 0.447 |
| **B06** | 0.800 | 0.13981 | 0.446 |
| **B07** | 0.880 | 0.15372 | 0.444 |
| **B08** | 0.960 | 0.16415 | 0.447 |
| **B09** | 0.840 | -0.22422 | 0.510 |
| **B10** | 0.840 | 0.29161 | 0.417 |
| **B11** | 0.840 | 0.14245 | 0.445 |
| **B12** | 0.800 | 0.37279 | 0.396 |
| **B13** | 0.920 | 0.05275 | 0.459 |
| **B14** | 0.880 | 0.15372 | 0.444 |
| **B15** | 0.720 | 0.07116 | 0.461 |
| **B16** | 0.880 | -0.00627 | 0.470 |
| **B17** | 0.560 | 0.22085 | 0.425 |
| **B18** | 0.960 | 0.16415 | 0.447 |
| **B19** | 0.960 | -0.34490 | 0.495 |
| **B20** | 0.680 | 0.20219 | 0.431 |

Item Reliability Statistics

| | Mean | Item-rest correlation | If item dropped Cronbach's α |
|---|---|---|---|
| **B21** | 0.920 | 0.05275 | 0.459 |
| **B22** | 0.880 | -0.00627 | 0.470 |
| **B23** | 0.960 | -0.26296 | 0.488 |
| **B24** | 0.760 | 0.10115 | 0.454 |
| **B25** | 0.920 | 0.18097 | 0.442 |

***Data processed with Jamovi version 2.6.44 on Noveember 05, 2026***