Framework for Developing Local Knowledge Curriculum of *Orang Asli* Children in Malaysia Using Fuzzy Delphi Method

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Abstract. Malaysian indigenous people, also known as *Orang Asli,* have various unique aspects of local knowledge like herbs and traditional medicine, beliefs, handicrafts, and life values. They become valuable assets to the country. The impact of modernization has led to a decline in the traditional skills of the Orang Asli. This chapter presents the rationale of the needs analysis for developing a local knowledge curriculum and its importance in the education process for *Orang Asli*, especially for the future of their children in Malaysia. To this end, this chapter discusses the importance of developing a local knowledge curriculum based on the need analysis for *Orang Asli*. Apart from the efforts to upgrade *Orang Asli's* local knowledge, the need analysis also aims to maintain and uphold the identity and prestige of the future generation of *Orang Asli*, in line with the sustainable cultural diversity and biodiversity of education. *Orang Asli*'s local knowledge may be preserved so that the traditional values, beliefs and culture will not be eroded by mainstream education.

Keywords: Orang Asli's education, local knowledge, curriculum framework, preserve, eroded, needs analysis.

1 Introduction

Indigenous communities are the descendants of those who originally inhabited a country or a geographical region predating the arrival of people from different cultures or ethnic backgrounds due to colonization. Research indicates that over 370 million indigenous individuals are dispersed across 70 countries worldwide(1). According to the Missionary Oblates of Mary Immaculate (2013), the Lakota in the USA, the Mayas in Guatemala or the Aymaras in Bolivia, the Inuit and Aleutians of the circumpolar region, the Saami of northern Europe, the Aborigines and Torres Strait Islanders of Australia and the Māori of New Zealand are among the indigenous peoples. These diverse indigenous peoples have, for the most part, preserved distinct social, cultural, economic, and political characteristics that distinguish them from the dominant societies within which they coexist. Their connection to and utilization of traditional lands are particularly noteworthy, highlighting the unique relationship they maintain with their ancestral territories.

Indigenous peoples, guided by their traditional values, visions, needs, and priorities, harbor a diverse array of ideas regarding development. Their unique cultural perspectives shape their understanding of progress and growth, contributing to a multifaceted and distinct approach to

development that reflects their heritage and worldview. Frequently sharing common challenges with other marginalized segments of society, including insufficient political representation, economic marginalization leading to poverty, limited access to social services, and experiences of discrimination, these diverse indigenous communities strive for acknowledgment of their identities, preservation of their ways of life, and the rightful claim to their traditional lands, territories, and natural resources. Despite their cultural distinctions, the various indigenous groups unite in their efforts to secure recognition and protection of these fundamental aspects.

In Malaysia, the Orang Asli represent the earliest population, dating back approximately 5000 years. Despite their historical significance, the exact details of their history and genetic classification remain unclear. The Orang Asli encompass at least 95 subgroups, each possessing its own distinct language and culture. It is believed that many of them originated from China and Tibet, following migration routes through mainland Southeast Asia before establishing communities in Peninsular Malaysia and the Indonesian archipelago (2–6).

The indigenous peoples' lifestyles and means of subsistence exhibit considerable diversity. In Malaysia, a significant portion of the indigenous population resides in rural areas, engaging in subsistence farming with diversified agriculture. Some practice permanent agriculture, overseeing rubber, oil palm, or cocoa farms, while others living near or within forested areas participate in hill rice cultivation, hunting, and gathering. A few remain semi-nomadic, relying on the seasonal resources of the forest. Those in rural areas depend on rivers for drinking water, food, washing, and transportation, whereas a smaller proportion resides in urban areas, sustaining themselves through waged or salaried employment (2–6).

Since gaining independence, the government has initiated public development projects that have impact on the community. Additionally, there have been planned development initiatives specifically tailored to benefit the gathering. As 66% of the *Orang Asli* are illiterate, the critical instrument to recover their quality of life is education (7).

In 1995, the Ministry of Education Malaysia took charge of governing Orang Asli schools with the aim of facilitating their progress. However, there have been assertions that the Malaysian government neglects the development of Orang Asli and their traditional beliefs (6,8,9). The pursuit of development, from the perspective of the indigenous people, has had a profound impact on all aspects of their lives and values.

2 Literature Review

2.1 A Brief Review of Malaysian *Orang Asli*

As mentioned earlier, the term "Orang Asli" is a collective Malay term introduced by anthropologists and administrators to categorize the 18 sub-ethnic groups officially under three prominent tribes for administrative purposes. These three tribes are (1) Semang or Negrito, (2) Senoi, and (3) Aboriginal Malay or Proto Malay (2,5,8,10).

2.2 Semang or Negrito Tribe

The Semang, alternatively referred to as Negrito or Northern Aslian, include the Low-land Semang tribes known as Sakai (though this term is considered derogatory by the Semang people). These communities are typically located in the northern part of Peninsular Malaysia.

The Semang or Negrito people share physical resemblances with various groups, including the Andaman Islanders, Aeta in the Philippines, Melanesians, and Tasmanians. Within the Semang, there are six sub-tribes: Kintak, Lanon, Kensiu, Jahai, Mendriq, and Batek. It is hypothesized that they originated from Africa and dispersed across Southeast Asia, emerging as one of the earliest Orang Asli tribes to arrive in Peninsular Malaysia approximately 25,000 years ago (2,5,8,10,11).

Among the three Orang Asli tribes, the Semang have the smallest population, with the majority of their settlements located in the isolated highlands of Kelantan, Terengganu, and the northern regions of Perak, Kedah, and Pahang. The native vocabulary of the Semang incorporates words that represent fundamental semantic categories, and there are instances of borrowing from non-Aslian languages, including Malay (12).

Traditionally, the Semang hold complex religious beliefs that encompass numerous gods. The majority of Semang tribes adhere to animism, attributing spirits to nonhuman entities. Their priests engage in magical practices, foresee the future, and administer cures for diseases.

The Semang subgroups are deemed to be at risk of extinction due to their smaller populations compared to other Orang Asli sub-groups. Certain segments of the community are undergoing profound transformations as a result of the modernization process, placing their language and culture in immediate jeopardy.

2.3 Senoi Tribe

The Senoi is the largest tribe among the three prominent tribes (6,10,13,14). For the convenience of administration, the classification of the tribes referred to the morphology, culture, language and geographical locations.

The term "Senoi" originates from the Semai and Temiar languages, where "sen-oi" and "seng-oi" both denote "people." The Semai people collectively inhabit the middle to northern regions of Peninsular Malaysia. Research by Bellwood (2), JHEOA (10), and Nicholas (5,8) indicates that the Senoi ethnic group consists of six distinct sub-groups: Semai, Temiar, Che Wong, Jah Hut, Semoq Beri, and Mah Meri.

According to Baer's study (15), the Senoi tribes are thought to have arrived in Peninsular Malaysia approximately 8000 years ago during the second wave of migration from the mountainous areas of Cambodia and Vietnam. The Semai community is further divided into two groups: Highland Semai and Lowland Semai. The Highland Semai are skilled in utilizing forest resources for activities like hunting, fishing, and swidden farming. Meanwhile, the Lowland Semai are more engaged in labor and participate in small-scale trading of jungle produce, which exposes them further to the modern economy.

Renowned for their non-violent nature and emphasis on communal sharing, the Semai follow a traditional leadership structure led by elderly members known as the Council of Elders. The council appoints a member, well-versed in intergroup relations, traditional healing, and customs and laws, as the head. This head is referred to as the "Raknaak."(6,10,13,14).

The Semai hold a belief system in which they acknowledge the presence of an ultimate supernatural entity responsible for the creation of the world and its inhabitants, including plants, seas, mountains, trees, animals, and, most importantly, humanity. In their cosmology, thunder is perceived as a supernatural being that governs human behavior and metes out punishment to

those who violate their social and cultural norms. Additionally, the Semai recognize other deities, referred to as cyanic, which form the basis of the supernatural and encompass elements like bad luck, illness, and various disasters.

2.4 Proto-Malays Tribe

The second largest Orang Asli group is the Proto Malay, also referred to as Aboriginal Malay. This group comprises six tribes: Jakun or Orang Hulu, Temuan, Semelai, Kuala, Kanaq, and Seletar. According to Fix (16), Proto Malay was categorized into three groups: Melayu Asli, which includes those who speak Malay and wear Malay costumes like the Temuan; the second category encompasses tribes combining Proto Malays and Senoi from linguistic and cultural perspectives; and the third and most significant type comprises tribes, primarily Muslims, who speak Sumatera dialects and settle in coastal areas.

The Proto Malays, arriving later than the Negrito around 2000 BC, were Austronesian speakers and seafaring people (2,18), establishing themselves primarily in the central and southern regions of Peninsular Malaysia. Although similar in appearance to Malays, the Proto Malays have diverse origins, with some arriving by sea in recent centuries and others residing in Peninsular Malaysia for thousands of years (16,19). Descendants of the Proto Malays, known as Deutro Malays, intermingled with Siamese, Javanese, Sumatran, Indian, Thai, Arab, and Chinese traders (20). As per Fix (16), the original Deutro Malays migrated from southern China, intermarried with Proto Malays and ancient trade route merchants, leading to the present-day Malays.

2.5 Concept of Local Knowledge

Indigenous knowledge is defined as "the unique, traditional, local knowledge existing within and developed around the specific conditions of women and men indigenous to a particular geographic area" (21). Kincheloe and Semali (22) associate indigenous knowledge with what the West labels as primitive, wild, and natural. Similarly, George (23) links indigenous knowledge to traditional knowledge, "lay beliefs," and "common sense beliefs." These terms refer to knowledge that has evolved within a specific societal context, used by laypeople in their daily lives, highlighting native ways of understanding the natural environment and organizing folk knowledge of flora and fauna, cultural beliefs, and history to enhance their lives.

The International Council for Science (ICSU) (24) uses the term traditional knowledge, defining it as a cumulative body of knowledge, know-how, practices, and representations maintained and developed by people with extended histories of interaction with the natural environment.

In this article, the term chosen is local knowledge. Local knowledge is unique to each culture or society, encompassing various types of knowledge possessed by individuals, regardless of age, gender, education level, or community type (rural, urban, nomadic, settled, migrant, or inhabitant). Local knowledge is seen as the evolving knowledge within each community, encompassing how problems are solved, how surroundings are measured and observed, how new information is validated, and how knowledge is stored, generated, applied, and transmitted to others. It constitutes a collection of facts relating to the entire system of concepts, beliefs, and perceptions that individuals hold about the world around them (25).

2.6 Local Knowledge of *Orang Asli*

In Malaysia, the local knowledge of *Orang Asli* is not well documented. However, there are common characteristics of local expertise and other local knowledge in some parts of the world. *Orang Asli* in Malaysia practice and use their knowledge in several areas, including mother-tongue language, herbal medicine, music, songs and dance, and social and traditional methods and values. The discussion in this section refers to the knowledge of *Orang Asli,* the Semai community in Malaysia.

Languages stand as some of the most intricate creations of the human mind, each serving as a vessel for a culture, literature—whether oral or written—and a worldview shaped by centuries of creativity and invention. For indigenous people, language is the essence of their identity, distinguishing their way of life from others and intricately connected to the cultural environment where meanings are preserved.

Due to their relatively isolated circumstances and a high degree of self-sufficiency, the Semai language has evolved, incorporating influences from various Aslian languages and becoming a common means of communication among the Orang Asli. However, interactions such as trade, intermarriage, migration to urban areas for employment, and the introduction of mainstream education have led to significant borrowing from and the adoption of the majority language. Simultaneously, the Semai language is gradually fading as social relations expand in modern conditions.

Elders note a concerning trend among Semai children, who increasingly reject their native language, associating it with poverty and adversity. This sentiment is further amplified by mass media, exacerbating the decline of indigenous languages. Today, Orang Asli languages face the imminent threat of extinction, putting not only their linguistic heritage at risk but also jeopardizing the unique identity and survival of these indigenous peoples.

Orang Asli communities have a rich tradition of utilizing herbal medicine, yet there is currently no centralized knowledge-based system in Malaysia to store and share this indigenous herbal knowledge (27). In terms of health knowledge, research indicates that Orang Asli is aware of the nutritional value of fruits and vegetables, considering them as 'good' foods, while identifying sugar and snacks as 'bad' foods. They understand that nutritious foods play a preventive role against illnesses by providing energy and enhancing blood circulation. However, there is a noted lack of knowledge among many women regarding appropriate nutrition for growth.

In the Orang Semai community, oral health issues, particularly toothaches, are prevalent. Traditional healers, known as Tok Halaq, play a crucial role in the community, being influential in preventing, promoting, and healing health issues. The reliance on these traditional healers reflects the community's trust in their expertise and the importance they hold in maintaining the well-being of the community.

Many Semai express a desire for development (28,29). However, their perception of economic development leans more towards expropriation rather than modernization (8,30). This perception aligns with statistical data, where, for example, there has been no notable improvement in Semai health or nutrition since Malaysia gained independence (5,15,31). When the Semai raises objections to expropriation, they are sometimes accused of being "against development" (27,29).

Inspired by their natural environment, the Orang Asli sing and perform the geographical landscape, flora and fauna, and ethos of the people. *Orang Asli's* music is orientalized as 'authentic' and embodies a variety of differences depending on their livelihood, ecological

niche, belief and cultural interaction. Orang Asli's music contains wisdom, knowledge and world views transmitted from generation to generation for thousands of years (32).

Skeat and Blagden (33) describe the musical instruments of the Semai (Sakai), such as the nose flute, drum framed with monkey skin, bamboo stampers and bamboo harp or guitar. The Semai's musical activities include *Sewang* performance. There are various types of *Sewang*, for instance, *Sewang Berubat* (healing ritual), *Sewang Besar* (large-scale *Sewang*) or *Sewang Bersuka Ria* (recreational *Sewang*), *Sewang Kebut* (more minor healing practices). There is also *Sewang* for childbirth, funerals, and propitiating *Poyang-Poyang* (spirit).

Many Semai elderly villagers are proficient in *ronggeng, joget* and *cha-cha* dancers. The *joget* was developed from the *branyo*, a localized dance influenced by Portuguese dances, and *cha-cha* was adapted from the Western dance of the early '60s.

Semai considers playing music at night taboo, even whistling at night. They believe that if they whistled at night, they would become blind, and their children would become disabled. They used to play the nose flute (*pencil*) next to the river at home while daydreaming or relaxing.

However, socio-political changes and globalization spurred the changes from a homogenous to a more heterogeneous identity, which led to the construction of *Orang Asli* with multiple identities and diverse musical aesthetics and interests. In addition, the exposure to the virtual world through the media influenced Orang Asli's identity and musical aesthetics. Traditional music has declined and gravitated toward the preference for music disseminated by the mass media.

Semai believes in supernatural invisible beings. For the Semai, the world is whole of spirits that, in one way or another, affect their life. Disease and misfortune are bound with shades. This caused the Semai religion to be identified as animism (34). Religion is not a distinct institution in Semai society; instead, it is a loosely shaped collection of beliefs, taboos and practices that is an integral part of Semai culture. For instance, the adults perform shamanic ceremonies in secret, often without singing, so as not to offend the religious sensibilities of the neighbors. In addition, Semai's belief in supernatural invisible beings is always associated with a medium, or shaman, who specializes in communicating with the paranormal and has the authority to direct magical power towards solving various group difficulties such as diseases (35).

Semai religion involves everyday needs such as healing and cultivation and is restricted to the people and landscape. The best word for this religion is the very Semai term *adat* (custom), which shows the identificational function, which consists of religious, customary laws and unwritten traditional codes regulating different aspects of social life. Culturally, the Semai follow Malay custom, which varies widely from place to place, and they speak Malay.

Adat or custom is woven into all aspects of Semai life and thus does not have a distinct border. *Adat* includes more than religious matters and encompasses the Semai kinship system and the ideas of social and natural order. Belief in supernatural invisible beings is always associated with a medium, or shaman, who specializes in communicating with the paranormal and has the authority to direct magical power towards solving various group difficulties such as diseases (35).

2.7 *Orang Asli's* Local Knowledge Curriculum Model

This research is carried out to analyze the need for developing a curriculum based on *Orang Asli's* local knowledge with the agreement of experts. The objective of the study is to identify

an appropriate design for developing the *Orang Asli's* local knowledge curriculum. Thus, the research question is, "By the expert's perception, what is the appropriate curriculum design based on *Orang Asli's* local knowledge?"

The focus of this research is Semai's children's home schooling in Cameron Highland district, Pahang. Twelve experts have been selected by purposive sampling based on fuzzy Delphi panel selection between 10 – 20 (36). Each expert chosen has more than ten years of experience in the *Orang Asli's* children's education (teacher of *Orang Asli* and *Orang Asli* under NGO), an official from Curriculum Development Division, Education Planning and Research Development, Ministry of Education Malaysia and officers from *Orang Asli* Affair Department, *Orang Asli* lecturers from Malaya University (Professor in Anthropology and Sociology Department) and *Tok Batin* of *Orang Asli*.

3 Method

The researchers have developed a survey question as the instrument for fuzzy Delphi analysis based on the research literature and interviews with experts. The pilot test was carried out with ten respondents were parents of *Orang Asli*, teachers of *Orang Asli*, lecturers in *Orang Asli's* children's education, officials from Department *Orang Asli*'s Affair Department, and officers from Daily School Management Department (*Orang Asli* Special Education). This instrument has the validity value of Cronbach Alpha 0.941.

After that, the data collection process and steps of fuzzy Delphi (37) have been carried out as below:

a. Identify the number of experts involved, between 10 – 20 respondents (36). For this research, there is a consensus of selecting 12 experts.
b. Identify the linguistic scale based on triangular fuzzy numbers. The researchers have identified a 5-point Likert Scale.

5-POINT LINGUISTIC SCALE			
Strongly Agree	0.60	0.80	1.00
Agree	0.40	0.60	0.80
Simple Agree	0.20	0.40	0.60
Disagree	0.10	0.20	0.40
Strongly Disagree	0.00	0.10	0.20

c. After that, all data are tabled to get the average or mean of (m_1, m_2, m_3). The minimum value, appropriate value and maximum value.
d. Ensure the distance between numbers to identify the threshold value by using the rumpus below:

$$d(\tilde{m}, \tilde{n}) = \sqrt{\frac{1}{3}\left[(m_1 - n_1)^2 + (m_2 - n_2)^2 + (m_3 - n_3)^2\right]}.$$

e. After that, we need to ensure that the cooperation percentage among the group members should be more than 75%.
f. I fixed the fuzzy evaluation aggregate by adding all fuzzy numbers.
g. Process Defuzzification. This process aims to identify the ranking for each variable or sub-variable by using the rumpus below:

$$A_{max} = 1/3 * (a_1 + a_m + a_2)$$

4 Result

These selected research items are within the linguistic range from "Strongly Disagree" to "Strongly Agree", a 5-point Likert Scale. A list of things based on Orang Asli's local knowledge curriculum Design is shown in Table 1.

Table 1. Curriculum Design Based on Orang Asli Local Knowledge

Item	Curriculum Design
1	Mother Tongue Language
2	Herbal Medicine
3	Music, Songs and Dance
4	Weaving and Traditional Handicraft
5	Traditional Costume
6	Social Traditional Practices and Value
7	Traditional Games
8	Custom and Taboo

The consensus of expert analysis in developing an appropriate local knowledge curriculum based on the needs of Orang Asli is shown in Table 2. The study found that the overall items about the local knowledge of Orang Asli is 89% in agreement with the experts and is appropriate to develop. It meets the conditions specified in the fuzzy Delphi data analysis, where the threshold value constructs (d constructs) ≤ 0.2 and with the agreement of the expert $\geq 75\%$.

Table 2. The Validity for Developing a Local Knowledge Curriculum for *Orang Asli* based on Experts' Consensus Agreement

Expert	The Validity for Designing Local Knowledge Curriculum for *Orang Asli*							
	1	2	3	4	5	6	7	8
1	0.0254	0.0254	0.2291	0.0509	0.0620	0.0473	0.0945	0.0945
2	0.0254	0.0254	0.0763	0.0509	0.0620	0.0473	0.0945	0.0945
3	0.0254	0.0254	0.0763	0.0509	0.0620	0.0473	0.0945	0.0945
4	0.0254	0.0254	0.2291	0.0509	0.0945	0.1125	0.0620	0.0620
5	0.2800	0.0254	0.0763	0.0509	0.0620	0.0473	0.0945	0.0945
6	0.0254	0.2800	0.0763	0.2545	0.0620	0.0473	0.0945	0.0945
7	0.0254	0.0254	0.0763	0.2545	0.0620	0.1125	0.0620	0.0620
8	0.0254	0.0254	0.2291	0.0509	0.0620	0.1125	0.0620	0.0620
9	0.0254	0.0254	0.0763	0.0509	0.3833	0.1125	0.0620	0.0620
10	0.0254	0.0254	0.0763	0.0509	0.3833	0.0473	0.0620	0.0620
11	0.0254	0.0254	0.0763	0.0509	0.0620	0.0473	0.3241	0.3241
12	0.0254	0.0254	0.0763	0.0509	0.0620	0.0473	0.0945	0.0945
d value for each item	0.0275	0.0487	0.1209	0.0891	0.1234	0.0730	0.1080	0.1080
d Value for overall items	0.087325							

Based on Table 2, the threshold value (d) for each item for developing a local knowledge curriculum for *Orang Asli* is less than or equal to the value of 0.2 (d ≤ 0.2). The entire items for developing local knowledge for *Orang Asli* have a value of less than 0.2, namely 0087. Thus, all the things for creating a local knowledge curriculum for *Orang Asli* are valid and accepted by the experts.

The results showed that the experts had reached a consensus that there is a need to develop a curriculum based on local knowledge for *Orang Asli*. It directly impacts the need to create a local knowledge curriculum for Orang Asli in the mainstream education system based on the views of experts.

The local knowledge curriculum for *Orang Asli* can be developed based on the consensus of experts, where the threshold value is less than or equal to 0.2. as shown in Table 3.

Table 3. Summary of Expert Consensus for Developing Local Knowledge Curriculum for *Orang Asli*

Item	Curriculum Design	Expert Consensus
1	Mother Tongue Language	Experts have agreed to accept this form of the curriculum with a threshold value of 0.0275
2	Herbal Medicine	Experts have agreed to accept this form of curriculum with the threshold value of 0.0487
3	Music, Songs and Dance	Experts have agreed to accept this form of the curriculum with a threshold value of 0.1209
4	Weaving and Traditional Handicrafts	Experts have agreed to accept this form of the curriculum with a threshold value of 0.0891
5	Traditional Costume	Experts have agreed to accept this form of the curriculum with a threshold value of 0.1234
6	Social Traditional Practices and Value	Experts have agreed to accept this form of the curriculum with a threshold value of 0.0730
7	Traditional Games	Experts have agreed to accept this form of the curriculum with a threshold value of 0.1080
8	Customs and Taboos	Experts have agreed to accept this form of the curriculum with a threshold value of 0.1080

The analysis report is based on the highest ranking for each item. It is based on the need to develop a local knowledge curriculum for *Orang Asli*, where the view of the appointed experts will determine the suitability of the curriculum.

Given that the experts are interviewed with a question such as "What type of local knowledge curriculum for *Orang Asli* should be developed?", it is, therefore, the expert's feedback on needs analysis in developing a local knowledge curriculum for Orang Asli appropriate.

Table 4. *Orang Asli* Local Knowledge Curriculum Design Based on Experts' Views and Ranking

		Mean Responses			Defuzzification Value	Score
	Item	m1	m2	m3	average of (m1,m2,m3)	
1.	Mother Tongue Language	0.60	0.80	1.0	0.80	1
2.	Herbal Medicine	0.58	0.78	0.98	0.78	2
3.	Music, Songs and Dance	0.55	0.75	0.95	0.75	4
4.	Weaving and Traditional Handicraft	0.56	0.77	0.97	0.77	3

5.	Traditional Costume	0.52	0.72	0.92	0.72	6
6.	Social Traditional Practice and Value	0.53	0.73	0.93	0.73	5
7.	Traditional Games	0.48	0.68	0.88	0.68	7
8.	Custom and Taboos	0.48	0.68	0.88	0.68	7

According to Table 5 above, the defuzzification values for all items (Item 1 to Item 8) fall between 0.68 and 0.80, surpassing the threshold of 0.6, which is the consensus value accepted by experts. This implies that all the experts "Strongly Agree" with the items in this questionnaire. The elevated values signify a unanimous agreement among experts regarding the necessity of a local knowledge-based curriculum for Orang Asli.

Item 1 [Mother Tongue Language] takes precedence on the expert's priority list, holding the highest defuzzification value of 0.80. This indicates that, based on the experts' perspectives, the development of Orang Asli's mother tongue language is one of the most crucial elements that should be incorporated into the curriculum.

Item 2 [Herbal Medicine] follows as the second priority on the expert's list, with a defuzzification value of 0.78. This suggests a consensus among experts on the need to integrate a local knowledge curriculum on Herbal Medicine for Orang Asli within the mainstream education system in the future.

Item 4 [Weaving and Traditional Handicraft], with a defuzzification value of 0.75, secures the third spot on the expert's priority list. In contrast, Item 3 [Music, Songs, and Dance], also with a defuzzification value of 0.75, is ranked fourth.

Item 5 [Traditional Costume] is ranked number 6 in the experts' priority list with a defuzzification value of 0.72. In contrast, Item 6 [Social Traditional Practice and Value] is ranked number 5 in the expert's priority list with a defuzzification value of 0.73.

 Item 7 [Traditional Games] and Item 8 [Customs and Taboos] are the lowest in the expert's priority ranking list, with a defuzzification value of 0.68. However, they agree with the experts; hence, "Traditional Games, Customs and Taboos" should be developed as part of the local knowledge curriculum for *Orang Asli* in the mainstream schools.

The research findings shown in Table 4 answer the research question, "Based on the experts' opinion, what type of local knowledge curriculum for *Orang Asli* should be developed?". The findings of this study show that a group of experts have reached a consensus agreement to establish a basis for an appropriate local knowledge curriculum for *Orang Asli*. As such, the curriculum should be developed and expanded as a formal curriculum in the mainstream education system in the following order of importance.

   a. Mother Tongue Language: Experts agreed that there is a need to design a local knowledge curriculum for *Orang Asli*, especially for the major tribes such as Semai language, Temuan language, Jahut language and Temiar language.
   b. Herbal Medicine: Experts have the consensus that *Orang Asli's* children should be introduced to ethno-herbal plant medicine, which was practiced by the *Orang Asli*.

c. The art of weaving and traditional handicrafts: Experts also agreed that the diversity of Orang Asli's arts and handicrafts should be recommended as part of the formal curriculum for *Orang Asli's* children.
d. Music, Song and Dance of the Orang Asli Community: To preserve the *Orang Asli's* culture and art, their Music, Songs and Dances should be developed and introduced in mainstream education.
e. Traditional Practices and Values: The traditions, practices and values of the *Orang Asli* should be developed in the local knowledge curriculum to strengthen the identity of *Orang Asli's* children.
f. *Orang Asli* Traditional Costume: The *Orang Asli's* children should be exposed to their traditional costume through the formal curriculum.
g. *Orang Asli* Traditional Games; Customs and Taboos: Even though these two items are ranked the lowest, they still need to be developed in the curriculum to preserve the traditional games, customs and taboos of *Orang Asli.*

In sum, the analysis shows that the experts have reached a consensus that there is a need to develop a local knowledge curriculum for *Orang Asli* in line with the sustainable cultural diversity and biodiversity of education so that *Orang Asli's* local knowledge will not be eroded by modernization.

5 Discussion

The Importance of Local Knowledge Curriculum for *Orang Asli*

The findings of this study indirectly show the significance of education development for *Orang Asli's* children. Based on the literature review related to local knowledge of *Orang Asli* and the findings of the needs analysis of this study, steps can be taken to preserve Orang Asli's local knowledge.

The integration of local knowledge as a form of the curriculum is seen as an urgent need that must be considered by all parties as an alternative to increasing the participation of *Orang Asli's* children in the school system today. The finding is consistent with the studies conducted by Mohd Nazri Abdul Rahman (38), which suggests that mainstream schooling should present a curriculum based on the mother tongue, values and practices of *Orang Asli*. This approach not only provides an opportunity for *Orang Asli* to maintain their intellects and traditions but also to uphold the identity of the *Orang Asli* (39).

In addition, the need to develop a curriculum based on local knowledge of *Orang Asli* can preserve the traditional values and socio-cultural practices in forming the desired identity of the *Orang Asli's* children from being eroded by modernization. The findings of this study are also in line with the results by Mohd Nazri Abdul Rahman et al. (37), which state that the need to develop *Orang Asli's* local knowledge curriculum can maintain the intellectualism of *Orang Asli*, to pass to their children through an accredited education system.

The findings also highlight the need to develop a local knowledge curriculum about herbal medicine. This finding indirectly addressed the issue also expressed by Aniza Mohd Said et al. (39), who stated that a local knowledge curriculum on herbal medicine should be developed to ensure that *Orang Asli's* knowledge of herbal medicine would not be eroded but will be passed down from generation to generation in the form of formal education. *Orang Asli's* herbal medicine is rich in nutrients and pleasing to the community. Therefore, herbal medicine should

be explored and maintained by the community itself (40). Through the development of a local knowledge curriculum, this forest heritage can be preserved and maintained for future generations.

The local knowledge curriculum of *Orang Asli* will also provide the opportunity and space for the *Orang Asli* communities to educate their children in accordance with their manners to inherit their intellectualism. The studies recommended place-based indigenous pedagogy (38,39,41) as an effort to inherit the intellectualism of *Orang Asli's*.

6 Conclusion

The *Orang Asli* community is deemed to have practical local knowledge, especially knowledge of the forest, the ecology, the wildlife and the component. It is also one of the important aspects that distinguish *Orang Asli*'s management system from the dominant 'scientific' resource management models (42).

Nonetheless, the Orang Asli collectively grapple with the significant challenge of being forcefully displaced from their ancestral lands, leading to a gradual erosion of their cultural identity. This decline is further intensified by an education system that inadequately accommodates their beliefs and practices. The issue is compounded by the far-reaching impacts of mainstream development, characterized by rapid changes in the natural environment alongside global economic, political, and cultural transformations. Specific policies, notably those advocating for integration and assimilation targeted at the Orang Asli, contribute to the worsening erosion of their cultural identity. The rich local knowledge held by the Orang Asli is now perilously close to disappearing.

In their pursuit of rights, the Orang Asli fervently advocate for the acknowledgment of their right to land, the right to influence development that aligns with their needs, the right to indigenous education and lifestyle, and the right to equal access to basic facilities. These declarations underscore their unwavering commitment to preserving their distinct cultural heritage and striving for a future that resonates with their values and aspirations.

Efforts should be made so that Semai language as a subject should be introduced and adapted into the school curriculum. Their traditional knowledge of the community, either *Orang Asli's* stories, old legends, their medical knowledge or their cultural practices, should be documented. In conclusion, there is a need to identify, document and develop a local knowledge curriculum for *Orang Asli*, to ensure that their natural wealth is passed down through the generations.

7 Acknowledgment

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