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USABILITY ASSESSMENT OF THE LEADERSHIP MODEL FOR ORANG ASLI SCHOOLS IN MALAYSIA USING THE FUZZY DELPHI METHOD (FDM)

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Abstract:

This research examines the effectiveness of specific leadership model elements designed for school leaders within the Indigenous Orang Asli community in Malaysia, utilizing the Fuzzy Delphi Method (FDM). The panel of experts consisted of 13 headteachers from Orang Asli national schools. The study addresses the primary leadership and educational challenges faced by the Orang Asli, considering their distinct cultural, geographical, and socioeconomic circumstances, which require a unique approach different from conventional schools. This evaluation is part of the third stage in the Design and Development Research (DDR) framework, employing a structured approach to test the usability and relevance of four primary leadership components: intrapersonal leadership, holistic leadership, cultural leadership, and collaborative leadership. The results show a high level of appropriateness for all components, as evidenced by a threshold (d) value of ≤ 0.2, a fuzzy score of ≥ 0.5, and a consensus percentage of $\geq 75\%$. Additionally, the study highlights the necessity for an inclusive and comprehensive leadership strategy in Indigenous education that honors the cultural identity of the Orang Asli. Such a strategy promotes a supportive educational environment, enabling more effective solutions to educational challenges.

Keywords:

Fuzzy Delphi Method, Indigenous Education, Leadership Model, Usability Evaluation

Introduction

In Education is a cornerstone for a nation's development and sustainability, ensuring that every individual, regardless of their background, ethnicity, religion, or nationality, has the right to access quality education. Reflecting this principle, the Malaysian government has launched numerous initiatives to improve educational access and quality, most notably through the Malaysian Education Blueprint (MEB) 2013–2025. This blueprint underscores the commitment to providing quality education across all societal segments, irrespective of socioeconomic or ethnic differences. It aligns with the National Education Policy, which ensures that every Malaysian child has an equitable opportunity for education. Furthermore, Malaysia's dedication to Sustainable Development Goal 4 (SDG 4) illustrates its resolve to secure inclusive, quality education and promote lifelong learning opportunities for all.

Despite these initiatives, challenges in achieving equitable education access and quality continue. Research by Kamarulzaman and Hashim (2013) emphasizes the need for a more inclusive educational approach to foster national unity, considering the diverse socioeconomic, religious, and ethnic backgrounds of students. Developing a specialized leadership model for Orang Asli schools is a critical area of research, aiming to incorporate Indigenous knowledge systems, cultural values, and community engagement into educational leadership practices (Washington & Johnson, 2023). Given Malaysia's unique multicultural environment, creating an education system that is inclusive and relevant to its various communities remains challenging. This is particularly true for school leaders and teachers working with Indigenous Orang Asli students, who face distinct obstacles related to cultural, geographical, and socioeconomic factors. Developing a tailored leadership approach for Orang Asli schools in Malaysia is essential to effectively address the unique challenges these institutions face. This study aims to create and evaluate a leadership model specifically designed to meet the needs of Orang Asli schools, considering the broader Malaysian educational landscape.

The assessment of this leadership model's usability represents a significant initiative in addressing the distinct educational needs of Orang Asli students. This approach also takes into account the broader Malaysian educational context. The study employs the Fuzzy Delphi Method (FDM) as a robust evaluation tool to achieve expert consensus on leadership practices that are specifically adapted to the needs and educational context of Orang Asli communities. This method is particularly suitable given the necessity for leadership models in Orang Asli schools to be adaptable and responsive to the specific requirements of these communities, including their unique sociocultural contexts and educational challenges.

By leveraging the FDM, the study seeks to ensure that the proposed leadership model is both practical and effective in fostering educational success among Orang Asli students. This initiative not only highlights the importance of culturally responsive leadership but also contributes to the larger goal of achieving equitable education for all segments of Malaysian society.

Literature Review

Indigenous Orang Asli Education in Malaysia

The educational challenges faced by the Orang Asli community in Malaysia are complex and multifaceted. These challenges include cultural and linguistic differences, geographical barriers, and inadequate infrastructure. Cultural and linguistic disparities pose significant

obstacles, as the mainstream education system often fails to recognize and integrate the unique cultural and linguistic heritage of the Orang Asli community. This oversight can lead to low student engagement and poor academic performance, as highlighted by Renganathan (2022). The disconnect between the educational content and the cultural realities of Orang Asli students often results in a learning experience that is neither relevant nor engaging.

The distinct cultural identity of the Orang Asli is frequently misunderstood within the broader educational framework. Their traditions and way of life differ significantly from those of the mainstream population, and a standardized curriculum that does not accommodate their cultural background exacerbates this disconnect. School leaders, particularly headteachers, are tasked with the challenging role of balancing traditional cultural practices with the demands of a modern education system. Williams (2020) underscores the importance of culturally responsive curricula, noting that such approaches have been shown to enhance student achievement by acknowledging and valuing local cultural values.

Integrating Indigenous knowledge and practices into the formal education system is therefore essential for creating a more inclusive and effective learning environment for Orang Asli students. By doing so, educators can foster a sense of belonging and relevance, which is crucial for improving educational outcomes. This integration not only supports academic success but also helps preserve and respect the cultural identity of the Orang Asli community, ultimately contributing to a more equitable educational landscape in Malaysia. The educational landscape for the Orang Asli community in Malaysia is fraught with challenges that are deeply rooted in cultural and linguistic disparities. Teachers and school leaders often encounter difficulties in understanding and adapting to the unique cultural values and traditions of the Orang Asli, which diverge significantly from mainstream educational norms. This lack of cultural comprehension can lead to misunderstandings and misalignments in educational approaches, as noted by Warren and Quine (2013). Such misalignments can result in educational practices that are not only ineffective but also potentially alienating for Orang Asli students.

One of the critical barriers to effective education for the Orang Asli is the linguistic gap between their native languages and the official medium of instruction used in schools. This discrepancy poses a significant challenge, as it hampers students' ability to fully comprehend lesson content, subsequently diminishing their motivation to attend school. The language barrier is not merely an academic hurdle; it is a fundamental obstacle that affects students' overall educational experience and engagement. Renganathan (2016) highlights that teaching methods that do not take into account the linguistic diversity of Orang Asli students contribute to higher dropout rates. When pedagogical strategies fail to incorporate cultural and linguistic inclusivity, students face substantial barriers to engagement and academic success. These barriers are not easily overcome without intentional and systematic changes to teaching practices. To address these challenges, it is crucial to implement language-sensitive teaching practices alongside culturally responsive curricula. Such approaches can bridge the existing gaps and improve educational outcomes for Orang Asli students. By recognizing and valuing the cultural and linguistic backgrounds of these students, educators can create a more inclusive and supportive learning environment. This not only enhances student engagement and achievement but also respects and preserves the cultural identity of the Orang Asli community, thereby contributing to a more equitable and effective educational system in Malaysia.

The educational challenges faced by Orang Asli communities in Malaysia are compounded by significant geographical barriers. The remote locations of these communities often hinder consistent access to educational facilities, with difficult terrain and extensive travel distances contributing to low attendance and high dropout rates (Sumathi, 2021). Many Orang Asli schools are situated in isolated rural areas, where access to education is further impeded by poor road conditions. Abdul Razak (2023) emphasizes that geographical accessibility remains a primary challenge for headteachers in these communities, highlighting the urgent need for solutions to improve transportation and access to schools. In addition to geographical challenges, inadequate infrastructure poses a critical barrier to the quality of education in Orang Asli schools. Essential facilities such as proper classrooms, sufficient teaching materials, and a trained workforce of educators are often lacking, which creates an unconducive learning environment (Adams, 2022). Fullan (2019) underscores that insufficient infrastructure limits both teachers' and students' potential to engage effectively in the learning process. Furthermore, many Orang Asli schools struggle with basic necessities, including reliable electricity, clean water supply, and access to educational technology. These infrastructural deficiencies not only hinder the learning experience but also exacerbate the educational disparities between Orang Asli students and their mainstream counterparts.The implications of these challenges are profound, underscoring the urgent need for targeted interventions to enhance both educational access and quality for Orang Asli communities. Addressing geographical and infrastructural shortcomings is vital for creating an environment where students can thrive academically and socially. Investment in transportation infrastructure, as well as improvements in school facilities and resources, are essential steps toward fostering equitable educational opportunities for Orang Asli students. By prioritizing these areas, policy-makers and educators can work toward bridging the educational gap and ensuring that all students, regardless of their geographical location, have access to a high-quality education. The socioeconomic challenges faced by the Orang Asli community in Malaysia significantly impact their educational outcomes. The prevalence of poverty within these communities directly affects their capacity to support their children's education, resulting in a lack of awareness regarding the importance of schooling. This lack of awareness contributes to low school attendance and high dropout rates, as highlighted by Santamaria et al. (2014) and Othman (2022). Recent research by Salleh and Abdul Razak (2024) further elucidates the multifaceted nature of the educational challenges encountered by school leaders in Orang Asli communities, emphasizing the interplay of socioeconomic, cultural, and geographical factors. This aligns with findings from Mazzlida and Ruhizan (2016), which indicate that poverty serves as a significant barrier to accessing quality education for Orang Asli students. The challenges of limited financial resources extend beyond mere attendance; they encompass restricted access to essential educational materials and a shortage of trained educators, as noted by Othman (2022). Moreover, Wong and Abdillah (2018) assert that systemic poverty among Orang Asli families is a critical factor contributing to high dropout rates, particularly at the primary school level. Their study reveals that key socioeconomic indicators, such as low household income and parents' limited educational attainment, are directly correlated with children's academic performance. This intersection of socioeconomic barriers highlights the urgent need for targeted interventions aimed at addressing both financial constraints and educational accessibility. To improve learning outcomes for Orang Asli students, it is essential to implement comprehensive strategies that not only provide financial assistance but also raise awareness about the value of education within the community. Initiatives could include scholarships, provision of learning materials, and community education programs focused on the benefits of sustained schooling. By addressing these intertwined socioeconomic factors,

stakeholders can work towards fostering an environment that supports educational engagement and success for Orang Asli students. The socioeconomic background of families is a critical determinant of school dropout rates in Malaysia, as highlighted by Zakari et al. (2022). Low socioeconomic status significantly impacts parents' awareness of the importance of their children's education, as noted by Azlina and Ma'rof (2013). Abdullah (2010) emphasizes that the financial constraints faced by families often translate into challenges in teaching and learning for Orang Asli students, who are particularly affected by poverty, as outlined by Ali (2024). This financial limitation restricts their ability to provide the necessary support for educational pursuits. In addition to these financial challenges, cultural differences present substantial barriers to education. The traditional learning modalities within the Orang Asli community, which emphasize oral knowledge transmission and experiential learning, often clash with the formal education system that prioritizes individual academic achievement (Zamzuri et al., 2023; Kamsin, 2023). This cultural dissonance can hinder students' engagement and performance within the conventional schooling framework. Geographical isolation further complicates access to quality education. Many Orang Asli communities reside in remote areas where connectivity is limited, making consistent school attendance a significant challenge (Hassan, 2023). The lack of infrastructure, including inadequate transportation options and insufficient school facilities, exacerbates these difficulties and restricts educational opportunities and resources available to these communities (Nordin et al., 2020). To effectively address these multifaceted challenges, a holistic and culturally responsive approach is essential. This involves creating educational strategies that respect and integrate the cultural practices of the Orang Asli community while also addressing financial and infrastructural limitations. By fostering an inclusive and equitable educational environment, stakeholders can better support Orang Asli students in overcoming the barriers they face, ultimately promoting higher educational attainment and reduced dropout rates within this marginalized community.

A culturally oriented educational approach is indeed vital for effectively supporting Orang Asli students in Malaysia. The research conducted by Abdul Razak (2023) underscores the necessity of active community participation and the development of a curriculum that resonates with the cultural context of the Orang Asli. This notion is further reinforced by Williams (2020), who argues that a curriculum grounded in Indigenous epistemology can significantly enhance students' sense of belonging and fortify their cultural identity.

The challenges faced by Orang Asli education are multifaceted, necessitating tailored solutions that are sensitive to their unique circumstances. As highlighted in studies by Rosnon and Talib (2019) and Adnan et al. (2021), integrating cultural elements into the educational curriculum is crucial for improving learning outcomes among Orang Asli students. The current curriculum often falls short in recognizing and accommodating the diverse cultural backgrounds and specific educational needs of these learners. This oversight contributes to the high dropout rates and diminished interest in education, further exacerbating the educational disparity between Orang Asli students and their peers from other communities (Nordin et al., 2020).

To address these pressing issues, it is essential to adopt a culturally responsive pedagogical framework that acknowledges and incorporates the unique traditions, values, and learning styles of the Orang Asli community. Such an approach not only fosters a more inclusive educational environment but also empowers Orang Asli students to engage meaningfully with their education, promoting higher retention rates and overall academic achievement. By

prioritizing culturally relevant education, stakeholders can work towards bridging the educational gap and ensuring equitable opportunities for Orang Asli students in Malaysia.

Leadership Models in the Educational Context

In the field of educational leadership, various models have emerged that significantly shape school management practices and influence student achievement. Among the most notable is the Transformational Leadership model, which emphasizes a leader's ability to inspire and motivate staff to reach higher performance levels while cultivating a positive school culture. Research indicates that this model enhances teacher commitment and encourages innovative practices by fostering a supportive environment that promotes professional growth and collaboration (Heenan, 2024). Furthermore, a study conducted by Kullan et al. (2022) highlights the impact of high-quality leadership among headteachers in Orang Asli schools, demonstrating that culturally responsive and community-based approaches can lead to improved educational outcomes. This finding is particularly pertinent given the unique cultural and contextual challenges faced by these schools. Moreover, research also emphasizes the essential role of leadership models in schools located in remote or marginalized communities. For example, Ziduli and Buka (2023) note that principals in such settings often encounter distinctive challenges that necessitate adaptive leadership strategies tailored to their specific environments. These findings underscore the importance of flexibility, cultural sensitivity, and a community-oriented approach in effective school leadership. In conclusion, the diversity of leadership models in education highlights the necessity for leaders to adapt their strategies according to the unique needs of their schools. In the context of Orang Asli schools, embracing a leadership style that is both culturally relevant and responsive to community dynamics is crucial for addressing the specific challenges these institutions face and for enhancing overall educational outcomes.

Culturally Adaptive Leadership Models for Orang Asli Schools

Adapting leadership models to specific cultural contexts, such as Orang Asli schools in Malaysia, is crucial for ensuring that educational practices are both relevant and effective. Johnson and Fluckiger (2022) emphasize the importance of sensitivity to cultural dynamics and the values of local communities in educational leadership. In this context, educators from within the Orang Asli community are instrumental in bridging the gap between traditional educational frameworks and culturally appropriate practices, thereby enhancing student achievement. The recommended leadership style for Orang Asli schools should encompass both transformational and inclusive elements. This dual approach facilitates the integration of indigenous knowledge and local practices into the educational framework, as noted by Warren and Quine (2013). Leaders within these schools play a pivotal role in navigating the complexities of mainstream educational objectives while maintaining cultural sensitivity toward the Orang Asli community. Transformational leadership, characterized by its focus on community engagement and culturally responsive practices, has been recognized as a key driver of positive change within this unique educational landscape (Krishnasamy, 2019; Rabahi et al., 2016). The development of a leadership model specifically tailored to the distinct challenges faced by Orang Asli education is imperative. Such a model would not only address the educational needs of Orang Asli students but also foster an environment conducive to academic achievement and community engagement. By integrating culturally adaptive leadership practices, schools can create a more inclusive and effective educational experience that acknowledges and respects the rich cultural heritage of the Orang Asli community.

In conclusion, the implementation of culturally adaptive leadership models in Orang Asli schools represents a promising pathway for strengthening educational leadership in diverse contexts. This approach ensures that educational practices are not only effective but also resonate with the cultural values and aspirations of the communities they serve.

Application of the Fuzzy Delphi Method (FDM) in Educational Research

The Fuzzy Delphi Method (FDM) represents an innovative evolution of the traditional Delphi method, specifically designed to enhance the process of achieving expert consensus in environments characterized by uncertainty. By integrating fuzzy set theory with the Delphi technique, FDM allows for a nuanced representation of expert opinions, thereby addressing some of the limitations inherent in conventional consensus-building methods. This approach employs fuzzy triangular numbers to measure linguistic variables, which subsequently organizes subjective assessments into a more systematic and interpretable format. The methodological process typically involves several critical steps, including problem identification, expert selection, feedback collection, and comprehensive data analysis to facilitate consensus (Mustapha et al., 2021; Zulkifli et al., 2022). Besides that, delphi technique is a method of obtaining consensus agreement among a group of experts. This FDM is implemented by selecting experts who possess expertise in the field of study and meet specific criteria, and by carrying out the steps involved in the implementation of FDM (Mustapha & Darusalam, 2022). In the realm of educational research, FDM has demonstrated considerable utility, particularly in the identification of key factors influencing teaching and learning in contexts marked by uncertainty and complexity. For instance, Zulkifli et al. (2022) successfully employed FDM to design educational content in religious studies tailored for children with special needs, showcasing the method's effectiveness in developing relevant and context-sensitive educational materials. Similarly, Chen et al. (2017) utilized FDM to delineate digital literacy competencies for lower secondary students, identifying essential dimensions and sub-dimensions that are critical for informed educational planning. In summary, the Fuzzy Delphi Method stands out as a significant advancement in the pursuit of expert consensus within educational research. Its application across a variety of studies highlights its effectiveness in tackling complex educational challenges, and the methodological advantages it offers render it a preferred choice for researchers navigating the uncertainties associated with expert opinions. By employing FDM, educational researchers can enhance the relevance and applicability of their findings, ultimately contributing to more informed decision-making in educational practice and policy.

Research Objectives

The primary objective of this study is to evaluate the usability of a leadership model specifically designed for Orang Asli schools in Malaysia, utilizing the Fuzzy Delphi Method (FDM). This study seeks to ascertain the relevance and effectiveness of the four core components of the model namely, intrapersonal leadership, holistic leadership, cultural leadership, and collaborative leadership. Additionally, the research aims to measure the level of agreement among an expert panel regarding the model's efficacy in addressing the unique challenges faced by leaders in Orang Asli schools.

Methodology

Research Design

This study employs a Design and Development Research (DDR) framework, which encompasses three primary phases as outlined by Richey and Klein (2014), with particular emphasis on phase three: usability evaluation. The Fuzzy Delphi Method (FDM) is strategically utilized to elicit consensus among a carefully selected panel of experts. This study is about implementing the FDM approach in designing and developing schools leadership model for Orang Asli Schools in Malaysia. It is an approach that has been used and widely accepted to collect data for a study based on the validation expert in a research study (Mohd Ridhuan & Nurulrabihah, 2020). This research seeks to get the consensus of experts in the Orang Asli School Leadership on the components, elements and their rankings to form a prototype model. Marzukhi et al. (2023) there are three conditions to fulfil in arriving at the decision-making process of the elements in the respective component of the prototype model. It includes the Triangular Fuzzy Number, which takes in the element of the threshold value (d), experts' consensus percentage, and Fuzzy score (A).

Instruments, Assessment, and Data Collection Procedures

Data collection was executed through an FDM questionnaire, which was meticulously developed based on insights garnered from phase two of the research, specifically utilizing the Nominal Group Technique (NGT) and Interpretive Structural Modelling (ISM). The Fuzzy Delphi Method was employed to facilitate consensus among experts, allowing for the collection of diverse ideas, critical feedback, and constructive suggestions for enhancing the content of the developed items.

The choice of FDM is grounded in its ability to minimize decision-making errors and enhance consistency, thereby reducing the number of rounds required to reach consensus (Yaakub et al., 2020). Furthermore, FDM offers a more systematic and objective statistical analysis compared to conventional methods, representing a significant advancement over traditional Delphi procedures (Mohd Ridhuan Mohd et al., 2013). This methodological approach enables more objective evaluations of factors based on empirical data, ultimately strengthening the reliability and validity of the study's findings.

In the context of this study, the questionnaire was meticulously designed to evaluate the appropriateness and usability of the leadership model in greater detail, with a specific focus on the four key leadership components: intrapersonal leadership, holistic leadership, cultural leadership, and collaborative leadership. The Fuzzy Delphi Method (FDM) questionnaire was administered to the expert panel through face-to-face interactions, ensuring a conducive environment for discussion and feedback.

Experts were instructed to rate each item on the questionnaire using a modified Likert scale, enabling them to express their level of agreement regarding the relevance of each component of the model. This approach facilitated a nuanced understanding of the experts' perspectives and provided a structured framework for their evaluations.

Subsequent to data collection, the responses were analyzed using established threshold criteria, specifically a distance measure ($d \leq 0.2$) to assess the proximity of expert opinions, a consensus percentage threshold ($\geq 75\%$) to determine the level of agreement among participants, and

fuzzy scores (≥ 0.5) to quantify the degree of consensus on each item. This rigorous analytical framework ensured that the findings reflect a robust consensus among experts, thereby enhancing the validity of the study's conclusions regarding the usability and applicability of the leadership model in the context of Orang Asli schools.

Participants

The study involved a total of 13 school headteachers from Indigenous (Orang Asli) schools located in the states of Negeri Sembilan, Perak, Pahang, Selangor, and Kelantan. The demographic characteristics of the participants, as detailed in Table 1, indicate a diverse group with significant qualifications and extensive experience in educational leadership.

Table 1: Expert Panel Demographics

Item	Details	Frequency	Percentage
Gender	Male	11	84.6%
	Female	2	15.4%
Age	<50 years	2	15.4%
	50-55 years	9	69.2%
	>55 years	2	15.4%
Academic Qualification	Bachelor's Degree	11	84.6%

Instrument and Data Analysis

For this study, a structured Fuzzy Delphi Method (FDM) questionnaire was employed to assess the usability of the leadership model and its relevance within the context of Orang Asli schools. The FDM was selected for its systematic approach to deriving consensus from an expert panel through a scale-based evaluation, which is particularly effective in qualitative assessments.

Participants rated the items on the FDM questionnaire using a Likert scale, facilitating a clear understanding of expert evaluations regarding the model's usability and contextual relevance. Data analysis was conducted utilizing specific threshold criteria: a distance measure (d) of $\leq$ 0.2 to evaluate the proximity of expert opinions, a consensus percentage of $\geq 75\%$ to gauge the level of agreement among the panellists, and fuzzy scores of ≥ 0.5 to quantify the degree of consensus achieved on each item. These calculations were performed using Microsoft Excel, following the methodological frameworks established by Chen (2000) and Cheng & Lin (2002). This rigorous analytical approach not only enabled the measurement of expert agreement but also assisted in identifying specific areas of the model that may require further refinement or improvement.

Findings

Demographic Analysis

The expert panel consisted of 11 male participants (84.6%) and 2 female participants (15.4%). The majority of participants (69.2%) were aged between 50-55 years, and 84.6% held a Bachelor's degree. Their professional experience ranged from 24 to 38 years, with 4 to 10 years in their current positions as headteachers at Orang Asli schools.

Usability Assessment

The findings, summarized in Table 2, indicate that all four components of the model met the expert consensus criteria:

Table 2: Usability Assessment Results

Component	Threshold (d) (≤ 0.2)	Consensus (%)	Fuzzy Score (≥ 0.5)	Status
Intrapersonal Leadership	0.040	100%	0.951	Suitable
Holistic Leadership	0.054	100%	0.944	Suitable
Cultural Leadership	0.022	100%	0.959	Suitable
Collaborative Leadership	0.040	100%	0.951	Suitable

These results suggest that the panel of experts unanimously agreed that all four components of the leadership model were suitable for the context of Orang Asli schools, demonstrating high levels of consensus and strong fuzzy scores. The findings from this study indicate a robust consensus among the expert panel regarding the usability and suitability of the leadership model components tailored for Orang Asli schools in Malaysia. Analysis through the Fuzzy Delphi Method (FDM) revealed that all components of the model met the predefined criteria, with threshold (d) values lower than 0.2, fuzzy scores surpassing 0.5, and consensus percentages reaching an impressive 100%. These results underscore the model's substantial potential for implementation in the context of Orang Asli education.

1. Intrapersonal Leadership: This component achieved a threshold (d) of 0.040, a fuzzy score of 0.951, and unanimous consensus at 100%. The experts concurred on the necessity for school leaders to possess strong intrapersonal skills to effectively navigate the unique challenges inherent in Orang Asli schools.
2. Holistic Leadership: Similarly, this component recorded a threshold (d) of 0.054, a fuzzy score of 0.944, and full consensus at 100%. The findings indicate that leaders must adopt a holistic approach that addresses the academic, emotional, and social needs of students, thereby fostering a more inclusive educational environment.
3. Cultural Leadership: Notably, this component exhibited the lowest threshold (d) value of 0.022, a fuzzy score of 0.959, and achieved full consensus of 100%. This highlights the critical importance of leaders understanding and respecting local cultures, which is essential for cultivating strong relationships within the school community and enhancing educational outcomes.
4. Collaborative Leadership: Lastly, this component registered a threshold (d) of 0.040, a fuzzy score of 0.951, and again reached full consensus of 100%. The panel emphasized that collaboration among teachers, parents, and the wider community is vital for elevating the quality of education in Orang Asli schools. In conclusion, the unanimous agreement among experts on the components of the leadership model signifies a promising framework for enhancing educational leadership practices in Orang Asli schools, thereby supporting the unique needs of this community.

Overall, the findings from this study affirm that the proposed leadership model is both relevant and suitable for application within Orang Asli schools. The high level of consensus achieved for each component underscores the expert panel's confidence in the model's effectiveness in enhancing leadership practices. This consensus indicates a strong belief that the model can significantly contribute to fostering more effective and inclusive educational development for

the Orang Asli community. The results not only validate the model's appropriateness but also highlight its alignment with the specific leadership needs present in these schools in Malaysia. By addressing the unique challenges faced by Orang Asli schools, the model offers a comprehensive framework for school leaders to improve educational outcomes and create a supportive learning environment. This reinforces the potential for the model to serve as a valuable resource for educational stakeholders committed to advancing the quality of education for the Orang Asli community.

Discussion of Findings

The usability evaluation of the leadership model for Orang Asli schools has been systematically analyzed through four critical components: intrapersonal leadership, holistic leadership, cultural leadership, and collaborative leadership. The analysis, conducted via the Fuzzy Delphi Method (FDM), revealed a remarkable level of agreement among the expert panel for all components, as evidenced in Table 2.

Intrapersonal Leadership Component

The findings pertaining to the intrapersonal leadership component are particularly noteworthy. This component achieved a threshold (d) of 0.040, indicating a full consensus of 100% among the experts, coupled with a fuzzy score of 0.951. Such metrics reflect a strong alignment in the expert panel's views regarding the importance of intrapersonal leadership in the context of Orang Asli schools. The low threshold (d) value signifies a robust consensus, underscoring the critical role this component plays in effective leadership within these educational settings.

Intrapersonal leadership emphasizes essential qualities such as integrity, commitment, and adaptability. These attributes resonate with the principles of transformational leadership articulated by Bass and Avolio (1994), which underscore the importance of personal characteristics in fostering effective leadership. Furthermore, the findings align with Yukl's (2013) assertion that successful leaders exhibit resilience and possess a strong vision, which is essential in navigating the unique challenges faced by Orang Asli schools.

Moreover, the research conducted by Ismail et al. (2021) reinforces the notion that school leaders who demonstrate high levels of integrity are more likely to build trust within their communities, particularly in rural contexts. This trust is paramount in the Orang Asli schools, where community engagement and support are vital for enhancing educational outcomes. Therefore, the intrapersonal leadership component emerges as a foundational element that not only contributes to effective leadership practices but also fosters a positive and trusting relationship between school leaders and the Orang Asli community.

In conclusion, the unanimous endorsement of the intrapersonal leadership component by experts further legitimizes its inclusion in the proposed leadership model, suggesting that its application could lead to significant improvements in leadership practices within Orang Asli schools. As we explore the other components of the model, it is essential to maintain this focus on the personal attributes of leaders, as they are integral to the overall success and sustainability of educational leadership in these communities. The findings regarding intrapersonal leadership in the context of educational leadership resonate profoundly with existing literature, such as the research conducted by Castro and Jimenez (2022). Their work underscores that school leaders who possess strong intrapersonal skills can significantly influence school culture and enhance the performance of both teachers and students. This connection reinforces the idea

that effective leadership goes beyond administrative tasks; it fundamentally shapes the educational environment and directly affects student outcomes. Moreover, another critical aspect of intrapersonal leadership is the capacity for self-reflection and the promotion of personal growth. Notman (2012) highlights the importance of critical self-reflection among effective school leaders, illustrating that those who regularly assess their strengths and weaknesses are better positioned to enhance their self-efficacy and fulfill their responsibilities. This reflective practice not only fosters personal development but also cultivates a culture of continuous improvement within the school. In the context of Orang Asli schools, the implications of these findings are particularly significant. By prioritizing intrapersonal leadership, school leaders can create a nurturing environment that supports both educators and students. This, in turn, can lead to improved management efficiency and contribute to the holistic development of the Orang Asli community. The ability to engage in self-reflection and personal growth allows leaders to adapt their approaches to meet the unique challenges faced by these schools, ultimately fostering a more resilient and effective educational framework.

In summary, the emphasis on intrapersonal leadership as a critical component of educational leadership in Orang Asli schools is well-supported by both empirical evidence and theoretical frameworks. It suggests that the cultivation of strong intrapersonal skills among school leaders is essential for driving positive change and enhancing the overall educational experience within these communities.

Holistic Leadership Component

The findings regarding the holistic leadership component, which recorded a threshold (d) value of 0.054, a full consensus percentage of 100%, and a fuzzy score of 0.944, underscore the critical importance of adopting a holistic approach to education in addressing the unique needs of the Orang Asli community. This consensus among the expert panel emphasizes that school leaders must adopt a comprehensive perspective, viewing students not just in terms of their academic achievements but also considering their emotional and social dimensions. The increasing attention to holistic leadership in educational studies highlights its potential to create a more integrated educational framework, which can significantly enhance both student development and school effectiveness. Kafa and Pashiardis (2019) argue that personal identity plays a pivotal role in leadership, and a holistic framework allows school principals to employ diverse leadership styles that are responsive to the varied educational needs of students. This adaptability is crucial in improving the quality of teaching and learning environments. Moreover, Aziz et al. (2019) provide evidence that a leadership approach focused on student outcomes can lead to improved academic performance, particularly in rural schools in Malaysia. This aligns with the findings in the context of Orang Asli schools, where understanding and addressing the multifaceted needs of students can lead to better educational results. Rianawaty et al. (2021) further emphasize that holistic education necessitates a systemic approach that integrates different components of the educational process, optimizing students' potential for growth and learning. Additionally, the work of Miseliūnaitė and Cibulskas (2024) highlights the benefits of holistic education at the primary school level, illustrating how such an approach can promote active learning. While challenges in implementation exist, the positive outcomes associated with holistic practices cannot be overlooked. In conclusion, the findings related to holistic leadership in Orang Asli schools highlight the necessity for educational leaders to adopt practices that are sensitive to the specific cultural and contextual needs of their students. By fostering an environment that supports the holistic development of Orang Asli students, school leaders can significantly

contribute to their overall success and well-being. This approach not only enhances individual student outcomes but also supports the broader educational objectives within the Orang Asli community.

Cultural Leadership Component

The findings concerning the cultural leadership component, which recorded a threshold (d) value of 0.022, a full consensus percentage of 100%, and a fuzzy score of 0.959, highlight the unanimous agreement among experts on the paramount importance of culturally responsive leadership within Orang Asli schools. This consensus underscores the necessity for educational leaders to understand and respect the local cultures, which is essential for fostering acceptance and collaboration between the school and the community. As supported by Salleh et al. (2023), leaders who are attuned to local cultural dynamics can cultivate stronger, more harmonious relationships with the school community. This understanding not only enhances the leaders' effectiveness but also promotes a sense of belonging and ownership among students and their families, which is particularly vital in culturally rich contexts such as those of the Orang Asli. The need for culturally relevant leadership is further emphasized by McLaughlin (2020), who notes the challenges school leaders face in navigating diverse school environments, particularly when student demographics increasingly reflect minority backgrounds. This is especially pertinent for the Orang Asli community, where understanding cultural nuances can significantly impact educational outcomes. Jayavant (2016) adds to this discourse by highlighting how cultural and linguistic awareness among leaders can positively influence students' aspirations and academic achievements. This indicates that culturally responsive leadership is not merely a theoretical construct but a practical approach that can lead to tangible improvements in student performance and engagement. Furthermore, the work of Santamaría and Jean-Marie (2014) provides empirical evidence illustrating how culturally responsive leadership practices, particularly among female principals from minority groups, can advance social justice and educational equity. Their findings reinforce the notion that leadership grounded in cultural understanding can be a powerful tool for addressing systemic inequities within educational settings. In summary, the emphasis on cultural leadership in Orang Asli schools reveals the critical need to integrate the knowledge, values, and traditions of the Orang Asli community into educational leadership practices. This integration not only strengthens the relationship between school leaders and the community but also fosters an inclusive and holistic educational environment. By prioritizing culturally responsive leadership, educational leaders can significantly contribute to the academic success and well-being of Orang Asli students, thereby enhancing the overall quality of education within these unique cultural contexts.

Collaborative Leadership Component

The collaborative leadership component, with a recorded threshold (d) value of 0.040, a full consensus percentage of 100%, and a fuzzy score of 0.951, underscores the critical importance of collaborative leadership in fostering cooperation among teachers, parents, and the broader community within Orang Asli schools. This unanimous agreement among experts highlights the belief that strong collaboration is essential for enhancing the quality of education in these unique contexts. The findings align with the research conducted by Tsipas and Tsipa (2023), which emphasizes the pivotal role of school principals in nurturing a collaborative culture. Effective leaders are instrumental in empowering teachers by recognizing and leveraging their strengths. This empowerment not only improves interpersonal dynamics within the school but also facilitates a more productive and supportive educational environment. The focus on

teacher recognition implies that successful collaboration hinges on leaders who are proactive in establishing positive working relationships founded on mutual trust and respect. While the potential for collaborative leadership to enhance educational outcomes and stimulate community engagement is evident, it is crucial to acknowledge that significant challenges remain. The implementation of collaborative practices requires ongoing efforts and commitment from all stakeholders to fully realize the benefits. Therefore, continuous professional development and support for school leaders and teachers are essential to ensure the effective adoption of collaborative leadership strategies that can ultimately improve educational quality in Orang Asli schools. In summary, the model's components have consistently achieved threshold (d) values below 0.2, fuzzy scores exceeding 0.5, and consensus percentages above 75%, thereby meeting the criteria established by Chen (2000) and Cheng & Lin (2002). These results indicate that the proposed model is both suitable and feasible for implementation within Orang Asli schools. The high level of consensus among the expert panel reinforces confidence in the model's potential to enhance the effectiveness of school leadership, paving the way for improved educational experiences for students and a stronger connection between schools and their communities.

Conclusion

This study assesses the usability of a leadership model specifically designed for Orang Asli schools in Malaysia using the Fuzzy Delphi Method (FDM). The model focuses on four main components: intrapersonal leadership, holistic leadership, cultural leadership, and collaborative leadership, which were selected based on the unique socio-cultural context of the Orang Asli community. The findings indicate that all these components achieved a high level of consensus among the expert panel, with threshold (d) values below 0.2, fuzzy scores exceeding 0.5, and consensus percentages exceeding 75%. This confirms the usability of the proposed model in enhancing leadership effectiveness in Orang Asli schools. Furthermore, the findings clearly demonstrate a comprehensive school leadership approach. The main contribution of this study is the development of a contextual leadership model that is relevant to the needs of Orang Asli schools. By adapting the model's components to address unique challenges such as cultural differences, geography, and socio-economic constraints, this model has the potential to serve as a practical framework for school leaders in bridging educational gaps and improving student achievement in Orang Asli schools. Additionally, the use of the Fuzzy Delphi Method in evaluating the model's suitability showcases a systematic and evidence-based approach to addressing uncertainty and ensuring the quality of the assessment. However, this study is not without its limitations. First, the small number of expert panelists, limited to 13 individuals, may affect the generalizability of the findings. Moreover, future research could enhance the model by incorporating other components such as digital leadership and psychosocial support to further strengthen leaders' ability to tackle contemporary educational challenges.

In conclusion, this study introduces a suitable and relevant leadership model for Orang Asli schools in Malaysia. This model not only serves as a guide for education leaders but also provides a foundation for ongoing efforts to improve the quality of Orang Asli education. With effective implementation, this model is expected to contribute to the development of a more inclusive and holistic educational system in Malaysia.

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References

Adams, D. (2022). Education in Malaysia. In Routledge eBooks. https://doi.org/10.4324/9781003244769

Abdul Razak, A. Z. (2023). Education transformation of Orang Asli students in Malaysia. In D. Adams (Ed.), In Education in Malaysia: Developments, Reforms and Prospects (pp. 34–48). Routledge.

Adnan, A. H. M., Salim, M. S. A. M., Tahir, M. H. M., Shah, D. S. M., & Yusof, A. M. (2021). Educating the 'Orang Asli' (Native People) of Malaysia in the Eyes of Orang Asli Teachers. International Journal of Academic Research in Business and Social Sciences, 11(9), 717–731.

Abdullah, R., Mamat, W., Zal, W., & Ibrahim, A. (2013). Teaching and learning problems of the orang asli education: students' perspective. Asian Social Science, 9(12). https://doi.org/10.5539/ass.v9n12p118

Ali, M. (2024). Understanding the intrinsic and extrinsic factors in financial literacy of the orang asli in malaysia. Nurture, 18(2), 214-227. https://doi.org/10.55951/nurture.v18i2.578

Alzahrani, A. and Albeladi, A. A. (2023). Collaborative leadership and its relationship with students' educational attainment. Journal of Educational and Social Research, 13(4), 331. https://doi.org/10.36941/jesr-2023-0113

Brinia, V., Zimianiti, L., & Panagiotopoulos, K. (2014). The role of the principal's emotional intelligence in primary education leadership. Educational Management Administration & Leadership, 42(4_suppl), 28-44. https://doi.org/10.1177/1741143213513183

Castro, G. B. D. and Jimenez, E. (2022). Influence of school principal's attributes and 21st-century leadership skills on teachers' performance. Journal of Humanities and Social Sciences, 4(2), 52-63. https://doi.org/10.36079/lamintang.jhass-0402.374

Chen, F., Chen, J., Wang, J., & Tai, D. (2017). Using fuzzy delphi method to construct digital literacy competences for junior high school students. International Journal of Information and Education Technology, 7(9), 686-689. https://doi.org/10.18178/ijiet.2017.7.9.954

Hamzah, M. and Jamil, M. (2019). The relationship of distributed leadership and professional learning community. Creative Education, 10(12), 2730-2741. https://doi.org/10.4236/ce.2019.1012199

Hassan, A. (2023). A study of uniten jakoa student: awareness, readiness, usage of cloud computing.. https://doi.org/10.15405/epfe.23081.85

Heenan, I. (2024). Enactment of transformational school leadership—insights from primary school and system leaders. Education Sciences, 14(6), 557. https://doi.org/10.3390/educsci14060557

Honingh, M. and Hooge, E. (2013). The effect of school-leader support and participation in decision making on teacher collaboration in dutch primary and secondary schools. Educational Management Administration &Amp; Leadership, 42(1), 75-98. https://doi.org/10.1177/1741143213499256

Horsford, S. D., Grosland, T. J., & Gunn, K. M. (2011). Pedagogy of the personal and professional: toward a framework for culturally relevant leadership. Journal of School Leadership, 21(4), 582-606. https://doi.org/10.1177/105268461102100404

Jayavant, S. (2016). Mapping the complexities of effective leadership for social justice praxis in urban auckland primary schools. Education Sciences, 6(1), 11. https://doi.org/10.3390/educsci6010011

Johnson, G. and Fluckiger, B. (2022). Agency and leadership by indigenous education workers for family-school-community engagement. The Australian Journal of Indigenous Education, 51(2). https://doi.org/10.55146/ajie.v51i2.59

Juharyanto, J., Arifin, I., Sultoni, S., Adha, M., & Qureshi, M. (2023). Antecedents of primary school quality: the case of remote areas schools in indonesia. Sage Open, 13(1). https://doi.org/10.1177/21582440221144971

Kafa, A. and Pashiardis, P. (2019). Exploring school principals' personal identities in cyprus from a values perspective. International Journal of Educational Management, 33(5), 886-902. https://doi.org/10.1108/ijem-03-2018-0102

Kamsin, I. (2023). Education: orang asli students' perspectives. International Journal of Academic Research in Business and Social Sciences, 13(12). https://doi.org/10.6007/ijarbss/v13-i12/20235

Mohd Ridhuan, M. J., & Nurulrabihah, M. N. (2020). Kepelbagaian Metodologi dalam penyelidikan reka bentuk dan pembangunan (First). Shah Alam, Selangor, Malaysia: Qaisar Prestige Resources 2020.

Mazzlida Mat Deli & Ruhizan Mohamad Yasin (2016). Quality Education of Orang Asli in Malaysia. International Journal of Academic Research in Business and Social Sciences 2016. Vol. 6(11), 233-240

McLaughlin, D. V. (2020). Exemplary leadership in diverse cultural contexts. Handbook on Promoting Social Justice in Education, 481-496. https://doi.org/10.1007/978-3-030-14625-2_77

Marzukhi, H., Mohd Jamil, M. R., Yunus, M. M., & Musafar Hameed, L. B. (2023). Fuzzy Delphi Method (FDM) for developing components of the Smallholders Awareness Training (SAT) Model . ANP Journal of Social Science and Humanities , 4(1), 12-22. https://doi.org/10.53797/anp.jssh.v4i1.2.2023

Mustapha, R., & Darusalam, G. (2022). Pendekatan Reka Bentuk dan Pembangunan dalam Penyelidikan Kontemporari. Penerbit Universiti Malaya.

Miseliūnaitė, B. & Cibulskas, G. (2024). Enhancing active learning through a holistic approach: a case study of primary education in lithuania. Education Sciences, 14(6), 592. https://doi.org/10.3390/educsci14060592

Mohd Ridhuan Mohd. Jamil, Zaharah Hussin, Nurul Rabihah Mat Noh, Ahmad Arifin Sapar & Norlidah Alias. (2013). Application of Fuzzy Delphi Method in Educational Research. Dlm. Design and Developmental Research. Saedah Siraj, Norlidah Alias, Dorothy De Witt & Zaharah Hussin (pnyt). Kuala Lumpur: Pearson Malaysia Sdn. Bhd.

Mustapha, R., Mahmud, M., Burhan, N., Awang, H., Sannagy, P., & Jafar, M. (2021). An exploration on online learning challenges in malaysian higher education: the post covid-19 pandemic outbreak. International Journal of Advanced Computer Science and Applications, 12(7). https://doi.org/10.14569/ijacsa.2021.0120744

Nordin, R., Fern, V., Cherley, M., & Subramaniam, L. (2020). Indigenous education for the orang asli: legal perspectives and best practices. Journal of Nusantara Studies (Jonus), 5(2), 365-383. https://doi.org/10.24200/jonus.vol5iss2pp365-383

Notman, R. (2012). Intrapersonal factors in new zealand school leadership success. International Journal of Educational Management, 26(5), 470-479. https://doi.org/10.1108/09513541211240264

Othman, I. W. (2022). Educating Orang Asli Students: The Challenges towards Achieving the Malaysian Sustainable Education Agenda. Jurnal Intelek, 17(1), 1. https://doi.org/10.24191/ji.v17i1.15845

Rianawaty, I., Dwiningrum, S., & Yanto, B. (2021). Model of holistic education-based boarding school: a case study at senior high school. European Journal of Educational Research, volume-10-2021(volume-10-issue-2-april-2021), 567-580. https://doi.org/10.12973/eu-jer.10.2.567

Richey, R. C., & Klein, J. D. (2014). Design and development research: Methods, strategies, and issues. Routledge

Rosnon, M. R., & Talib, M. A. (2019). Indigenous education rights: The Malaysian case. International Journal of Academic Research in Business and Social Sciences, 9(10), 149–167.

Salleh, M. S. H. M., & Abdul Razak, A. Z.(2024). Empowering Education: Developing A Needs-Based Leadership Model For Orang Asli Schools In Malaysia. International Journal of Education, Psychology and Counseling, 9(56), 924-939.

Santamaría, L. J. and Jean-Marie, G. (2014). Cross-cultural dimensions of applied, critical, and transformational leadership: women principals advancing social justice and educational equity. Cambridge Journal of Education, 44(3), 333-360. https://doi.org/10.1080/0305764x.2014.904276

Sawalludin, A. F., Jia Min, C. L. and Mohd Ishar, M. I. (2020) "The Struggle of Orang Asli in Education: Quality of Education", Malaysian Journal of Social Sciences and Humanities (MJSSH), 5(1), pp. 46 - 51. https://doi.org/10.47405/mjssh.v5i1.346

Shaked, H. and Schechter, C. (2018). Holistic school leadership: development of systems thinking in school leaders. Teachers College Record: The Voice of Scholarship in Education, 120(2), 1-40. https://doi.org/10.1177/016146811812000204

Tsipas, N., Zagkotas, V., & Tsipa, S. (2023). An empirical study of collaborative culture as a model of organizational behavior in greek primary schools. European Journal of Education Studies, 10(6). https://doi.org/10.46827/ejes.v10i6.4835

Wahab, N., Goh, P., Ong, E., Ibrahim, M., & Affandi, H. (2020). Construction of the forest school framework based on indigenous knowledge in malaysia. Jurnal Cakrawala Pendidikan, 39(2), 269-278. https://doi.org/10.21831/cp.v39i2.29316

Wong, B. W. K. & Abdillah, K. K. (2018). Poverty and primary education of the Orang Asli children. In C. Joseph (Ed), Policies and politics in Malaysian education: Education reforms, nationalism and neoliberalism (pp. 54-71). Ney York: Routledge

Zakari, N. A., Majid, M. Z. A., & Hussin, M. (2022). Keciciran Murid Sekolah di Malaysia: Suatu Pemerhatian Awal. Malaysian Journal of Social Sciences and Humanities (MJSSH), 7(2). https://doi.org/10.47405/mjssh.v7i2.1288