# Content Validity Assessment Using Aiken's V: Knowledge Integration Model for Blockchain in Higher Learning Institutions

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***Abstract*—The integration of blockchain technology into higher learning institutions (HLIs) holds the potential to revolutionize data management, enhance transparency, and improve trust in academic systems. However, the effective adoption of blockchain requires a comprehensive and valid model that addresses the specific needs and contexts of HLIs. This study aims to assess the content validity of the Knowledge Integration Model for Blockchain in Higher Learning Institutions using Aiken's V method. The proposed model was developed through a systematic literature review and refined with expert input. Content validity was evaluated by seven experts with backgrounds in education, blockchain technology, and information systems. Each item within the model was rated for its relevance, clarity, and representativeness using a Likert scale. The instrument, consisting of 50 items across six constructs, was evaluated by seven domain experts using Aiken's V methodology. Each item was rated based on its relevance and clarity using a 5-point Likert scale. The results revealed that out of 50 items, 21 required revision or removal due to low Aiken's V scores (<0.70), 21 were deemed acceptable but required minor revisions, and 8 demonstrated strong content validity (V ≥ 0.80). These findings underscore the importance of expert evaluation in refining research instruments and ensuring construct alignment. The use of Aiken's V provided a robust quantitative foundation for the validation process. The refined instrument serves as a reliable tool for assessing institutional readiness and knowledge integration capabilities in the context of blockchain adoption. This work contributes to the growing research on educational blockchain implementation by offering a validated framework that can support empirical investigations and strategic decision-making in higher education.**

***Keywords*—Blockchain; content validity; aiken's v; higher learning institutions; knowledge integration model**

## I. Introduction

Knowledge integration—the process of combining insights, expertise, and perspectives from multiple domains—is essential for ensuring that blockchain solutions are contextually relevant, sustainable, and scalable within the educational ecosystem. Although scholarly interest in blockchain applications in education is increasing, there remains a lack of research on how knowledge from technical, pedagogical, administrative, and regulatory domains can be effectively synthesized to support implementation. The integration of blockchain technology into higher learning institutions (HLIs) presents a transformative opportunity to enhance data integrity, security, and transparency in academic processes. However, a significant research challenge persists: the limited understanding of how to integrate knowledge across these domains to enable effective blockchain adoption. This study seeks to validate an instrument designed to assess the Knowledge Integration Model for Blockchain in Higher Education, thereby addressing the gap in comprehensive adoption frameworks.

The research is guided by two key questions: 1) To what extent does the proposed model demonstrate content validity?, and 2) What revisions are necessary to improve its constructs and items? The primary objective is to ensure that tools used to measure institutional readiness and integration capabilities are both valid and reliable. This study is significant as it offers a robust measurement instrument for empirical research and practical implementation of blockchain in higher education, focusing on the integration of domain-specific knowledge. Key contributions include a validated instrument, empirical evidence of content validity using Aiken's V, and a refined framework to support strategic decision-making. As blockchain technology gains momentum in the academic sector, it is crucial to ensure that assessment tools for institutional readiness, perceptions, and integration capabilities are methodologically sound.

This study evaluates the content validity, construct validity, and internal consistency of the proposed instrument through expert judgment and statistical analysis. By validating this tool, the research aims to provide a reliable foundation for future empirical studies and practical applications of blockchain technologies in higher education. The validated instrument will also serve as a critical component in examining how knowledge from technological, pedagogical, administrative, and regulatory domains can be effectively integrated to support successful blockchain adoption.

The remainder of this study outlines the literature review, methodology, presents the results, discusses necessary revisions, and concludes with implications for future research and practice.

## II. Literature Review

The integration of blockchain technology into higher education institutions presents a transformative opportunity to enhance data security, streamline administrative processes, and foster a more transparent and trustworthy learning environment [1]. Blockchain, initially conceived as the foundational technology for cryptocurrencies, has transcended its original purpose and is now recognized for its potential to revolutionize various sectors, including education [2]. Its decentralized and immutable nature ensures that records are tamper-proof and verifiable, addressing critical concerns about data integrity and security that are prevalent in traditional educational systems [3]. By leveraging blockchain's inherent security features, educational institutions can protect sensitive student data, such as academic transcripts, personal information, and financial records, from unauthorized access and cyber threats [4]. This is particularly important in an era of increasing data breaches and identity theft, where the security of personal information is paramount [5].

Furthermore, blockchain technology can facilitate the creation of a more transparent and accountable educational ecosystem [6]. In traditional systems, academic records are often stored in centralized databases, which can be vulnerable to manipulation or loss. Blockchain, on the other hand, distributes data across a network of computers, making it virtually impossible for a single point of failure or malicious actor to compromise the integrity of the information [7]. This decentralized approach not only enhances security but also promotes trust among students, faculty, and administrators. Many higher education institutions have already started to implement blockchain technology for academic degree and result management [8]. Moreover, blockchain can streamline administrative processes, reduce costs, and improve efficiency in higher education institutions. By automating tasks such as transcript verification, degree authentication, and tuition payment processing, blockchain can free up valuable time and resources for educators and administrators, allowing them to focus on more strategic initiatives such as improving teaching and learning outcomes [9].

The immutability of blockchain ensures the integrity of educational records, preventing fraud and enhancing trust in qualifications [10] [11]. The characteristics of blockchain technology can address these issues within educational settings [12]. Blockchain is essentially a distributed database that boasts decentralization, security, and transparency [13] [14]. This transparency ensures that all stakeholders have access to accurate and up-to-date information, fostering a more collaborative and efficient learning environment. For example, consider the issue of verifying academic credentials. Blockchain technology provides a transparent and autonomous solution and enhances the quality of shared data among stakeholders [15]. Using blockchain, institutions can issue digital credentials that are easily verifiable, eliminating the need for time-consuming manual verification processes and reducing the risk of fraudulent claims.

Blockchain's decentralized framework offers a platform for validating data and transactions, independent of third-party control, in a secure, transparent, and permanent setup [16]. Smart contracts, self-executing agreements written into the blockchain code, can automate processes such as verifying academic credentials and managing tuition payments [17]. Smart contracts automate procedures, minimizing errors caused by people or counterfeits [18]. The employment of smart contracts streamlines auditing procedures, resulting in a 30% reduction in audit time and a 20% decrease in audit costs [19]. The use of blockchain technology could reduce project disputes arising from delayed payments [20].

The decentralized database created by blockchain technology offers enhanced security, faster payments, and improved data transfer reliability and transparency [21]. The application of blockchain extends beyond cryptocurrency, finding utility in data management, supply chain tracking, and healthcare, among other fields [22][23]. In healthcare, blockchain improves interoperability, data integrity, and security while cutting maintenance expenses [24]. As blockchain technology gains traction across various sectors, including digital currency, finance, and business [25] [26], its entrance into the healthcare industry signals a move towards more secure and efficient data management practices. Several firms have started experimenting with blockchain technology for a variety of purposes, including supply chain management, identity verification, and decentralized marketplaces [27][28]. Blockchain has many potential applications, including those in the healthcare industry [27] [29] [30]. More exploration is needed to determine the most effective way to design a blockchain-based system.

## III. Methodology

This study adopts a quantitative approach involving a comprehensive content validity assessment process. The content validity evaluation was carried out through four structured and systematic phases. These phases were designed to ensure the integrity and accuracy of the research instrument, as well as to meet rigorous methodological standards in educational research.

The four phases are as follows:

- Construction development
- Expert selection
- Implementation of content validity assessment
- Revision of constructs and items

### A. *Construction Development*

This stage involves the conceptualization and operationalization of the main constructs based on an extensive literature review. The study employs a questionnaire as the research instrument, using a 5-point Likert scale. The scale is as follows:

1 = Very inappropriate

2 = Inappropriate

3 = Not sure

4 = Appropriate

5 = Very appropriate

The instrument comprises six distinct constructs:

- Technology Factors (11 items)
- Organizational Factors (12 items)
- Environment Factors (10 items)
- Knowledge Integration (6 items)
- Perceived Usefulness (6 items)
- Blockchain Adoption Likelihood (5 items)

Total items: 50

In total, the questionnaire comprises 50 items. These constructs were developed through in-depth analysis of previous studies, content analysis, and a thorough literature review across the six constructs as presented in Table I. The measurement items for each construct were systematically developed based on an extensive review of relevant literature. Each item was carefully formulated to ensure alignment with the theoretical foundations and operational definitions established during the construct development phase.

TABLE I. ITEMS DEVELOPED FOR EACH CONSTRUCT FORMULATED FROM THE LITERATURE REVIEW

| Construct | Item Code | Items |
|---|---|---|
| Technology - Security & Privacy | B1 | Blockchain ensures unauthorized parties cannot access academic records. |
| | B2 | Blockchain technology provides stronger data privacy than current systems. |
| | B3 | I trust blockchain to securely store my institution's credentials. |
| | B4 | Blockchain reduces risks of data breaches in education. |
| Technology - Transparency & Trust | B5 | Blockchain makes academic transactions (e.g., grading) more transparent. |
| | B6 | I can verify the authenticity of blockchain-stored records easily. |
| | B7 | Blockchain increases trust in shared knowledge (e.g., research data). |
| | B8 | Blockchain's transparency reduces conflicts over academic records. |
| Technology - Data Integrity | B9 | Blockchain prevents tampering with academic records. |
| | B10 | My institution's use of blockchain ensures accurate record-keeping. |
| | B11 | Historical changes to records are traceable via blockchain. |
| Organizational - Institutional Readiness | C1 | My institution has the technical infrastructure to adopt blockchain. |
| | C2 | Budget is allocated for blockchain implementation. |
| | C3 | Staff are trained to use blockchain-based systems. |
| | C4 | My institution has a clear roadmap for blockchain integration. |
| Organizational - Leadership Support | C5 | Administrators actively promote blockchain initiatives. |
| | C6 | Leadership addresses concerns about blockchain adoption. |
| | C7 | Faculty are encouraged to pilot blockchain tools. |
| | C8 | Leadership prioritizes blockchain adoption in strategic plans. |
| Organizational - Financial & Technical Resources | C9 | My institution can afford blockchain implementation costs. |
| | C10 | IT teams are skilled in maintaining blockchain systems. |
| | C11 | Blockchain tools are compatible with existing IT systems. |
| | C12 | External funding (e.g., grants) supports blockchain projects. |
| Environment - Government Policies & Regulation | D1 | National policies encourage blockchain use in education. |
| | D2 | Legal frameworks support blockchain-based academic credentials. |
| | D3 | Government funding is available for blockchain initiatives. |
| | D4 | My institution complies with regulations for blockchain adoption. |
| Environment - Industry Collaboration | D5 | My institution partners with tech firms for blockchain solutions. |
| | D6 | Joint research projects use blockchain for knowledge sharing. |
| | D7 | Employers recognize blockchain-verified credentials. |
| Environment - Societal Expectation | D8 | Employers prefer candidates with blockchain-stored degrees. |
| | D9 | Public awareness of blockchain benefits in education is growing. |
| | D10 | Society pressures institutions to adopt transparent technologies. |
| Knowledge Integration (KI) | E1 | Blockchain supports interdisciplinary knowledge development. |
| | E2 | Access to shared knowledge is equitable across departments/institutions. |
| | E3 | Archived knowledge is easily retrievable via blockchain. |
| | E4 | Research findings are implemented faster via blockchain. |
| | E5 | Blockchain platforms enable real-time sharing of course materials across departments. |
| | E6 | My institution uses blockchain to track the impact of knowledge on community projects. |
| Perceived Usefulness | F1 | Blockchain saves time in credential verification. |
| | F2 | Using blockchain enhances my productivity as a staff/educator/student. |
| | F3 | Blockchain simplifies administrative processes (e.g., transcript requests). |
| | F4 | Blockchain adds value to my institution's knowledge management. |
| | F5 | Automated smart contracts (e.g., for research royalties) improve workflow efficiency. |
| | F6 | Blockchain increases transparency in research data sharing and citation tracking. |
| Blockchain Adoption Likelihood | G1 | My institution plans to expand blockchain use beyond credentials (e.g., research, administration). |
| | G2 | My institution currently uses blockchain for any academic processes (e.g., credentials, research). |
| | G3 | Blockchain offers significant advantages over our current record-keeping systems. |
| | G4 | Blockchain adoption has improved our institution's operational efficiency. |
| | G5 | Blockchain supports my institution's alignment with national digital education goals (SDGs). |

*B. Expert Selection*

To ensure the content validity of the developed model or instrument, an expert validation process was carried out. Seven (7) experts were purposely selected based on their academic qualifications, domain relevance, and professional experience exceeding five (5) years. As detailed in Table II, five (5) are academicians from local public universities, while the remaining two (2) are industry professionals with relevant expertise. All experts have active involvement in teaching, research, or system development related to the model's domain. They voluntarily evaluated the instrument via an online form, providing both quantitative ratings and qualitative feedback. This input was subsequently used to calculate the content validity indices using Aiken's V.

TABLE II. EXPERT PANEL INFORMATION FOR CONTENT VALIDATION

| No. | Expert Initials | Background | Position/Role | Expertise Area | Experience | Institution/Sector |
|---|---|---|---|---|---|---|
| 1 | Expert 1 | Industry | Solution Architect | Information Systems, IT Enterprise Architecture | 15 Years | Bank Rakyat |
| 2 | Expert 2 | Academic | Associate Professor | Blockchain System | 18 years | Asia Pacific University of Technology and Innovation (APU) |
| 3 | Expert 3 | Industry | Senior Manager | Big Data Analytics, Blockchain, Information Systems | 18 years | Kementerian Digital Malaysia |
| 4 | Expert 4 | Academic | Associate Professor | Information Systems | 20 years | Universiti Putra Malaysia (UPM) |
| 5 | Expert 5 | Academic | Senior Lecturer | Industrial Computing | 17 years | Universiti Sains Islam Malaysia (USIM) |
| 6 | Expert 6 | Academic | Senior Lecturer | Knowledge Management, MIS, Project Management | 23 years | Universiti Putra Malaysia (UPM) |
| 7 | Expert 7 | Academic | Senior Lecturer | Cybersecurity | 8 years | Universiti Sains Islam Malaysia (USIM) |

*C. Implementation of Content Validity Assessment*

To ensure the instrument's content validity, this study employed a rigorous quantitative validation process combining the Content Validity Index (CVI) and Aiken's V coefficient. A panel of 7 subject matter experts evaluated each item's relevance using a 5-point Likert scale, ranging from 1 (not relevant) to 5 (highly relevant). The content validity was quantitatively assessed through two complementary approaches. We statistically validated expert consensus using Aiken's V coefficient, which quantifies agreement beyond simple percentages by accounting for the rating scale's ordinal nature. The V values were calculated for each item and tested for statistical significance ($p < 0.05$), with items demonstrating $V \geq 0.70$ being retained as valid. This dual-method approach provided robust quantitative evidence of content validity through statistically validated expert judgments, ensuring the instrument's items appropriately represent the target construct while minimizing subjective bias in the validation process. To ensure that the items developed in the instrument are relevant and representative of the construct being measured, content validity was assessed using Aiken's V index. This method quantitatively evaluates the degree of agreement among subject matter experts regarding the relevance of each item. Aiken's V is appropriate for assessing content validity when experts rate items on an ordinal scale (e.g., 1 = Not Relevant to 5 = Highly Relevant). The formula used to calculate Aiken's V is as follows:

Aiken's V is calculated using the formula:

$$V = \frac{\sum (s)}{n(c-1)}$$

where,

$s = r - l$

r = rating given by expert, l = lowest possible rating

n = number of experts

c = number of possible rating categories (e.g. if using a 1–5 scale, c = 5)

The resulting V value ranges from 0 to 1, where:

- $V \geq 0.80$ indicates high content validity,
- V between 0.70 and 0.79 suggests moderate content validity, and
- $V < 0.70$ may imply poor content validity, requiring revision or removal of the item.

*D. Revision of Constructs and Items*

Based on expert feedback, this phase involved an iterative process of refining and enhancing the constructs and items in the research instrument. During the content validity assessment, the panel of experts was asked to conduct a critical evaluation of the overall constructs and individual items included in the instrument. These experts were encouraged to provide quantitative ratings for each item, as well as qualitative feedback in the form of written comments in the space provided.

The primary aim of this process was to improve the clarity and comprehensibility of the items. The researcher paid close attention to all input received from the panel of experts. This final phase of the content validity assessment played a crucial role in ensuring that the developed instrument accurately measured the intended constructs, in line with the established research objectives. Through this process, the researcher aimed to achieve a high level of content validity, thereby enhancing the overall integrity of the research instrument. The comments and suggestions from experienced experts were used to further improve the instrument [31].

Following the content validity assessment using the Content Validity Index (CVI) and Aiken's V, necessary revisions were made to the constructs and items to improve clarity, relevance, and overall validity of the instrument.

- Items that did not meet the minimum acceptable threshold—I-CVI ≥ 0.78 for individual items, and Aiken's V ≥ 0.70—were reviewed carefully. Based on expert feedback and statistical indicators
- Items with low validity scores were either revised to improve clarity and appropriateness or removed if they were deemed redundant or irrelevant.
- Wording adjustments were made to enhance the precision and readability of the items, ensuring they accurately reflect the intended construct.

In some cases, new items were added to better represent key dimensions of the construct, as recommended by the panel of experts. This revision process ensured that all items retained in the final version of the instrument demonstrated strong content validity and alignment with the conceptual framework of the study. The refined instrument is thus considered suitable for subsequent pilot testing and data collection.

## IV. Findings and Discussion

The Aiken's V analysis was conducted on a 50-item instrument assessed by seven experts. Each expert provided their rating on a scale (presumably from 1 to 5), reflecting the perceived relevance of each item to the construct being measured, as evidenced by Table III. The calculated Aiken's V values offer a statistical indication of agreement among experts and are crucial in evaluating the overall quality and clarity of each item. The primary objective of this analysis was to determine the degree of consensus among experts regarding the relevance and clarity of each item, thus guiding decisions on item retention, revision, or elimination. Aiken's V coefficient, which ranges from 0 to 1, offers a quantifiable measure of expert agreement, with higher values indicating stronger content validity.

TABLE III. Results of Content Validity Calculation Analysis with the Aiken Method

| **EXPERTS/ ITEMS** | **EX 1** | **EX 2** | **EX 3** | **EX 4** | **EX 5** | **EX 6** | **EX 7** | **Aiken's V** |
|---|---|---|---|---|---|---|---|---|
| B1 | 4 | 4 | 4 | 3 | 4 | 4 | 2 | **0.64** |
| B2 | 4 | 4 | 4 | 3 | 4 | 4 | 3 | **0.68** |
| B3 | 4 | 4 | 4 | 3 | 4 | 4 | 3 | **0.68** |
| B4 | 4 | 4 | 4 | 3 | 4 | 4 | 3 | **0.68** |
| B5 | 4 | 4 | 4 | 3 | 4 | 4 | 5 | 0.75 |
| B6 | 4 | 4 | 4 | 3 | 4 | 4 | 5 | 0.75 |
| B7 | 4 | 4 | 4 | 3 | 4 | 4 | 5 | 0.75 |
| B8 | 4 | 4 | 4 | 3 | 4 | 4 | 5 | 0.75 |
| B9 | 4 | 4 | 4 | 3 | 4 | 4 | 5 | 0.75 |
| B10 | 2 | 4 | 4 | 3 | 4 | 4 | 5 | **0.68** |
| B11 | 3 | 4 | 4 | 3 | 4 | 4 | 5 | 0.71 |
| C1 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 0.71 |
| C2 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | **0.68** |
| C3 | 4 | 4 | 4 | 4 | 4 | 2 | 2 | **0.61** |
| C4 | 4 | 4 | 4 | 4 | 4 | 3 | 2 | **0.64** |
| C5 | 5 | 4 | 4 | 4 | 4 | 2 | 3 | **0.68** |
| C6 | 5 | 4 | 4 | 4 | 4 | 2 | 3 | **0.68** |
| C7 | 3 | 4 | 4 | 4 | 4 | 3 | 3 | **0.64** |
| C8 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | **0.68** |
| C9 | 4 | 4 | 4 | 4 | 4 | 2 | 3 | **0.64** |
| C10 | 3 | 4 | 4 | 4 | 4 | 3 | 4 | **0.68** |
| C11 | 3 | 4 | 4 | 4 | 4 | 3 | 4 | **0.68** |
| C12 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 0.79 |
| D1 | 5 | 4 | 4 | 4 | 4 | 4 | 5 | 0.82 |
| D2 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 0.79 |
| D3 | 5 | 4 | 4 | 4 | 4 | 5 | 4 | 0.82 |
| D4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 0.71 |
| D5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 0.75 |
| D6 | 4 | 4 | 4 | 4 | 4 | 3 | 5 | 0.75 |
| D7 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 0.71 |
| D8 | 2 | 4 | 4 | 4 | 4 | 3 | 5 | 0.68 |
| D9 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 0.75 |
| D10 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 0.71 |
| E1 | 4 | 2 | 4 | 4 | 4 | 5 | 5 | 0.75 |
| E2 | 4 | 2 | 4 | 4 | 4 | 4 | 4 | **0.68** |
| E3 | 4 | 2 | 4 | 4 | 4 | 4 | 4 | **0.68** |
| E4 | 3 | 2 | 4 | 4 | 4 | 3 | 4 | **0.61** |
| E5 | 4 | 2 | 4 | 4 | 4 | 4 | 4 | **0.68** |
| E6 | 3 | 2 | 4 | 4 | 4 | 3 | 4 | **0.61** |
| F1 | 4 | 2 | 4 | 5 | 5 | 4 | 4 | 0.75 |
| F2 | 4 | 2 | 4 | 5 | 5 | 4 | 4 | 0.75 |
| F3 | 3 | 2 | 4 | 5 | 5 | 4 | 5 | 0.75 |
| F4 | 4 | 2 | 4 | 5 | 5 | 4 | 5 | 0.79 |
| F5 | 4 | 2 | 4 | 5 | 5 | 4 | 5 | 0.79 |
| F6 | 4 | 2 | 4 | 5 | 5 | 5 | 5 | 0.82 |
| G1 | 4 | 5 | 4 | 5 | 5 | 3 | 5 | 0.86 |
| G2 | 4 | 5 | 4 | 5 | 5 | 3 | 5 | 0.86 |
| G3 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 0.86 |
| G4 | 4 | 5 | 4 | 5 | 5 | 3 | 5 | 0.86 |
| G5 | 4 | 5 | 4 | 5 | 5 | 4 | 5 | 0.89 |

Aiken's V Analysis Report evaluates 50 items for content validity as depicted in Table IV, with results categorized into three groups based on expert ratings: 1) strong content validity, 2) acceptable but may need minor revision, and 3) needs revision or removal. Out of the total, 21 items were found to fall into the "needs revision or removal" category, having Aiken's V scores significantly below the ideal threshold of 0.75. These scores indicate weaker expert agreement on the relevance or clarity of the items, suggesting that they may either be misaligned with the intended construct or ambiguous in wording. Another 21 items achieved scores near the threshold and were deemed "acceptable", while 8 items demonstrated strong content validity, reflecting high agreement among the evaluators.

TABLE IV. INTERPRETATION OF ANALYSIS

| Item | Aiken's V | Interpretation |
|---|---|---|
| B1 | 0.64 | **Needs revision or removal** |
| B2 | 0.68 | **Needs revision or removal** |
| B3 | 0.68 | **Needs revision or removal** |
| B4 | 0.68 | **Needs revision or removal** |
| B5 | 0.75 | Acceptable, may need minor revision |
| B6 | 0.75 | Acceptable, may need minor revision |
| B7 | 0.75 | Acceptable, may need minor revision |
| B8 | 0.75 | Acceptable, may need minor revision |
| B9 | 0.75 | Acceptable, may need minor revision |
| B10 | 0.68 | **Needs revision or removal** |
| B11 | 0.71 | Acceptable, may need minor revision |
| C1 | 0.71 | Acceptable, may need minor revision |
| C2 | 0.68 | **Needs revision or removal** |
| C3 | 0.61 | **Needs revision or removal** |
| C4 | 0.64 | **Needs revision or removal** |
| C5 | 0.68 | **Needs revision or removal** |
| C6 | 0.68 | **Needs revision or removal** |
| C7 | 0.64 | **Needs revision or removal** |
| C8 | 0.68 | **Needs revision or removal** |
| C9 | 0.64 | **Needs revision or removal** |
| C10 | 0.68 | **Needs revision or removal** |
| C11 | 0.68 | **Needs revision or removal** |
| C12 | 0.79 | Acceptable, may need minor revision |
| D1 | 0.82 | Strong content validity |
| D2 | 0.79 | Acceptable, may need minor revision |
| D3 | 0.82 | Strong content validity |
| D4 | 0.71 | Acceptable, may need minor revision |
| D5 | 0.75 | Acceptable, may need minor revision |
| D6 | 0.75 | Acceptable, may need minor revision |
| D7 | 0.71 | Acceptable, may need minor revision |
| D8 | 0.68 | **Needs revision or removal** |
| D9 | 0.75 | Acceptable, may need minor revision |
| D10 | 0.71 | Acceptable, may need minor revision |
| E1 | 0.75 | Acceptable, may need minor revision |
| E2 | 0.68 | **Needs revision or removal** |
| E3 | 0.68 | **Needs revision or removal** |
| E4 | 0.61 | **Needs revision or removal** |
| E5 | 0.68 | **Needs revision or removal** |
| E6 | 0.61 | **Needs revision or removal** |
| F1 | 0.75 | Acceptable, may need minor revision |
| F2 | 0.75 | Acceptable, may need minor revision |
| F3 | 0.75 | Acceptable, may need minor revision |
| F4 | 0.79 | Acceptable, may need minor revision |
| F5 | 0.79 | Acceptable, may need minor revision |
| F6 | 0.82 | Strong content validity |
| G1 | 0.86 | Strong content validity |
| G2 | 0.86 | Strong content validity |
| G3 | 0.86 | Strong content validity |
| G4 | 0.86 | Strong content validity |
| G5 | 0.89 | Strong content validity |

The following items specifically require attention due to their low Aiken's V values:

B1 (0.643), B2 (0.679), B3 (0.679), B4 (0.679), B10 (0.679), C2 (0.679), C3 (0.607), C4 (0.643), C5 (0.679), C6 (0.679), C7 (0.643), C8 (0.679), C9 (0.643), C10 (0.679), C11 (0.679), D8 (0.679), E2 (0.679), E3 (0.679), E4 (0.607), E5 (0.679), and E6 (0.607). These items span across several constructs and indicate widespread issues in content design. It is recommended that each of these items be reviewed for conceptual clarity, language precision, and alignment with the overall measurement objectives.

Analysis of Aiken's V scores revealed distinct patterns across constructs, warranting careful consideration. A significant observation was the relatively low validity scores attained by items within the Organizational Factors construct (specifically, items C3 through C9). These items, designed to gauge institutional readiness and leadership support for blockchain integration, consistently fell below the established validity threshold of 0.70. This suggests a potential lack of clarity or precision in the operational definitions of these constructs, potentially leading to ambiguity in respondent interpretation and assessment.

To enhance the interpretation of the quantitative findings, it is important to consider the qualitative feedback provided by the expert panel. For instance, item B1 ("Blockchain ensures unauthorized parties cannot access academic records"), which received a validity score of 0.64, was critiqued by one expert for being overly simplistic and not adequately reflecting the complexities of blockchain security. Similarly, item E4 ("Research findings are implemented faster via blockchain"), with a score of 0.61, was considered irrelevant by another expert who emphasized that the speed of research implementation is influenced by various factors beyond the technology itself. These examples highlight the value of expert evaluation in identifying items that may appear relevant but lack depth or fail to align with real-world applications and theoretical constructs.

A comparison between the current findings and existing literature on technology adoption in higher education reveals a notable discrepancy. Specifically, items related to the Technology and Environment constructs (D1 to D3) exhibited relatively higher content validity scores, whereas items under the Knowledge Integration construct (E2 to E6) showed lower ratings. One plausible explanation for this divergence is that technical and environmental aspects of blockchain adoption are more tangible and thus easier for experts to assess. In contrast, knowledge integration involves abstract, multidimensional considerations, making it inherently more challenging to evaluate. Additionally, potential misalignment between departmental objectives may further complicate the formulation and assessment of relevant items.

To strengthen the theoretical grounding of the revised items, the Technology-Organization-Environment (TOE) framework is employed. This framework posits that technology adoption is shaped by the interaction of technological, organizational, and environmental contexts. In this study, the original item phrasing within the Knowledge Integration dimension may not have fully captured the intricate relationships among these factors. For example, item E2 originally read, “Access to shared knowledge is equitable across departments or institutions”. It has been revised to: “Blockchain-based knowledge-sharing platforms should prioritize equitable access and usage across all departments and institutions”. This revision aims to better reflect the Organizational dimension of the TOE framework by explicitly addressing the importance of strategic planning and equitable resource distribution in fostering inclusive and effective knowledge integration efforts.

This revision process is critical to ensure that the instrument provides reliable and valid results for future applications. Table V summarizes of interpretation of each item.

TABLE V. SUMMARY OF INTERPRETATION

| Interpretation | Number of Items |
|---|---|
| Needs revision or removal | 21 |
| Acceptable, may need minor revision | 21 |
| Strong content validity | 8 |

When an item receives a low Aiken’s V score, typically below the threshold of 0.7, it indicates that expert raters do not sufficiently agree on the item’s relevance, clarity, or appropriateness for measuring the intended construct. This serves as a signal that the item may be flawed or misaligned and, therefore, requires careful attention. The first step in addressing a low score is to thoroughly review any qualitative feedback provided by the experts. Such feedback can help identify specific concerns such as ambiguous wording, double-barreled questions, or a lack of alignment with the overall theoretical framework. If feedback is not available, consider conducting a follow-up discussion with the panel to gain deeper insights into the causes of disagreement.

Following this analysis, the item should be revised with a focus on improving clarity, refining language, and ensuring conceptual alignment. The goal is to eliminate any ambiguity and enhance the item’s relevance and interpretability. Once revisions are made, the updated item should be resubmitted for expert evaluation in a second round of content validation to determine whether the changes have resulted in an improved Aiken’s V score. If the item continues to score below acceptable levels even after revision, it is advisable to consider removing it from the instrument. Retaining low-quality items can compromise the validity and reliability of the entire tool.

Throughout this process, all changes—whether revisions or deletions—should be systematically documented, including justifications and version history. This not only enhances transparency but also reinforces the instrument’s methodological rigor when reported in academic or professional settings.

## V. CONCLUSION

In conclusion, low Aiken’s V scores highlight critical areas in need of refinement within a measurement instrument and should not be overlooked. Addressing these scores through systematic revision, expert consultation, and re-evaluation is essential to enhance the content validity and overall quality of the instrument. Whether through improving clarity, ensuring alignment with constructs, or removing consistently weak items, these actions contribute to developing a more robust and reliable tool. By documenting the revision process and maintaining methodological transparency, researchers can strengthen the credibility and academic integrity of their validation efforts.

For future research endeavors, it is strongly recommended to conduct a second, more focused round of expert evaluation following the revision of items exhibiting low Aiken's V scores. This subsequent evaluation is crucial for assessing whether the implemented modifications have demonstrably improved the content validity of the affected items and, by extension, the instrument as a whole. Furthermore, the strategic inclusion of qualitative feedback, gathered both during the initial and subsequent expert evaluations, can provide invaluable, in-depth insights into the item-specific issues driving the low scores. These qualitative narratives can serve as a compass, guiding researchers toward more precisely targeted revisions and enabling them to address underlying problems that quantitative metrics alone may not fully reveal.

To further enhance the robustness and generalization of the validation process, it is advisable to expand the panel of experts to encompass a wider range of backgrounds, perspectives, and areas of expertise relevant to the constructs being measured. This diversification can help to mitigate potential biases stemming from a homogeneous expert group and ensure that the instrument is valid across diverse populations and contexts. Finally, it is highly recommended to pilot test the revised instrument with a representative sample drawn from the target population for which the instrument is ultimately intended. This pilot testing phase will provide critical data regarding the clarity, reliability, practical applicability, and overall user-friendliness of the instrument. By incorporating both quantitative and qualitative analyses of the pilot test data, researchers can ensure a more comprehensive assessment of the instrument's validity and identify any remaining areas requiring further refinement before embarking on full-scale implementation and data collection. These rigorous validation steps are essential for maximizing the utility and impact of the measurement instrument in future research and practice.

## ACKNOWLEDGMENT

The authors would like to express their sincere gratitude to Universiti Sains Islam Malaysia (USIM) for the financial support provided through the research grant PPPI/USIM/TAMHIDI/USIM/112323.

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