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The Education and Social Mobility of Orang Asli Jakun to Leverage Life Quality using a Fuzzy Method

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Abstract

There is uncertainty regarding decreasing class inequalities in educational attainment is perceived to help leverage life quality (LLQ). Previous literature revealed that the quality of education of Orang Asli is still low compared to the mainstream society based on various factors. Nevertheless, enrolment of Orang Asli youngsters into universities seemed to have increased. This paper demonstrated on measuring the category for LLQ based on the factors of education and social mobility among the Orang Asli Jakun from Johor that graduates of Universiti Teknologi MARA(UiTM). The Fuzzy Analytic Hierarchy Process (F-AHP) method was used to efficiently measure the LLQ of Orang Asli Jakun graduates based on the eight sub-factors identified, five for social mobility and three for educational mobility. According to the F-AHP, the total score (TS^W) for financial (0.159) and education expansion (0.171) were identified as the most influential factors contributing to the LLQ. Meanwhile, the family support and change of residence sub-factors were identified as the least influential factors with TS^W of 0.017 and 0.022, respectively. The overall score of 68.70% implied a moderate category for LLQ. The outcome of the study justified Orang Asli Jakun graduates from UiTM were aware of the importance of higher education for LLQ. In conclusion, this study highlighted that the Orang Asli Jakun graduates from UiTM could improve their LLQ through tertiary education and social mobility.

Keywords: Education, Social Mobility, Fuzzy Method, Leverage Life Quality, Orang Asli Jakun

Introduction

The Orang Asli of Peninsular Malaysia is the indigenous minority consisting of three main ethnic groups namely Negrito, Senoi, and Proto-Malay. Each of the groups consists of 6 sub-ethnic divisions. According to the statistics released by the Department of Indigenous Development (JAKOA, 2019), a total of 198,015 indigenous people live in Peninsular Malaysia. Particularly, the Proto-Malay descendants of the Orang Asli Jakun are found in the Malaysian

states of Johor, Pahang, Selangor, Melaka, Negeri Sembilan and Perak accounting for a total of 37,187 individuals. The Jakun population is most concentrated in Johor with approximately 8,144 (21.9%) individuals. They still practise animism and have their own culture and language symbolising their identity (Saat and Zakaria, 2013).

The four challenges faced by the Orang Asli of Peninsular Malaysia include poverty, lack of participation and cooperation from the local community level, improving the Orang Asli community, together with the traditional Orang Asli way of life (Shah et al., 2018). Based on these challenges, improving the Orang Asli community is the main interest of this study through education and social mobility.

Among the government's efforts to improving the Orang Asli community include implementing a variety of economic, social, and educational development projects (Abdullah et al., 2013). The social development programs under the New Economic Policy focus on providing infrastructure facilities, housing, health, and education. Although the National Plan targeted to close the income inequality gap among Malaysians, poverty among the Orang Asli population remains higher compared to the other ethnic groups. According to Woon (2020) in *The Sun Daily*, the absolute poverty rate among the indigenous people was 7.2%, relatively higher than the rate estimated among the Chinese (1.4%) and Indians (4.8%). To solve this problem, Deli and Yasin (2016) suggested that the life quality of the Orang Asli can be improved by providing them with quality education. Thus, it can be highlighted that education can significantly improve their quality of life and is regarded as a crucial factor to success. Quality education can uplift poverty and improve the quality of life, especially for the marginalised and minority communities like the Orang Asli (Sawalludin et al., 2020).

In line with education development, social mobility should also be promoted by the propagation and spread of education. Educated individuals could achieve higher social status (Nazimuddin, 2015). Generally, education is widely accepted as a key determinant of social mobility in an individual's lifetime and across generations. Hence, poor performance in education appears to be one of the main barriers preventing these people from alleviating poverty.

Even though the mentality of the oldies of Orang Asli community do not regard education to be significant because they believe that the rule of the thumb of survival is by performing their day to day works, but their youngsters seemed have positive views on the role of education like Orang Asli Jakun. According to Nor et al (2018) the Orang Asli Jakun community in Rompin Pahang do prioritise education and career for better quality as they dispelled the negative view of the Orang Asli towards education.

Similarly, positive view on the role of education was observed among the Iban community (indigenous people in Sabah). The Iban community believe that education is a transformation agent of socialisation and economic status. The Iban community regard education as an important factor in economic significance, social status, prestige, pride, and survival. Moreover, education also assisted the Iban community to overcome poverty and improve their social standing in modern society (Lyndon et al., 2018).

Therefore, education is regarded as an indicator of social mobility for a nation or race. Through education, people could enjoy a more systematic life (Zaidin, 2015). Education is the most prominent factor in driving the social mobility of certain communities, especially the rural communities because social mobility is a process of change or movement of a person or group from one position to another in a society. In short, education improves one's standard

of living for a better life (Lyndon et al., 2018). Therefore, quality education can improve the quality of life.

A significant number of the Orang Asli youngsters have successfully advanced into tertiary institutions (Abdullah et al., 2013) indicating their social and academic adaptation alongside the self-esteem among Orang Asli students. Syron and McLaughlin (2010) added that the adaptation in higher education is experienced differently among Orang Asli students because they face adaptation problems and their low self-esteem often leads to lower academic achievement, resulting in withdrawal from higher education institutions (Primus et al., 2017). Despite such challenges, the enrollment among Orang Asli students to local universities has gradually improved.

In the year 2009, approximately 2.2% of the indigenous youngsters undertook graduate studies at higher learning institutions (Salleh and Ahmad, 2009). Meanwhile, Deli and Yasin (2016) added that 370 and 408 Orang Asli students were accepted into public universities in Malaysia in the year 2010 and 2011, respectively. The number increased to 507 in 2018 (211 in Diploma and 296 in Degree). Meanwhile, the enrolment of Orang Asli students into Universiti Teknologi MARA (UiTM) was estimated at 43.58% (144 people) for Diploma and 68.25% (129 people) for Degree (JAKOA, 2019). In the year 2014, a local newspaper (Unknown, 2014) reported that 25 Orang Asli students furthered their studies abroad including 9 in the United Kingdom, 8 in Australia and 2 in India.

To understand the background of Orang Asli students at tertiary institutions, interviews via Google Meet and WhatsApp video calls were conducted with 12 graduates of UiTM, where nine of the respondents were from the Jakun tribe and three were from Orang Kuala tribe. In this research, we focus on data from Orang Asli Jakun tribe only. Of the nine of Orang Asli Jakun, eight are working in various sectors (Doctor, Librarian, System Engineer, Clerk, Assistant Administration of Finance, Nurse, and Graphic Designer) and one is currently pursuing a Master's degree. All the respondents agreed that the support from their family was one of the main factors for their success. Moreover, some of the parents of the respondents were from mixed marriages (Chinese and Jakun, Melayu and Jakun) and no longer live in the village. It could be a factor that may influenced their positive views on education and social mobility.

Therefore, the current educational impact study aims to assess the perspectives among the UiTM's Orang Asli graduate students from the Jakun tribe in Johor. This study aims to measure the significant impacts of the education and social mobility factors on the leverage life quality (LLQ). The insights from this study would help evaluate the LLQ among the Orang Asli Jakun graduates in Johor through higher education using the fuzzy method approach to analyse the identified factors.

Factors on Education and Social Mobility of Orang Asli

Education is a central vehicle for reproduction and mobility. Parents and family support is one of the significant factors influencing the academic achievement of children. Yusof et al (2017) revealed significant parental commitment in leading to the enrolment of the Orang Asli students in nine primary schools. Li and Zhong (2017) also demonstrated that the association between parents and children's education has increased over time. Similar studies (Lee et al., 2018) further added that Orang Asli parents viewed education as a key element for their children to pursue their desired careers, hence, encouraged their children to strive towards academic excellence.

Based on these justifications, the commitment of the Orang Asli parents to improving their children's performance at school is apparent. The active participation and support of parents during the early stages could improve the learning potential of their children at a higher level. Parents who emphasised the importance of education could improve their children's attitude towards academic excellence and solve the dropout problem among the Orang Asli community. Based on extant literature (Primus, Abdullah, and Ismail, 2017), the dropout issue is regarded as a common problem among Orang Asli children at all educational levels. Data from the Orang Asli Development Department indicated that the dropout rate among indigenous people is alarming where almost 50% of indigenous students drop out of school at Form One (JAKOA, 2019).

The government has made various efforts for the betterment of the Orang Asli community, for instance through the relocation plan (RPS: Rancangan Penempatan Semula) where some were moved from remote areas to suburban areas. This resettlement program aims to improve the socio-economic development of the Orang Asli community. Consequently, the economy, health, and education could bring some changes in the livelihood of the indigenous (Lee et al., 2018). Perhaps, the resettlement program could be the key performance indicator to help the educational mobility among Orang Asli.

Social mobility could affect the access to education as mentioned by Simon (2018) starting from early learning, school achievement, transition to higher education, and the stratification of higher education. A study conducted in Britain, Sweden, and Germany (Richard, 2010) during the 20th century identified that greater social mobility was promoted by educational expansion. In short, lower social mobility translates to reduced opportunities to learn in education. The Global Social Mobility Index 2020 in the World Economic Forum (2020) was organised into 10 distinct pillars which can be further divided into 5 crucial social mobility determinants namely health, access and quality of education, technology access, work opportunities and social protection, together with inclusive institutions. Thus, enhancing access to education fosters social mobility.

On the other hand, Nazimuddin (2015) revealed various ways of facilitating social mobility including political power, marriage, family affiliations, and access to education. Moreover, a change in occupation is also considered to be the best single indicator of social mobility because occupational status is closely correlated with educational status.

Nevertheless, the quality of life among the Orang Asli is still poor compared to the other ethnicities in Malaysia (Harun and Idris, 2020). According to a recent study by Saifullah, Masud and Kari (2021), the Orang Asli community is likely to remain economically poor due to insufficient access to basic education and the inability to being employed. The study also indicated that economic status and access to education are the most significant factors that would help improve the overall well-being of an indigenous community. Therefore, education and economy are the two significant contributory factors responsible for the success of Orang Asli in Peninsular Malaysia.

Based on the aforementioned studies, education and social mobility are perceived as the most important factors to LLQ of Orang Asli, with the following sub-factors; a) education expansion, family support and financial status (education); b) education access, employment, marriage, change of residence, and behaviour (social mobility). This study utilised the fuzzy approach based on the identified factors. This study also proposed that the Orang Asli Jakun UiTM graduates with higher education and social mobility will reveal improved potential on LLQ.

Materials and Methods

The fuzzy method is an alternative method for a more precise analysis. One of the important characteristics of the fuzzy method is that it can determine the best option from various factors using linguistic variables. The recent advances in this method facilitated in acquiring more precise results in the decision-making process, forecasting, estimating, optimisation, assessment, etc. The Fuzzy Analytic Hierarchy Process (F-AHP) method is particularly useful in decision processes that involve information which is uncertain, vague or imprecise. Since the nature of this study involved many uncertain factors or information, the F-AHP method was deemed efficient in measuring the LLQ of Orang Asli based on the identified factors.

Preliminaries

This sub-section provides three definitions from (Zadeh, 1965), (Zadeh, 1975) and (Cox, 1994) respectively and Definition 4 is our definition on LLQ for this research. All the definitions are believed to be related to the proposed method for reference purposes.

Definition 1 A fuzzy set \tilde{A} in a universe of discourse X is characterised by a membership function $\mu_{\tilde{A}}(x)$ that is associated with each of the x element in X , a real number in the interval

$[0, 1]$. The function value $\mu_{\tilde{A}}(x)$ is termed as the grade of membership x in \tilde{A} .

Definition 2 A linguistic variable is characterised by a quintuple $(x, T(x), U, G, \tilde{M})$ in which x is the name of the value; $T(x)$ denotes the term set of x , that is, the set of the name of the linguistic value of x , with each value being a fuzzy variable denoted generically by x ranging across a universe of discourse U associated with the base variable u ; G is a syntactic rule or generating the name X , of values of x . A particular X , that is name generated by G , is called a term; while \tilde{M} is a semantic rule for associating with each X its meaning, $\tilde{M}(x)$ which is a fuzzy subset U .

Definition 3 A triangular fuzzy number (TFN) \tilde{A} can be defined by a triplet (a_1, a_2, a_3) . The membership function $\mu_{\tilde{A}}(x)$ is defined as:

$$\mu_{\tilde{A}}(x) = \begin{cases} 0, & x < a_1, \\ \frac{x-a_1}{a_2-a_1}, & a_1 \leq x \leq a_2, \\ \frac{x-a_3}{a_2-a_3}, & a_2 < x \leq a_3, \\ 0, & x > a_3 \end{cases}$$

Definition 4 The LLQ is defined as follows (i.e., based on the total scores (TS^w) in %):

Table 1: The LLQ

TS ^w (%)	Category
TS > 80	High LLQ
80 > TS > 50	Moderate LLQ
TS < 50	Less LLQ

Data Collection

Interviews were conducted with the target respondents via online survey according to the factors and sub-factors that were relevant to the community of Orang Asli Jakun ethics in the state of Johor. In this study, three stakeholders who are believed to provide significant input were (i) JAKOA (d^1), (ii) Tok Batin (d^2), and (iii) UiTM (d^3). The stakeholders evaluate the importance of each sub-factor based on the mean fuzzy number provided in Table 2.

Table 2: The type of stakeholder’s evaluation

Linguistic variables	Mean of fuzzy numbers
<i>Very high (VH)</i>	1.0
<i>High (H)</i>	0.75
<i>Medium (M)</i>	0.50
<i>Low (L)</i>	0.25
<i>Very low (VL)</i>	0

The Fuzzy Method

The classical Analytic Hierarchy Process (AHP) method introduced by Saaty (1980) is equipped with the fuzzy approach. Thus, the current study employed the F-AHP. The algorithm of the method is summarised in Figure 1. The details of the steps involved are elaborated in the next section.

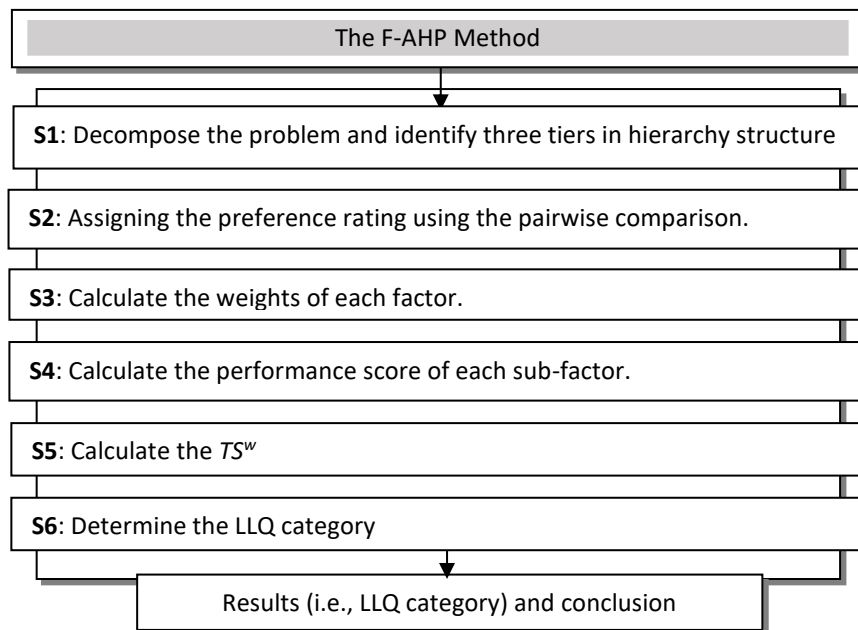


Figure 1: The algorithm of the F-AHP method

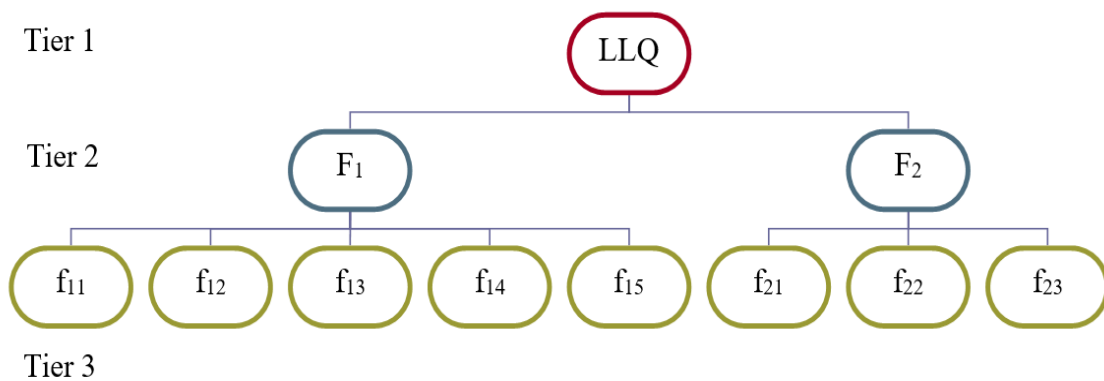
Numerical Example

The online survey involved the Orang Asli Jakun ethnic graduates of UiTM, Johor. Due to the absence of common subfactors to measure the LLQ of Orang Asli, the following subfactors were employed in this case study. For social mobility factor (F_1), the five subfactors that were identified were education access (f_{11}), marriage (f_{12}), behaviour (f_{13}), employment (f_{14}), and change of residence (f_{15}); while the educational mobility factors (F_2) consisted of three subfactors namely education expansion (f_{21}), family support (f_{22}), and financial status (f_{23}).

Meanwhile, the three stakeholders evaluated the importance of the factors using the mean of fuzzy numbers provided in Table 2. The following 6 steps were applied based on the proposed method (see Figure 1).

S1: Identifying the three tiers in the hierarchy structure.

The actual problems were transformed into a hierarchy structure as depicted in Figure 2. The structure consisted of three tiers namely the goal of the study (LLQ) at the first tier, followed by the two related mobility factors (F_1 and F_2) in the second tier to achieving the LLQ. Finally, the third tier consisted of 8 sub-factors ($f_{11}, f_{12}, f_{13}, f_{14}, f_{15}$ and f_{21}, f_{22}, f_{23} for each factor respectively) from the previous tier.



Note: LLQ ~ Leverage life quality

Figure 2: The three tiers of hierarchy structure

Table 3: The five degrees of importance using TFNs

Degree of importance	TFNs	Reciprocal of TFNs
<i>Just equal</i>	(1, 1, 1)	(1, 1, 1)
<i>Equally important (EI)</i>	(1/2, 1, 3/2)	(2/3, 1, 2)
<i>Weakly more important (WMI)</i>	(1, 3/2, 2)	(1/2, 2/3, 1)
<i>Strongly more important (SMI)</i>	(3/2, 2, 5/2)	(2/5, 1/2, 2/3)
<i>Very strongly more important (VSMI)</i>	(2, 5/2, 3)	(1/3, 2/5, 1/2)
<i>Absolutely more important (AMI)</i>	(5/2, 3, 7/2)	(2/7, 1/3, 2/5)

S2: Assigning linguistic preference rating.

According to the F-AHP, a pairwise comparison of five linguistic variables were employed using Table 3 based on the perspectives of the three stakeholders. For simplicity, the weights of each stakeholder were assumed to be equal and obtained as shown in Table 4.

Table 4: The pairwise comparison evaluation between factors

Factors	Stakeholders	F ₁	F ₂
F ₁	d ¹	(1,1,1)	(2/3, 1, 3/2)
	d ²		(2/5, 1/2, 2/3)
	d ³		(3/2, 2, 5/2)
F ₂	d ¹	(2/3, 1, 3/2)	(1,1,1)
	d ²	(3/2, 2, 5/2)	
	d ³	(2/5, 1/2, 2/3)	

S3: Calculating the weights of each factor

In this study, Chang’s extent analysis (1996) was utilised to derive the weights of each factor:

Table 5: The factor weights

Factor	F ₁	F ₂
Weights (W _i)	0.469	0.531

Similarly, the weights of all the 8 sub-factors concerning each factor were obtained through:

Table 6: The weights of each sub-factor with respect to F₁ and F₂

Factors	Sub-factor				
Social mobility, F ₁	0.236	0.364	0.201	0.119	0.080
Educational mobility, F ₂	0.387	0.165	0.448	-	-

S4: Calculating the performance score (P^w) for each sub-factor.

The performance scores were calculated by multiplying factor weights with sub-factor weights:

Table 7: The performance score of each sub-factor

Factor	F ₁					F ₂		
W _i	0.469					0.531		
Sub-factor	f ₁₁	f ₁₂	f ₁₃	f ₁₄	f ₁₅	f ₂₁	f ₂₂	f ₂₃
w _i	0.236	0.364	0.201	0.119	0.080	0.387	0.165	0.448
Performance score (P ^w)	0.111	0.171	0.094	0.059	0.038	0.205	0.088	0.238

S5 & S6: Calculating the TS^w and determining the LLQ category.

From S4, the P^w of each sub-factor were multiplied with an average of stakeholder’s evaluation to derive the TS^w (Table 8).

Table 8: The TS^w for the entire evaluation

Sub-factor	P^w	Stakeholder's evaluation (d^1, d^2, d^3)	Average	TS^w
education access, f_{11}	0.111	(VH, H, M)	0.750	0.083
marriage, f_{12}	0.171	(M, H, VH)	0.750	0.128
behaviour, f_{13}	0.094	(M, H, H)	0.667	0.063
employment, f_{14}	0.059	(H, H, H)	0.750	0.044
change of residence, f_{15}	0.038	(M, L, VH)	0.583	0.022
education expansion, f_{21}	0.205	(H, VH, H)	0.833	0.171
family support, f_{22}	0.088	(VH, VH, H)	0.917	0.017
financial, f_{23}	0.238	(H, H, M)	0.667	0.159
The total scores (in %)				68.70%

According to Table 8, sub-factors financial (f_{23}) and education expansion (f_{21}) were identified as the most influential factors contributing to the LLQ of UiTM's Orang Asli Jakun graduates, followed by marriage (f_{12}) and education access (f_{11}). Meanwhile, the family support (f_{22}) and change of residence (f_{15}) sub-factors were identified as the least influential factor with TS^w of 0.017 and 0.022, respectively. Overall, the total score, TS^w , of 68.70% indicated that 'moderate LLQ' was achieved (see Definition 4) based on this case study.

Discussion and Conclusion

The major advantage of this study was the contribution in terms of the mathematical knowledge that can be used for future social science studies. The F-AHP method was employed to assess the LLQ of the UiTM's Orang Asli Jakun graduates in the state of Johor (a real-life case study).

Based on the analysis, the two factors that were assessed were social mobility (F_1) and educational mobility (F_2), with 5 sub-factors for F_1 and three for F_2 . Of the 8 sub-factors, financial (0.238) weighed the most, followed by education expansion (0.205), and marriage (0.171). Since financial and education expansion were sub-factors of education mobility, the educational factor was regarded as the most important factor supported by the social mobility factor, marriage for LLQ. However, the change of residence with the lowest weights (0.038) indicated that the Jakun students did not emphasise moving out from their village for LLQ, hence, considered as a support sub-factor only. As for the TS^w , the education expansion was determined as the most influential factor (0.171), followed by financial (0.159), and marriage (0.128). Therefore, education mobility can significantly impact LLQ via its education expansion and financial sub-factors. The results also revealed that marriage, a sub-factor in social mobility, could also contribute to the LLQ of Jakun students.

On the other hand, the overall score of 68.70% implied that the Orang Asli Jakun in the state of Johor were categorized under 'moderate LLQ' based on Definition 4. Thus, the LLQ of the Orang Asli Jakun graduates of UiTM in the state of Johor was in line with the study by Mohd Nor et al. [9], where they revealed the increased education awareness among the Orang Asli Jakun students in Pahang based on the positive responses.

UiTM is the only public university in Malaysia that provides privileges to Bumiputra including Orang Asli (UiTM Act 1976) by granting them financial support and education opportunities. Since education expansion was identified as a prominent factor influencing the LLQ followed

by financial, the Orang Asli Jakun graduates from UiTM are aware of the importance of higher education for LLQ. Furthermore, the preliminary data obtained through interview sessions with 12 Orang Asli graduates of UiTM (Diploma and Bachelor degree) revealed that education influenced their social mobility and improved their quality of life too. Therefore, JAKOA is important in planning effective developmental programs for the Orang Asli community in Malaysia.

Finally, this study demonstrated that the Orang Asli Jakun graduates of UiTM with tertiary education and social mobility could improve their LLQ. Also, since this study only focused on a few factors influencing LLQ, future studies on the LLQ for Orang Asli Jakun in the state of Johor or other states could include additional factors and equality in terms of their rights. LLQ should aim to assess the diversity and inclusiveness of the indigenous community, including issues such as funding schemes and opportunities to access the educational system for their children. Researchers could also consider other substantial factors like the ethical perspectives in developing the LLQ categories.

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