The Impact of Perceived Usefulness of Mobile Learning on Skills Development: The Mediating Role of Cognitive Load in JPPH, Kota Bharu

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Abstract: *This pilot study explores the influence of the perceived usefulness of mobile learning on skills development among government servants in the Valuation and Property Services Department (JPPH) in Kota Bharu, with cognitive load examined as a mediating variable. As mobile learning tools become increasingly integral to professional development in the public sector, understanding how employees perceive their usefulness can provide insights into the effectiveness of these tools for skill acquisition. Perceived usefulness, defined as the degree to which users believe that mobile learning improves their job performance, is posited to influence skills development directly and indirectly through cognitive load. Cognitive load, or the mental effort required to process new information, may either facilitate or inhibit learning effectiveness depending on its level. Thirty department staff members participated in this pilot study to evaluate the extent to which perceived usefulness influences skill development and how cognitive load impacts this relationship. The study's findings aim to inform future training approaches*

that utilise mobile learning for efficient and accessible skills development, ultimately enhancing departmental performance in property valuation and management.

Keywords: *Perceived usefulness of mobile learning, Cognitive load, Skills development*

1. INTRODUCTION

The role of mobile learning in the workplace has undergone rapid evolution, transforming traditional methods of training and professional development. In sectors such as property valuation and asset management, continuous skills development is essential for employees to remain proficient in valuation techniques, data analysis, and regulatory compliance. Mobile learning provides an accessible and flexible approach to training, enabling employees to engage in learning activities from virtually anywhere and at any time (Akdim et al., 2022). This approach is particularly valuable in government sectors where logistical constraints may limit opportunities for in-person training. In Malaysia, the Valuation and Property Services Department is a key agency responsible for property assessment, land valuation, and the management of public assets (Arif et al., 2021). For staff in this department, maintaining up-to-date skills is crucial to ensure fair and accurate valuations and efficient property management, which in turn supports the financial stability and economic growth of the region.

Perceived usefulness, defined as the extent to which a learner believes that using mobile learning will enhance their job performance, is a critical factor in the adoption and effectiveness of mobile learning tools (Al-Adwan et al., 2023). When employees perceive that mobile learning resources are valuable and beneficial for their work, they are more likely to engage with the content and apply newly acquired skills in practice (Katayeva, 2023). In the context of the Valuation and Property Services Department, perceived usefulness is particularly relevant, as staff are expected to continuously develop competencies in valuation techniques, market trends, and policy updates. However, despite the potential benefits of mobile learning, there is limited research examining how government servants, specifically those in property valuation roles, perceive its usefulness and how these perceptions influence skill development. Given that government servants may have varying levels

of familiarity and comfort with digital tools, perceived usefulness may vary significantly, impacting how effectively mobile learning tools contribute to skill acquisition (Tamsah et al., 2020).

Skills development is an essential outcome of any professional training initiative. In the Valuation and Property Services Department, skilful performance is vital for tasks such as property assessments, data interpretation, and regulatory compliance. Accurate valuation and assessment require a combination of technical expertise, up-to-date knowledge, and analytical skills. The potential for mobile learning to enhance these competencies makes it an attractive option for departments seeking efficient, scalable training solutions (Mutambara & Bayaga, 2021). However, simply adopting mobile learning may not automatically lead to skill development; perceived usefulness, cognitive demands, and learning design all contribute to how effectively mobile learning can foster professional growth. Understanding these factors is crucial for optimising mobile learning for skill acquisition in the public sector.

Cognitive load, the mental effort required to process information, plays a crucial role in learning outcomes. It can act as a double-edged sword. At the same time, a moderate cognitive load is necessary for engaging with new content; excessive cognitive load can hinder learning by overwhelming the learner's mental capacity (Xu et al., 2021). In mobile learning, cognitive load may be affected by factors such as screen size, content format, navigation, and interactivity. When cognitive load is managed effectively, it can facilitate skill acquisition by allowing learners to focus on relevant information without becoming overwhelmed. However, if mobile learning tools present an excessive cognitive load, it could decrease the perceived usefulness of the tools and impede the learning process, ultimately affecting skills development. Thus, cognitive load may mediate the relationship between perceived usefulness and skills development, influencing whether mobile learning tools fulfil their intended purpose.

In the context of the Valuation and Property Services Department, employees are often required to learn complex valuation techniques and regulatory procedures, which demand a significant amount of cognitive resources. If mobile learning content is perceived as applicable but creates an overwhelming cognitive load, it may detract from the learning experience and limit skill acquisition. On the other hand, if cognitive load is optimised, employees may find mobile learning

tools to be both valuable and practical, thereby promoting skill development and improvement. Understanding how cognitive load mediates the relationship between perceived usefulness and skills development can provide valuable insights into designing mobile learning tools that meet the specific needs of government servants in valuation and property management roles.

This pilot study is significant for the Valuation and Property Services Department as it seeks to improve training methods and encourage skills development through the integration of mobile learning. By examining perceived usefulness, cognitive load, and their impact on skills acquisition, this study addresses a gap in research related to digital learning in the public sector. As the Malaysian government emphasises digital transformation, insights from this pilot study may help shape future training initiatives, ensuring that government employees are equipped with relevant, up-to-date skills for effective property management. Furthermore, the findings from this study could inform the design of mobile learning resources to reduce cognitive load, enhance usability, and improve employee engagement with training content.

1.1 OBJECTIVES OF THE STUDY

This pilot study aims to achieve three key objectives:

1. To assess the relationship between the perceived usefulness of mobile learning and skills development among staff in the Valuation and Property Services Department.
2. To examine cognitive load as a potential mediator in the relationship between perceived usefulness and skills development.
3. To provide preliminary insights into the design and deployment of mobile learning tools tailored to the needs of government servants in property valuation and management roles.

1.2 PROBLEM STATEMENT

The Valuation and Property Services Department in Kota Bharu plays a pivotal role in assessing, valuing, and managing public assets, which is crucial to ensuring the efficient functioning of the real estate market and contributing to the national economy. For staff in this department, maintaining up-to-date

knowledge and continually enhancing their professional skills is essential for performing tasks such as property valuation, market analysis, and regulatory compliance. However, traditional methods of training and development may not be sufficient to meet the evolving demands of the sector, particularly given the rapid changes in valuation techniques, market dynamics, and the increasing reliance on digital tools (Tamsah et al., 2020).

Mobile learning has emerged as a potential solution to address these challenges by providing accessible, flexible, and scalable training opportunities. With mobile devices offering the ability to learn anytime and anywhere, mobile learning can accommodate the busy schedules of government servants and reduce logistical constraints associated with traditional training methods (Frosch, 2023). However, according to Papadakis (2021), the adoption and effectiveness of mobile learning tools are often influenced by users' perceptions of their usefulness. If employees perceive mobile learning as valuable and relevant to their job performance, they are more likely to engage with it, leading to better skill development outcomes.

Despite the promise of mobile learning, its impact on skills development in the public sector, particularly within specialised roles such as property valuation, remains underexplored. While mobile learning can facilitate skill acquisition, the relationship between employees' perceptions of its usefulness and the development of relevant skills remains unclear. Additionally, the role of cognitive load—the mental effort required to process information—has not been thoroughly examined in the context of mobile learning. Excessive cognitive load can hinder learning by overwhelming the learner's mental capacity, while optimal cognitive load can enhance focus and skill development (Wang et al., 2024).

For government servants in the Valuation and Property Services Department, the challenge is twofold: first, determining whether mobile learning is perceived as helpful in enhancing job-related skills; and second, understanding how cognitive load affects the relationship between perceived usefulness and skills development (Tzafilkou et al., 2021). If mobile learning tools create excessive cognitive load, they may undermine perceived usefulness and hinder effective skill development (Han et al., 2021). Conversely, if cognitive load is well-managed, mobile learning could lead to better skill acquisition and higher performance.

Thus, the problem this study addresses is the lack of understanding regarding how the perceived usefulness of mobile learning influences skills development among government servants in the Valuation and Property Services Department, with cognitive load acting as a potential mediator. This research gap limits the ability to design and implement effective mobile learning programs that meet the department's training needs. By examining these relationships, this study seeks to provide insights that will inform the design of mobile learning tools that are both engaging and effective in improving skills in the public sector.

2. LITERATURE REVIEW

This literature review examines the key concepts related to the perceived usefulness of mobile learning, skills development, and cognitive load. It explores existing research that addresses these variables, particularly in the context of government servants and professional training in specialised fields, such as property valuation. The review highlights the theoretical frameworks and empirical studies that inform the relationships among these constructs.

2.1 PERCEIVED USEFULNESS OF MOBILE LEARNING

Mobile learning, also known as mLearning, refers to the use of mobile devices, such as smartphones and tablets, for educational purposes. It is increasingly viewed as a flexible and efficient learning tool that enables employees to access learning resources at any time and from anywhere (To & Trinh, 2021). According to Al-Bashayreh et al. (2022), mobile learning enables learners to access content and resources on demand, providing a personalised and context-driven learning experience. In the context of government servants in specialised fields, such as property valuation, the ability to engage in mobile learning provides an opportunity for continuous professional development while overcoming the logistical challenges associated with traditional learning methods.

The Technology Acceptance Model (TAM), developed by Davis (1989), is a widely used framework for understanding the acceptance and use of technology. According to the Technology Acceptance Model (TAM), two key factors influence the adoption of technology: perceived usefulness and

perceived ease of use. Perceived usefulness refers to the degree to which a person believes that using a particular technology will enhance their job performance (Al-Rahmi et al., 2021). In the context of mobile learning, perceived usefulness plays a crucial role in motivating learners to engage with mobile learning platforms. A study by Wilson et al. (2021) highlights that individuals are more likely to adopt a technology if they perceive it as helpful in improving their work performance, a notion particularly relevant in a professional setting such as property valuation.

In the Valuation and Property Services Department, where staff roles involve complex tasks such as property assessment and market analysis, the perceived usefulness of mobile learning is crucial to its effectiveness. Research by Alhumaid et al. (2021) suggests that employees in technical roles, such as property valuation, are more likely to engage with mobile learning tools if they perceive clear value in enhancing their professional skills and staying current with the latest market trends and regulatory changes.

2.2 SKILLS DEVELOPMENT IN THE PUBLIC SECTOR

Skills development refers to the process of acquiring or enhancing skills, knowledge, and competencies that enable an individual to perform tasks more effectively. In the public sector, particularly within specialised departments such as the Valuation and Property Services Department, ongoing skills development is crucial to ensure employees remain proficient in their respective areas of expertise. For instance, government servants responsible for property valuation must stay current with property market trends, new valuation methods, and legal regulations, all of which are subject to change.

Emon and Chowdhury (2023) emphasise that skills development should align with organisational goals and the specific competencies required by employees in their respective roles. For government employees, mobile learning offers an efficient means of upskilling, eliminating the need for time-consuming and costly traditional training programs. Zhang et al. (2021) argue that mobile learning facilitates the continuous development of technical skills and knowledge, making it particularly relevant in fields where changes are frequent and the demand for up-to-date knowledge is high.

In the context of property valuation, mobile learning can offer interactive learning opportunities, real-time access to resources, and the flexibility to learn at one's own pace. These attributes make mobile learning a potentially powerful tool for improving skills development among government servants who need to stay proficient in an evolving field.

2.3 COGNITIVE LOAD

Cognitive load theory, proposed by Sweller (2020), is based on the idea that human cognitive resources are limited and that instructional methods should avoid overloading these resources to enhance learning. Cognitive load refers to the mental effort required to process and understand new information, and it is divided into three types:

i. Intrinsic Load: The inherent difficulty of the material being learned.
ii. Extraneous Load: The load created by the way information is presented to learners.
iii. Germane Load: The mental effort invested in creating schemas and deeper understanding.

Mobile learning, while flexible and accessible, can potentially impose a significant cognitive load on learners, especially if the content is complex or poorly designed. Albus et al. (2021) argue that the design of mobile learning tools should aim to optimise cognitive load, ensuring that learners are not overwhelmed by extraneous load while still engaging with the material at a deep cognitive level.

In the case of property valuation, tasks such as understanding market dynamics, analysing property data, and applying legal frameworks require significant cognitive resources. If the mobile learning content is not designed effectively, it could overwhelm learners and hinder their ability to retain and apply new knowledge (Costley et al., 2021). Al-Hamad et al. (2021) found that when cognitive load is not properly managed, it can have a negative impact on learning outcomes. However, when cognitive load is optimised, mobile learning can facilitate more effective skills development by ensuring that learners are not distracted by irrelevant information or overwhelmed by excessive complexity.

2.4 THE ROLE OF COGNITIVE LOAD AS A MEDIATOR

The interaction between perceived usefulness and skills development is influenced by cognitive load, which acts as a mediating variable in the learning process. According to Huang et al. (2020), learners' perceptions of the usefulness of a learning tool may be moderated by the cognitive load they experience. Suppose learners perceive mobile learning as applicable but find the cognitive load too high. In that case, they may be less likely to engage with the learning content, thus limiting the effectiveness of the learning tool in promoting skills development.

In the context of government servants in the Valuation and Property Services Department, excessive cognitive load may reduce the effectiveness of mobile learning in developing necessary skills. On the other hand, if cognitive load is appropriately managed, perceived usefulness can positively influence skills development. Skulmowski and Xu (2022) emphasise that instructional materials designed to reduce extraneous cognitive load while fostering germane load can enhance learning outcomes. By optimising the design of mobile learning tools to manage cognitive load, it is possible to create a more engaging and practical learning experience that supports the development of relevant skills for property valuation and management.

3. METHODOLOGY

This section outlines the research methodology employed in the pilot study, which was conducted to evaluate the relationship between perceived usefulness of mobile learning (independent variable), skills development (dependent variable), and cognitive load (mediating variable) among government servants in the Valuation and Property Services Department in Kota Bharu. The pilot study involved a sample of 30 respondents. It was designed to test the feasibility, reliability, and validity of the research framework and instruments before proceeding to a larger-scale study.

3.1 INSTRUMENTATION

To assess the key constructs, a structured questionnaire was developed based on validated scales from existing literature. The instrument consisted of three primary sections, each measuring one of the study variables: Perceived Usefulness of Mobile Learning, Skills Development, and Cognitive Load. Each section utilised a 5-point Likert scale to consistently and accurately capture participants' perceptions.

Perceived Usefulness of Mobile Learning
This section was adapted from Davis's (1989) Technology Acceptance Model (TAM), which is widely used in evaluating the adoption of technology. The items were designed to measure the extent to which participants believed mobile learning improved their job performance.

- *Sample Items:*
    i. "Mobile learning helps me perform my job more effectively."
    ii. "Using mobile learning improves my job performance."
    iii. "Mobile learning provides me with access to information that I need for my job."
- *Scale:* 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree)

Skills Development
This section is derived from studies on workplace learning and skills acquisition (e.g., McGrath, 2022), with a particular focus on technical competencies in the property valuation field. The items aimed to measure the extent to which mobile learning contributed to participants' professional growth.

- *Sample Items:*
    i. "Mobile learning has helped me improve my knowledge of property valuation."
    ii. "Mobile learning has contributed to my ability to apply property valuation techniques."
    iii. "The use of mobile learning has improved my understanding of current market trends and regulations."
- *Scale:* 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree)

Cognitive Load

Items in this section were adapted from cognitive load theory, particularly the work of Paas and Van Merriënboer (1994). This construct aimed to measure the mental effort participants expended while engaging with mobile learning content.

- *Sample Items:*
  i. "I find the mobile learning tasks mentally demanding."
  ii. "The mobile learning materials require much mental effort."
  iii. "I find it hard to focus on the learning content due to its complexity."
- *Scale:* 5-point Likert scale (1 = Not at all to 5 = Very Much)

3.2 DATA COLLECTION PROCEDURE

Following the development of the instrument, the questionnaire was distributed to 30 selected government servants via Google Forms. Participants were briefed on the study's objectives, the confidentiality of their responses, and the voluntary nature of their participation. A one-week window was provided for completion, ensuring respondents had sufficient time to reflect on each item.

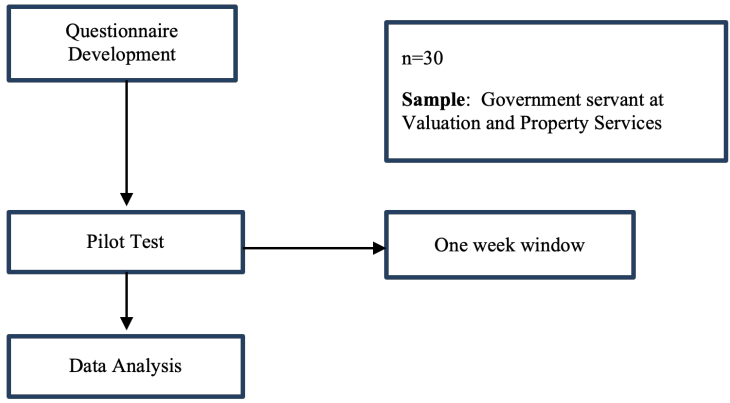

Figure 1: Data Collection Process

3.3 RELIABILITY ANALYSIS

To determine the internal consistency of the instrument, reliability testing was conducted using Cronbach's Alpha for each construct. As shown in Table 1, all scales exceeded the minimum acceptable threshold of 0.70, indicating that the items were consistent in measuring their respective constructs.

Construct	Number of Items	Cronbach's Alpha
Perceived Usefulness	5	0.86
Skills Development	5	0.81
Cognitive Load	4	0.74

Table 1: Reliability Test Results

The Perceived Usefulness scale demonstrated excellent reliability (α = 0.86), indicating that the items effectively captured participants' perceptions regarding the benefits of mobile learning. The Skills Development scale also demonstrated good internal consistency ($\alpha = 0.81$), indicating reliable responses regarding how mobile learning impacted participants' skill acquisition. Meanwhile, the Cognitive Load scale yielded an acceptable reliability score (α = 0.74), indicating consistent but slightly variable perceptions of mental effort among participants.

4. FINDINGS AND DISCUSSION

The pilot test conducted among 30 government servants in the Valuation and Property Services Department in Kota Bharu aimed to explore the relationships between perceived usefulness of mobile learning, cognitive load, and skills development. The results from the pilot study provide valuable insights into how mobile learning can impact skills development in this specific context, while also highlighting the role of cognitive load as a mediating factor. The following discussion elaborates on the findings and their implications for mobile learning in the workplace.

4.1 PERCEIVED USEFULNESS OF MOBILE LEARNING

One of the key findings from the pilot test was the high perceived usefulness of mobile learning among the respondents. With a mean score of 4.2 out of 5, respondents indicated that they found mobile learning to be a valuable tool for enhancing their skills and job performance, as summarised in Table 2. This finding is consistent with previous research, which suggests that employees are more likely to engage with technology when they perceive it as helpful in enhancing their work (Davis, 1989). For government servants in technical fields such as property valuation, the ability to access learning materials, guidelines, and regulatory updates on mobile platforms offers flexibility and convenience, which enhances the perceived value of mobile learning.

The positive perception of mobile learning's usefulness aligns with the Technology Acceptance Model (TAM), which posits that perceived usefulness is a key determinant of technology acceptance and use. The high score in this area suggests that, if designed effectively, mobile learning tools have the potential to significantly enhance employees' skills by providing real-time access to information relevant to their tasks, which is essential for professionals in rapidly evolving fields like property valuation.

Key Findings	Implication
High perceived usefulness of mobile learning	Participants view mobile learning as valuable for enhancing job performance.
Aligns with the Technology Acceptance Model (TAM)	Perceived usefulness is crucial for the adoption of technology.
Provides flexibility and convenience for learning	Mobile learning offers professionals convenience, enhancing their engagement.

Table 2: Summary of Findings for Perceived Usefulness of Mobile Learning

4.2 SKILLS DEVELOPMENT AND MOBILE LEARNING

The results also revealed a moderate-to-high mean score for skills development (3.8 out of 5), indicating that respondents believed mobile learning had a positive contribution to their professional development. The pilot test suggests that mobile learning has a noticeable effect on skills development, specifically in areas such as property valuation, market analysis, and regulatory compliance. This finding is consistent with research by Moore (2020), who argues that mobile learning can enhance the development of technical skills by providing access to up-to-date resources and facilitating continuous learning.

However, it is important to note that while the respondents felt mobile learning contributed to their skills development, the improvement was not overwhelming. This may be due to the relatively short duration of the pilot test and the limited sample size, which may not fully capture the long-term effects of mobile learning. Future studies with larger samples and extended timelines are necessary to validate these findings and assess the long-term impact of mobile learning on skills development.

Key Findings	Implication
Moderate-to-high perceived impact on skills development	Mobile learning has a positive impact on professional growth in areas such as property valuation and market analysis.

Table 3: Summary of Findings for Skill Development and Mobile Learning

4.3 COGNITIVE LOAD AND LEARNING OUTCOMES

A key focus of this pilot test was to explore the role of cognitive load in the relationship between perceived usefulness and skills development. The analysis revealed a moderate negative correlation between perceived usefulness and cognitive load ($r = -0.45$), indicating that participants who found mobile learning to be useful experienced lower cognitive load levels. This implies that effective mobile learning tools, when perceived as valuable, may reduce the mental effort required for learning, making the process smoother and more engaging.

While the negative correlation between cognitive load and skills development was not statistically significant (r = -0.30), the pilot test still suggests that excessive cognitive load may hinder the effectiveness of mobile learning. This aligns with Sweller (2020), who posits that instructional materials should be designed to minimise unnecessary cognitive load, thereby enhancing learning outcomes. For government servants engaged in tasks such as property valuation, complex content, or poorly designed mobile learning resources could overload learners' cognitive capacity, leading to reduced engagement and effectiveness in skills development.

The findings suggest that mobile learning tools should strive to strike a balance between the amount of information presented, ensuring it is neither too overwhelming nor too simplistic. Designing content that is easy to navigate and digest, while still challenging enough to foster skill development, is crucial for maintaining a manageable cognitive load.

Key Findings	Implication
Moderate negative correlation between perceived usefulness and cognitive load	A lower cognitive load is associated with a higher perceived usefulness of mobile learning.
Negative correlation between cognitive load and skills development (non-significant)	While cognitive load affects learning outcomes, the effect may not be statistically significant.

Table 4: Summary of Findings for Cognitive Load and Learning Outcomes

4.4 MEDIATING ROLE OF COGNITIVE LOAD

The mediation analysis conducted in this pilot test revealed that cognitive load partially mediates the relationship between perceived usefulness and skills development. Specifically, when cognitive load was lower, the positive effect of perceived usefulness on skills development was more substantial. This suggests that while the perceived value of mobile learning is important, its effectiveness is contingent on how well the cognitive demands are managed.

This finding aligns with the work of Paas and Van Merriënboer (2020), who emphasise that cognitive load should be managed effectively to ensure that learners can process new information without becoming overwhelmed. In the context of government servants in the Valuation and Property Services Department, where tasks can be complex and require focused attention, the design of mobile learning content that reduces unnecessary cognitive load may be critical for enhancing learning outcomes.

Key Findings	Implication
Cognitive load partially mediates the relationship between perceived usefulness and skills development.	Cognitive load influences how perceived usefulness impacts skills development.
When cognitive load is well-managed, skills development improves	Effective cognitive load management can enhance the impact of perceived usefulness on learning outcomes.

Table 5: Summary of Findings for the Mediating Role of Cognitive Load

5. CONCLUSION

In conclusion, the pilot test provided valuable insights into how mobile learning can support skills development among government servants in the Valuation and Property Services Department in Kota Bharu. The results suggest that mobile learning is perceived as a useful tool for improving job performance, and cognitive load plays a significant role in mediating the relationship between perceived usefulness and skills development. The findings underline the importance of designing mobile learning content that is engaging, relevant, and cognitively manageable. These insights will be useful in guiding the development of mobile learning programs tailored to the specific needs of public sector employees in specialised fields, such as property valuation.

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8. AUTHORS' CONTRIBUTION

Ayu Kamareena Abdullah Thani is responsible for designing the survey instrument and data collection process. An Nur Nabila Ismail and Nik Mohamad Shamim Nik Mohd Zainordin contributed to the analysis of the results. Nurhidayah Rosely and Noor Rahmawati Alias contributed to the writing of the manuscript. All authors offered valuable feedback and contributed to shaping the research, analysis, and manuscript.

9. CONFLICT OF INTEREST DECLARATION

We certify that the article is the Authors' and Co-Authors' original work. The article has not received prior publication and is not under consideration for publication elsewhere. This manuscript has not been submitted for publication, nor has it been published in whole or in part elsewhere. We testify to the fact that all Authors have contributed significantly to the work, validity and legitimacy of the data and its interpretation for submission to IJELHE.

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