

Assessing Educational Approaches to Incorporate Indigenous Knowledge in Enhancing Learning Motivation among Malaysian Indigenous Students

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Abstract: Education serves the dual purpose of balancing Indigenous Knowledge (IK) and, at the same time, contributes to the modernization agenda. The integration of IK into the national education system through its curriculum and instructions is a desirable goal towards taking indigenous people's education into account as a democratic priority. However, previous studies found that there is a mismatch between curriculum, as well as pedagogy and Indigenous students' interests and/or non-relatedness to their daily life activities. Therefore, the aim of this paper is to assess the educational approaches that incorporate IK, and their relationship with Indigenous students' learning motivation. This quantitative study administered questionnaires to 140 Indigenous students from three selected schools in Malaysia. The findings indicate that learning motivation has the highest mean (4.34), followed by language with a 4.30 value. Further analysis reveals that out of five hypotheses tested, three are supported, specifically language, educational materials, and educational tools, as important educational approaches to incorporating Indigenous Knowledge. The expectation is that the Ministry of Education in Malaysia will integrate Indigenous Knowledge related to language, educational materials, and tools into the curriculum, thereby promoting inclusive learning and indirectly aligning with Sustainable Development Goals (SDGs) 4 for quality education and SDGs 11 for sustainable cities and communities.

Keywords: Education, Indigenous, Knowledge, Learning, Motivation

1. Introduction

In recent decades, Indigenous Knowledge (IK) has been receiving the recognition it deserves which is now being seen as providing invaluable resources of environmental knowledge especially “in the field of biotechnology” as Orang Asli has the medicinal knowledge of plants and plant-based products. (Nordin, 2001 in Sait, E. K. L., Mersat, N. I., & Wong, S. K. (2017). Such knowledge is obviously useful and has pharmaceutical value in producing medical drugs. However, the main question now lies on whether the younger generation of indigenous people is acquiring such invaluable traditional knowledge from their elders knowing that they are assimilated into the national modern educational setting. Based on a study done in Bintang and Padawan in Sarawak among the Bidayuh and Iban communities, it was discovered that their ethnic IK “is not really expressed and adapted” by the young due to exposure to modern education system of national schools that employ “a more scientific approach to daily life”; In a way this has contributed to the reduction in the daily practical exposure to the “indigenous knowledge and associated [traditional] ways of learning” from the elders (Sait, Mersat, & Wong, 2017). The study also stated that many Bidayuh and Ibans in Bintang dan Padawan only had their primary level education in their villages but later were sent to secondary boarding schools which were located far from their villages, usually in towns. Therefore, with the physical distance and separation from not only the source of IK from within the immediate local village environment but also from their elders who have invaluable vast IK, the young are experiencing a change in their “traditional practices and customs”. In fact, Sait et al. concluded that “there is a marked deterioration of indigenous knowledge among the younger generation on uses of natural resources” due to modernisation in areas such as education and technology that have introduced “new methods and practices of curing diseases, farming or cultivating various plants, fishing, building houses, making handicrafts and harvesting resources from the forest” (2017).

The effects of modernisation on IK and education needs to be addressed if we are to benefit from both the invaluable IK and modernisation, possibly striking the need to balance both in education. Therefore, integration of IK within the national education system through its curriculum and instructions is obviously a desirable goal for taking into account the education of the indigenous people as a democratic priority. Education is necessary for economically disadvantaged indigenous children, as a means of personal and community development (Muslim, 2017). Muslim added that the formal schooling for indigenous youth “needs to consider both human rights and cultural wisdom. Indigenous children may have different family practices from the mainstream values and the formal schooling advocated by the government” which may be inappropriate for their cultural parenting practices. Therefore, imposing formal schooling for these learners may be unsuccessful and the local government “needs to identify ways to better provide them with the training and education required in their life” (2017).

Moreover, indigenous knowledge is the basis for local knowledge in making decisions and survival among IC in areas related to food security, education and other vital economic and social activities. IK is based on empirical experience and has been embedded in IC and cannot easily be removed from them. Previous studies investigate how IK has been transferred from one generation to another however there is a lack of research in education related to sustaining indigenous knowledge (IK) among the IC in Malaysia. Past literature in other countries show that research on the education for sustainable development of IC has often been ignored and remains unrecorded due to the fact that mainstream education is seen as separate from IK.

Abd Rahman et al. (2018) found that two main challenges in implementing (environmental) education in indigenous schools were related to (1) the teachers involving issues such as time constraints, heavy workload, poor teaching aids, unavailability of manuals and lack of support from school management, and (2) the indigenous students who had low self-confidence, problems with learning and a lack of environmental awareness. Saifullah, Masud, & Kari (2021) specified that “socio economic status and access to education” are the most influential factors that affect the welfare of the Orang Asli (indigenous) community. In addition, Abdul Wahab & Nordin (2021) noted that the Orang Asli are far behind and underperform in education, with absenteeism rate increasing yearly across both primary and secondary levels, a staggering 94% of the IC students risk dropping out from school before reaching Form Five. They added the students were unable to apply the knowledge acquired through formal education systems in Malaysia due to the different environment settings. This failure is due to

the lack of understanding on how IC pupils learn, think, and act. Therefore, access to education, retention within the education system and keeping the interest in learning are very much vital for the community to develop.

Shah et.al (2015) explains that the tendency of losing interest in learning during instructions could be due to the mismatch between curriculum and pedagogy, and their interests and/or non-relatedness to their daily indigenous life activities. It can be said that indigenous students are more interested in accumulating their IK of life skills that are their main source of knowledge for life and survival. Hence their participation in mainstream education has always been the concern of the government and academia. Previous studies have found several impactful factors on indigenous people's education and the most influential factor is their life culture of not considering education as “a serious matter” (Ahmad et.al, 2011 & Hood Salleh, 2010 in Mohd Azizul, 2020).

Since it can improve indigenous students' educational experiences and foster cultural diversity, the incorporation of indigenous knowledge into the curriculum is an essential component of teacher preparation programmes and curriculum development (Silohenda , 2023). This knowledge can be applied in a variety of contexts to human endeavours, including education from traditional, spiritual, and practical knowledge (Karunamay, 2023). Silohenda (2023) identified six areas that higher education institutions might consider integrating IK into: research, teaching and learning, curriculum, assessment and evaluation, and human resources. A thorough grasp of the cultural, language, and environmental components of indigenous knowledge is necessary for the intricate process of incorporating it into education (Jacob, Cheng & Porter, 2015). Handayani (2018) highlights the need for a meaningful connection between school learning and students' life and offers a four-step process for incorporating indigenous knowledge into the science curriculum.

In addition, Mutalib et.al (2020) claimed that teachers in Malaysia have been incorporating some elements of indigenous people's way of life into lessons but there are no records of such adaptation as teachers are not well versed with research documentations. He also suggested that “an English language Module for indigenous children can be produced based on Battiste’s (2002) model of Aboriginal pedagogy and that such indigenous pedagogy framework can be incorporated with the present English Language pedagogy used in the school and the curriculum introduced by Ministry of Education” (Mutalib et. al 2020). Therefore, a common national curriculum and instructions is expected to be inclusive in its true meaning by integrating the IC knowledge of their environment, life, beliefs, traditions and experiences into the curriculum contents and delivery. Only through having such explicit indigenous knowledge integration into the national educational curriculum at all levels may it be called ‘inclusive’ at its best.

At the recent National Indigenous People (Orang Asli) Convention 2019 held in Putrajaya, the Prime Minister addressed the need for efforts towards the improvement of the levels of education among indigenous students. The demand for an awareness as to the importance of education was critical in ensuring the progressive development of the indigenous people. Therefore, it is crucial to identify factors to incorporate indigenous and learning motivation among Malaysian Indigenous students. Based on the discussion above, the research objectives to be addressed by the study are: (1) to identify the status of educational approaches to incorporate Indigenous Knowledge in enhancing learning motivation among Indigenous students in Malaysia, and (2) to examine the relationship between educational approaches of Indigenous Knowledge in enhancing learning motivation among Indigenous students in Malaysia.

2. Conceptual Framework Development and Hypotheses

Conceptual framework for this study was developed from previous theories, models and studies. Figure 1 shows a conceptual framework of the study, which include cognitive, cultural background, educational materials, educational tools, and language. This framework was derived as a foundation from a comprehensive analysis of prior previous research. Within this framework, five hypotheses were formulated, each designed to explore the relationship between these variables.

2.1 Cognitive

It is critical to identify students’ cognitive skills, which include the processes of accepting, comprehending, and applying knowledge and information (Sani, 2014). Cognitive processes include

absorbing information, comprehending, and using it (Sani, 2014). Children acquire the cognitive skills necessary to interpret sensory data. Consequently, they make use of knowledge when it is needed. It involves the ability to concentrate, read, think critically, solve problems, and retain the knowledge learned. Students should be able to process information quickly and effectively to develop their cognitive capacities (Valamis, 2023). This will ensure that they recognize and appropriately process new information (Indeed, 2019). Regarding learning difficulties, it was discovered that information literacy instruction facilitates the flow of several interrelationships between IK, culture, education, and national development (Du, 2017). As a prerequisite for 21st century learning abilities in education, information literacy education—which includes reading, writing, and maths—as well as 4C—communication, collaborative, critical, and creative thinking—must be provided for the IC. Since most information is essentially passed down orally from generation to generation, information literacy education is one of the elements that needs to be researched in order to prevent IK from disappearing and to keep the students' motivation high in continuing their modern education. Building upon these studies, the present research hypothesis: H1: There is a significant relationship between Cognitive and Learning Motivation.

2.2 Cultural Background

The diversity of parents' cultural background has the potential to give effect to academic performance of minority children. Parent's influence affects individual development in the academic level whether it is low, medium or high degree. IS not master literacy as it relates to their parent's background academic (Sani, 2014). Studies indicate that cultural factors influence the formation of and the development of one's students' personality covering family circumstances as well as academic level of parents. However, IP are aware of the importance of a good education for them, especially for their children. Good mastery of literacy can have a greater impact on IS (Awang et al, 2022). They sustain their learning to improve the standard of living and the family economy (Al-Roubaie, 2010). Chin et al. (2020) believes good quality education is able to bring the IP community to improve the quality and well-being of life. Drawing from the collective findings, the following hypothesis is proposed: H2: There is a significant findings between Cultural Background and Learning Motivation.

2.3 Educational Materials and Tools

According to Mohd Noor (2020), the number of IC children enrolled in primary and secondary schools has increased significantly over the last decade, however the dropout rate among them is still high. This has been attributed to factors such as culture, school location, poverty, pedagogy and content of the syllabus. To ensure that they do not fall behind their peers, it is essential to stir ICT interest, skills, knowledge, and preparation from an early age in schooling (Mayan, 2017). According to Luaran et al. (2016), the majority of Indigenous Students (IS) assert that the usage of ICT in the classroom has improved English proficiency, especially for those who have access to computers and the internet, particularly those who use ICT at home. Students look up information and educational resources on the internet. Drawing from the collective findings, the following hypothesis is proposed: H3: There is a significant relationship between Educational Materials and Learning Motivation.

2.4 Educational Tools

Another important factor in learning activities among students is using practical learning tools and devices that increase anticipation in the education process. Formal and informal educational processes use tools and devices to promote socialisation or cultivate an individual to develop in cognitive, affective, physical and social aspects (Celik & Yesilyurt, 2013). There are problems of ICT capabilities among students in remote locations despite having good attitudes about ICT (Shamila et al, 2019). The use of the internet among IS students has shown positive impacts and increased proficiency in learning. Students who access ICT at home have higher ICT experience and computer competency (Luaran et al, 2016). Students use the internet to access an array of learning reference materials from various sources. Using the internet throughout the learning process boosts student achievement in

English compared to students who do not utilise the internet (Daraha, 2013). The practical use of the internet in learning has an impact on IS, since the use of the internet can link with a variety of information that is useful to them. Thus, it can enhance knowledge while enhancing student accomplishment. Therefore, the hypothesis of H4: There is a significant relationship between Educational Tools and Learning Motivation.

2.5 Language

Language in education involves the process of sharing ideas, knowledge, skills and attitudes between the teacher and the learner. In instructional descriptions, language can be seen as a wide, communicative phenomenon. Teachers and students use spoken and written language to deliver assignments, engage in learning processes, give academic material, measure learning, display knowledge and competence, and foster classroom life. Language plays a critical role in the transmission of Indigenous knowledge and their ties to the land and their traditional ecological knowledge serve to highlight the significance of Indigenous languages (Chiblow, 2021). Galla (2017) emphasises the significance of Indigenous languages for community-engaged language revitalization initiatives, as well as for gaining access to and expressing Indigenous knowledge systems. The literacy practises in school are different for indigenous children and they are facing more academic obstacles than children from other groups (Anderson et al., 2016), and this affects their performance. Errico (2017) mentions that the IS academic performance is being hindered by a lack of awareness of the relevance of their culture in the school curriculum. As a result, Malaysian language education does not effectively allow IS to engage in meaningful learning in schools (Renganathan, 2013). In addition, the use of the correct language can increase the level of students' desire to gain knowledge, thus making the learning process meaningful to them (Letchamanan et al, 2021). Drawing from these insights, the study posits: H5: There is a significant relationship between Language and Learning Motivation.

2.6 Learning Motivation

Numerous important components have been uncovered through research on learning motivation among Malaysia's Orang Asli indigenous tribes. Cheng (2021) discovered that Orang Asli people are highly motivated to become entrepreneurs to make income, create work possibilities, and promote their culture. To solve issues with the educational system, Nordin (2018) emphasised the significance of Orang Asli student icons in raising awareness and inspiration among their peers. The beneficial effects of an ICT programme to boost their children's motivation to attend school was highlighted by Kamsin (2023). All of these studies highlight how crucial it is to preserve cultural traditions, empower communities, and use creative teaching methods to increase Orang Asli students' willingness to learn.

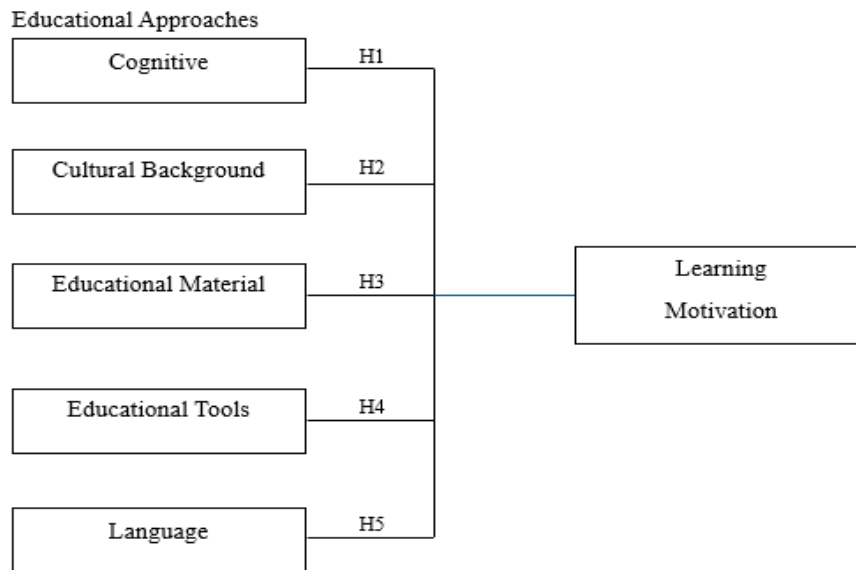


Fig.1 Conceptual Framework

3. Research Methodology

The researchers employed a quantitative method to investigate the factors of indigenous knowledge that impact the educational motivation of indigenous students. After obtaining ethical clearance from relevant authorities, the researcher distributed the administrative questionnaires to 11–12-year-old respondents at three selected indigenous primary schools in Malaysia. The purposive sampling method selected respondents who could answer survey questions. The Raosoft Calculator suggested a sample size of 121, and after data cleaning, the researchers used a total of 140 survey responses. To answer the research objectives, the researchers used the Statistical Package for the Social Sciences version 29 (SPSS) and Partial Least Squares Structural Equation Modelling version 3 (SmartPLS) for data analysis.

4. Results of the Study

4.1 Common Method Bias (CMB)

It is common to see Harman’s single factor score being used to test CMB. Harman’s test of all items (measuring latent variables) is loaded into one common factor. If the total variance for a single factor is less than 50%, it suggests that CMB does not affect the data, hence the results. For this study, all items from all constructs were entered for analysis and constrained to only a single factor. The results showed that the single factor explained only 17.5%, less than the benchmark value of 50% of the total variance, indicating that common method biasness was not a likely contaminant of the research.

4.2 Demographic Profile

Table 1 shows the demographic profile of indigenous students and the distribution of the age in this study was 46% for the 11 years old and 54% students at the age of 12 years old. Meanwhile in the gender section, female students comprise 55%, followed by male students 45%.

Table 1. Demographic Profile

Variable	Details	N	Percent (%)
Age	11 years old	64	46
	12 years old	76	54
	Total	140	100
Gender	Male	63	45
	Female	77	55
	Total	140	100

4.3 Demographic Profile

Table 2 shows the mean and standard deviations for each variable in the present study. Respondents were asked to indicate their opinion on student motivation, cognitive, culture background, educational material, educational tools and language. Student motivation recorded the highest mean score of 4.34 out of 5.0 points with a standard deviation of 0.835, this suggests that, on average, they are quite driven in their educational pursuits. Meanwhile, their strong cultural background is reflected in a mean score of 4.05 with a standard deviation of 1.152. Additionally, language proficiency stands out with a mean score of 4.30 and a standard deviation of 0.924. However, the analysis also uncovers variability in cognitive abilities, with a mean score of 3.10 and a standard deviation of 1.061, as well as perceptions of educational materials (mean: 3.75, standard deviation: 1.176) and tools (mean: 3.66, standard deviation: 1.141).

Table 2. Descriptive analysis of construct

	Mean	Standard deviation
Learning Motivation	4.34	0.835
Cognitive	3.10	1.061
Culture Background	4.05	1.152
Educational Materials	3.75	1.176
Educational Tools	3.66	1.141
Language	4.30	0.924

4.4 Measurement Model Assessment

The assessment of the measurement model findings is presented in Table 3. The criteria employed to evaluate the measurement model included factor loading, composite reliability (CR), and average extracted variance (AVE). Ramayah et al. (2018) proposed a suggested threshold of 0.708 or greater for the loading of indicators in order to assess indicator reliability. According to previous research conducted by Hair et al. (2017), Byrne (2016), and Ziyae (2016), loading values more than 0.7, 0.6, 0.5, and 0.4 respectively are considered sufficient. However, it is important to note that these loading values should be supplemented by other items that exhibit high loading scores, in order to ensure the accuracy and reliability of the Average Variance Extracted (AVE) and Composite Reliability (CR) measures. The CR and AVE benchmarks are 0.7 and 0.5, correspondingly. The findings shown in Table 3 indicate that all of the aforementioned criteria have been satisfied, hence implying that the measurement model has convergent validity. The measurement model assessment is depicted in Figure 1, which displays the SmartPLS result.

Table 3. Factor Loading, Composite Reliability and Average Variance Extracted

	Items Code	Factor Loading	Composite Reliability (CR)	Average Variance Extracted (AVE)
Learning Motivation	D1	0.791	0.712	0.563
	D5	0.775		
	D6	0.681		
Cognitive	E21	0.816	0.840	0.525
	E22	0.747		
	E23	0.413		
	E24	0.873		
	E26	0.685		
	E26	0.685		
Culture Background	G21	0.684	0.894	0.588
	G22	0.860		
	G23	0.684		
	G24	0.796		
	G25	0.870		
	G26	0.681		
Educational Materials	F11	0.835	0.798	0.508
	F12	0.617		
	F13	0.705		
	F14	0.401		
	F15	0.637		
	F16	0.552		
Educational Tools	F21	0.795	0.817	0.528
	F23	0.770		
	F25	0.659		
	F26	0.674		
Language	G11	0.791	0.810	0.526
	G12	0.744		
	G13	0.792		
	G14	0.512		
	G15	0.537		
	G16	0.450		

Following that, the model's discriminant validity was evaluated using the Heterotrait-Monotrait ratio of correlations (HTMT), as recommended by Hair et al. (2014). In the present study, it was observed that all the HTMT values for each construct fell within the specified threshold values of 0.90 (Gold et al., 2015) and 0.85 (Kline, 2015). Therefore, this suggests that the discriminant validity has been established. The fulfilment of each criterion, as indicated in Table 4, substantiates the assertion of discriminating validity for the measurement model.

Table 4. HTMT Assessment of Discriminant Validity

	Cognitive	Culture Background	Educational Materials	Educational Tools	Language	Learning Motivation
Cognitive						
Culture Background	0.168					
Educational Materials	0.175	0.48				
Educational Tools	0.182	0.595	0.788			
Language	0.242	0.871	0.457	0.499		
Learning Motivation	0.196	0.318	0.501	0.566	0.434	

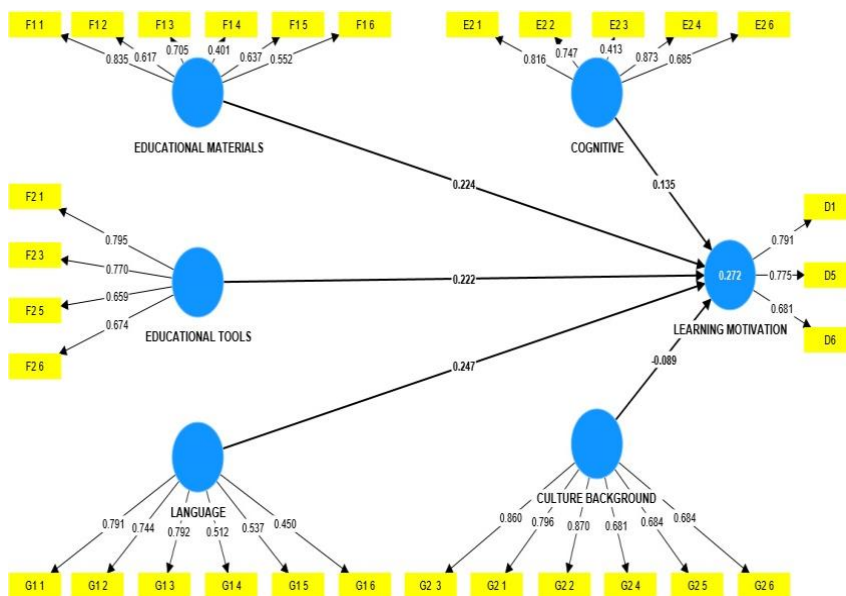


Fig. 2 SmartPLS Output of the Measurement Model

4.5 Structural Model Assessment

Table 5 exhibited the results of path analysis, VIF, f^2 , R^2 and Q^2 for student motivation, cognitive, culture background, educational material, educational tools and language. The Variance Inflation Factor (VIF) was evaluated to determine if there is a multicollinearity issue in the model and must be at a suggested value of $VIF < 5.0$ (Hair et al., 2011) or $VIF < 3.3$ (Diamantopoulos & Siguaw, 2006). The result of this procedure showed that the model is not having the problem of multicollinearity as all VIF values are well below 3.3. The rule used to interpret the results is: support the hypothesis when $p < 0.001$ ($t > 1.645$) or $p < 0.05$ ($t > 1.96$) or $p < 0.001$ ($t > 2.58$). The results have clearly demonstrated that from five hypotheses, three hypotheses are supported. The next step in assessing the significance and relevance of the structural model relationship is to assess the level of R^2 . Cohen (1988) also recommends a different value of R^2 , where 0.26, 0.13, 0.02 respectively are described as substantial, moderate and weak. The value of R^2 in this study is 0.272 (moderate).

The blindfolding procedure was also carried out using the $D = 7$ distance omission by analysing the predictive relevance. The predictive relevance Q^2 for student motivation is 0.108. The result of the Q^2 value is considered above zero and can be concluded that the model has predictive relevance based on cognitive, cultural background, educational material, educational tools and language (endogenous construct). Meanwhile, it is recommended by Ramayah et al. (2018) to assess the level of effect size (f^2) using effect size proposed by Cohen (1988). The objective of the (f^2) assessment is to identify the level of the effect size of predictor constructs on an endogenous construct (Cohen, 1988; Ramayah et al., 2018). As recommended by Cohen (1988), the recommended (f^2) values, 0.35, 0.15 and 0.02 are interpreted as large, medium and small with regard to the level of effect size. Table 5, the results showed that the effect is small for all relationships.

Table 5. Results of Path Analysis, VIF, f^2 , R^2 and Q^2

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Values	P Values	VIF	f^2	R^2	Q^2
Cognitive -> Learning Motivation	0.135	0.136	0.128	1.059	0.145	1.012	0.025	0.272	0.108
Culture Background -> Learning Motivation	-0.089	-0.063	0.102	0.871	0.192	1.867	0.006		
Edu Material -> Learning Motivation	0.224	0.232	0.099	2.269	0.012	1.629	0.042		
Edu Tools -> Learning Motivation	0.222	0.222	0.101	2.203	0.014	1.600	0.043		
Language -> Learning Motivation	0.247	0.239	0.102	2.423	0.008	1.676	0.050		

5. Discussions and Conclusions

This study identified the level of five educational approaches to incorporate indigenous knowledge in enhancing learning motivation. Based on Table 2.0, the highest mean was learning motivation with 4.34, followed by language with 4.3 and cultural background with 4.05. Meanwhile, findings show that cognitive skills show the lowest mean with score of 3.10. This study was supported by Nordin, (2018); Kamsin, (2019); and Cheng, (2021). Numerous important approaches have been uncovered through research on the Indigenous people in Malaysia's drive to learn. Both Cheng (2021) and Nordin (2018) emphasise the importance of the drive to conserve and advance culture as well as individual interests as motivators. Furthermore, Cheng (2021) and Yusof (2017) stress the need of generating revenue and employment prospects for the community in addition to the necessity of ongoing parent motivation initiatives. These results highlight the intricate interactions between communal, cultural, and personal elements that influence Orang Asli learning motivation. that indigenous students. Further analysis was carried out with five hypotheses measured. Out of five, three hypotheses were supported to incorporate indigenous knowledge in enhancing learning motivation.

Study found that educational approaches that are important to incorporate in IK are language educational materials and educational tools. These findings are supported by Gardner (2016) that emphasises the importance of language in the classroom for efficient communication and understanding, especially when it comes to kids who are indigenous. In extending this conversation to the embodiment thesis, Govender (2016) makes the case that teaching African languages can be improved by using an embodied approach and that language and knowledge acquisition are closely related. These studies highlight how important language is to the effective teaching, transmission, and

preservation of indigenous knowledge. In this digital era, tools for information and communication technology have the ability to gather, preserve, and distribute IK, potentially averting its extinction (Dlamini, 2017). Educational resources as a way to spread native wisdom, and it is important to create instructional materials that integrate indigenous knowledge and environmental awareness for meaningful learning among indigenous students (Rosa, 2023). Surprisingly, this study contradicts Sani (2014) says that indigenous students are not master literacy as it relates to their parent's academic background. As nowadays, most of indigenous students' parents show a positive parental involvement in education that is linked to increased productivity, well-being, and academic success (Sianturi, et al. 2023).

This study demonstrates the importance of meaningful educational approaches to indigenous knowledge content in the curriculum, and it is hoped that all related authorities will play an important role in integrating it with policy and equipping the right skills and knowledge to preserve and elevate indigenous knowledge (Ngulube, 2015). This will align with and support Agenda SDGs 4 for quality education and SDGs 11 for sustainability of cities and communities.

6. Co-Author Contribution

The authors affirmed that there is no conflict of interest in this article. Author 1 carried out the field work, research method and interpretation of the results in the discussion part. Author 2, Author 3 and Author 4 prepared the literature review and overlooked the writeup of the whole article. Author 5 did the data analysis and wrote the results. Author 6 carried out fieldwork and data entry.

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