



A Need Analysis for The Development of Multicultural Learning Model Based on Local Wisdom Integrated Gamification : Public Schools and Female Teachers Need More

Yuyun Elizabeth Patras^{1*}, Rais Hidayat², Yuli Mulyawati³

^{1*,3}Faculty of Teacher Training and Education, ²Education Administration Program, Universitas Pakuan, Indonesia

*Corresponding Author. Email: yuyunpatras64@gmail.com

Abstract: This study aims to analyze teacher needs in Indonesia regarding the development of multicultural learning models based on local wisdom and integrated gamification. This research uses a mixed method that begins with a quantitative approach and continues qualitatively. The quantitative process starts with a literature review to synthesize research indicators and research instruments and distribute instruments to 301 teachers as respondents (urban teachers = 42%, rural teachers = 58%). Quantitative data analysis used the Rasch Model. This qualitative approach uses in-depth interviews with teachers and experts to explain quantitative research findings. The results of this study show a high need for teachers at all levels of education to develop a multicultural learning model based on local wisdom integrated gamification. The need is even greater for public schools and female teachers. This research implies that there must be further efforts to develop multicultural learning models so that they can be implemented in various schools.

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Introduction

Advances in communication technology in the digital age pose increasingly complex challenges in social, economic, and educational life (Burbules et al., 2020; Fukuda, 2020). Every day, society faces differences that must be addressed appropriately and wisely. The complexity is higher in a plural society like Indonesia (Firdaus et al., 2020; Wasino, 2013). The country has hundreds of ethnic groups and various local communities (Putra, 2021). Indonesia has declared itself a multicultural country in that culture, religion, and ethnicity exist today (Arauf, 2022). Technological advances, such as the existence of various types of social media, add complexity to the challenges for society. People are crammed with confusing information through social media, so it is easy to conflict with different ones (Koc-Damgaci & Aydin, 2018). Therefore, the educational process requires the development of a multicultural learning model that can improve the multicultural competence of both teachers and students.

Multicultural education and multicultural competence are vital, but the development of multicultural learning models is still not systematic, has not been tested valid, is less effective, and has not shown sustainability. As a result, the educational process of monoculturalism is still found in the learning process, so the process causes many opposing sides in society (Arbabi et al., 2017; Canen & Peters, 2005). Research findings show that there are still figures in a country who undermine multicultural education (Thomas, 2020), and there are still discriminatory teachers and principals (D'hondt et al., 2021). Generally,



teachers in schools developing multicultural education only emphasize concepts, theories, and less exciting and interactive media, and the context is far from students.

Research on developing multicultural learning models based on local wisdom integrated gamification is an essential topic in education. Multicultural education demands societal change, especially in today's youth (Barton & Ho, 2020). In each community, it has its own local wisdom [(Marlina et al., 2022; Yasir et al., 2022) as Sundanese have *silih asah*, *silih asih*, *silih asuh* dan *silih wangi*. Researchers believe that if students interact with local wisdom intensively, multicultural competence will grow in students. (Hadi, 2019; Tohri et al., 2022). Exploring and using local wisdom through gamification will be exciting and needs testing. So far, gamification has proven effective in the learning process and has been widely used, including in improving academic abilities (Manzano-León et al., 2022), acquisition of language learning outcomes (Panmei & Waluyo, 2022), and increasing teamwork (Redondo-Rodríguez et al., 2022).

The multicultural learning model implements a learning model that effectively achieves multicultural learning objectives. The learning model refers to the learning approach used, including how the teacher sets teaching objectives, the stages, the learning environment, and classroom management (Qondias et al., 2022; Suastika et al., 2021). Research shows many multicultural learning models, including the use of traditional games (Dewi et al., 2020), character biography writing (Fisher, 2021), and problem-based learning (Qondias et al., 2022). The multicultural learning model is part of the implementation of multicultural education. According to Ivenicki (2021), multicultural education refers to teaching and learning strategies aimed at understanding and respecting cultural diversity, recognizing the specificity of cultural identity, including individual identity, and combating inequality. According to Doucette et al. (2021), multicultural education is a learning practice that frees students from oppressive structures in society, being proactive in a multiethnic environment (Chaika et al., 2021), and apply anti-discrimination attitudes to differences in abilities possessed by students (Rachmadtullah et al., 2020).

Local wisdom refers to the paradigm and concept of knowledge and way of life through local social actions reflected in a nation's values and behavior (Susanto et al., 2019). In local wisdom, a system of communal values is built and rooted to arrive at valid normative stability so that each region has a different character (Sujinah et al., 2019). Local wisdom, in general, is oriented toward socio-scientific issues, so it is instrumental in increasing the conceptual knowledge and literacy of community members (Lubis et al., 2022). The results of the study show that local wisdom has a strong influence on various sustainable developments. Among the results of the survey: local wisdom affects the way the community improves ecotourism management (Marlina et al., 2022), Local wisdom affects educating young people in managing adolescent life (Hanafie Das et al., 2022), And disaster mitigation can be done with inspiration from local wisdom (Priyambodo et al., 2022). Other studies suggest that local wisdom affects financial literacy (Priyambodo et al., 2022), improving the character of students (Kardana et al., 2022), and tolerance in religious life (Pajarianto et al., 2022).

A gamification is a learning approach that uses elements in games or video games to motivate and maximize students' feelings of enjoyment and engagement in a learning process (Oliveira et al., 2022). Gamification is already widely used in learning (Dahalan et al., 2023; Oliveira et al., 2022) because it has various advantages, including learning is more exciting and successful (Manzano-León et al., 2022), improves students' cooperation and emotional intelligence (Redondo-Rodríguez et al., 2022). In this study, researchers will develop gamification, such as role-playing and looking for traces of Sundanese culture. Because of



the advantages of the gamification model in learning, the model is predicted to be a learning model of the present and the future. (Kaya & Ercag, 2023).

The novelty of this research is that there is research on developing multicultural learning models based on local wisdom integrated gamification. In addition, this research also adopts a new way of data analysis using the Rasch Model. This research is the initial stage of three stages of research, namely the study of learning model needs, the development of learning model models, and the implementation and impact of multicultural learning models. Through these three stages, this research will contribute conceptually and practically to improving Indonesian education quality, especially for teachers and students as education stakeholders. This research focuses on the initial analysis stage of developing a multicultural learning model based on local wisdom integrated with gamification.

Research Method

The research method uses a mixed-method approach (Pieri et al., 2022). Research starts with quantitative methods, then qualitative (Khaldi, 2017). The quantitative method process through the literature review on learning models, multicultural education, local wisdom, and gamification in education. Then, the researcher compiled a draft instrument (4 variables: analysis of learning model needs, multicultural teacher compatibility, local wisdom, and gamification). Before being distributed to respondents, the draft received input from 15 respondents (teachers and lecturers) so that the instrument conclusively met the readability test. Researchers then distributed the instrument to 301 respondents (Male = 32%, Female 68%. Age less than 40 years = 68%, over 40 years = 32%. Teaching experience less than 15 years = 65%, more than 15 years = 35%. Primary school teachers = 64%, High school 36%. Public teachers = 51%, private teachers = 49%. Urban teachers = 42%, Rural teachers = 58%). using *purposive sampling* techniques (Etikan, 2016); the researcher determined the number of samples subjectively and the sample criteria used (Tongco, 2007).

The collected data is then analyzed using the Rasch Model (Boone, 2020; Zehirlioglu & Mert, 2020). Researchers obtained qualitative data by interviews (Pascoe Leahy, 2021) with respondents through focus group discussion (FGD) activities aimed at confirming findings to 18 respondents (public elementary school teachers, five men, 13 women). FGD deepens the findings of quantitative and qualitative results to experts/lecturers in culture, learning models, language, and media. The purpose of this FGD is to confirm quantitative and qualitative findings. The stages of the qualitative data analysis process include data collection, reduction, and presentation (Creswell, 2012; Khaldi, 2017).

Results and Discussion

The results of the test of the instrument item of teacher needs for the multicultural learning model on 301 respondents showed that the top three items that were most difficult to agree with were item N6 (*I master the multicultural learning model*), N7 (*I use a multicultural learning model based on local wisdom*) and N5 (*I know the multicultural learning model*). The bottom three items that are most easily approved are item N2 (*I see students motivated to learn when teachers use learning models*), N3 (*I feel the use of learning models helps achieve student learning outcomes*), and N1 (*I use learning models when carrying out teaching*). Based on these findings, teachers are familiar with learning models and their functions but do not know profoundly and use multicultural learning models in learning. The following table is the result of the instrument test needs of the multicultural model using Winstep in the item measure section:

Item STATISTICS: MEASURE ORDER

ENTRY NUMBER	TOTAL SCORE	TOTAL COUNT	MEASURE	MODEL		INFIT		OUTFIT		PT-MEASURE		EXACT MATCH		Item
				S. E.		MNSQ	ZSTD	MNSQ	ZSTD	CORR.	EXP.	OBS%	EXP%	
6	1008	301	1.65	.11	1.39	4.1	1.96	7.8	.80	.86	66.7	65.1	N6	
7	1026	301	1.43	.11	1.16	1.9	1.40	3.8	.84	.86	72.0	65.9	N7	
5	1055	301	1.05	.11	1.10	1.1	1.27	2.7	.85	.86	74.8	66.8	N5	
8	1139	301	-.12	.12	1.00	.0	1.00	.0	.88	.86	72.3	71.0	N8	
4	1152	301	-.31	.12	.66	-4.1	.63	-4.3	.89	.86	80.1	71.6	N4	
9	1154	301	-.34	.12	.74	-3.0	.69	-3.4	.90	.86	77.7	71.7	N9	
10	1166	301	-.52	.12	.79	-2.4	.72	-3.1	.89	.86	77.0	72.1	N10	
1	1181	301	-.75	.12	1.49	4.7	1.51	4.3	.83	.86	76.2	72.0	N1	
3	1200	301	-1.04	.12	.97	-.2	.86	-1.4	.87	.85	80.1	71.9	N3	
2	1201	301	-1.05	.12	1.07	.8	.94	-.6	.88	.85	78.0	71.8	N2	
MEAN	1128.2	301.0	.00	.12	1.04	.3	1.10	.6			75.5	70.0		
S. D.	68.0	.0	.95	.00	.25	2.7	.41	3.7			4.0	2.7		

The statements that respondents found the most difficult to agree with included items N5, N6, and N7. Although it is equally difficult to decide on these items, there are marked differences based on demographic categories. N5 (*I know the multicultural learning model*) is the most challenging statement to be approved by the class teacher category in grade 4 -6 elementary school teacher units, and the subject teacher category, both Civics and Non-Civics and the employment status category in the PNS/P3K unit. N6 (*I master the multicultural learning model*) is the most difficult statement to be approved by the gender category in the female unit, the class teacher category in the high-grade (4-6), the maple teacher in the Civics and Non-Civics units, the school status category in the State School unit, and the teacher employment status category in the PNS / P3K unit. N7 (*I use a multicultural learning model based on local culture*) is a statement that is difficult to agree with by the age category in the 41-50 age unit, the class teacher category in the high grade (4-6), subject teachers in the Civics and non-Civics teacher units, and the employment status category in the PNS/P3K unit. Based on these data, it is indicated that a multicultural learning model is needed, especially for female teachers aged 40-50, elementary school teachers in low and high grades, both Civics and non-Civics teachers, schools with state status and teachers with civil servant/P3K status.

The findings of the multicultural learning model need testing results were confirmed by the focus group discussion (FGD) results on 18 elementary school teachers. 16 out of 18 respondents agreed they have not used multicultural learning in the classroom because they do not understand or master it. One respondent stated they could use a multicultural learning model but did not have enough time and needed collaboration from various parties, such as parents, between teachers and the school environment. The lack of use of multicultural learning models in schools is illustrated by the statement of one FGD respondent (male, the working period under five years, not having certification, graduate, and teaching in high-class elementary schools): "... Yes, it is difficult because not all teachers like the culture in the surrounding environment, but the teacher inevitably has to be able to adapt to the culture of the surrounding environment so that it is easy to make a multicultural learning model....." Observations on learning tools confirm the condition of teachers developing multicultural learning models in elementary schools. This is indicated by data from 12 out of 18 teachers stating that their RPP does not reflect multicultural RPP. 10 out of 18 teachers said their learning media did not reflect multicultural learning. Eight teachers out of 18 said they did not use learning technology to explore multicultural things, and ten teachers said they used it, but only one teacher had evidence of using it. There, 11 out of 18 teachers did not collect a portfolio of learning

outcomes containing multicultural education, and seven people said they managed a multicultural education, but none had evidence.

Regarding the perceptions of 301 teachers about the use of local wisdom in learning, it shows that teachers have the most difficulty agreeing with the statements of items LW8 (*I appreciate the way local people in financial literacy*), LW1 (*I understand the unique paradigm and concept of knowledge from a community*) and LW7 (*I appreciate the way local communities mitigate disasters*). The three items of local wisdom instruments that are most easily approved are the LW3 item (*I respect the values upheld by a local community*), LW11 (*I educate students with local wisdom of the Indonesian people*), and LW10 (*I appreciate the way local people tolerate in life*). Based on these findings, it is indicated that teachers already know the importance of upholding and respecting the values of a local community, instilling local fan awareness and high tolerance. However, teachers find it difficult to implement local wisdom values related to local wisdom-based financial and economic management, a deep understanding of local community thinking concepts and paradigms, and disaster mitigation capabilities based on local wisdom. The following table shows the results of the local wisdom instrument test using Winstep in the item measure section:

Item STATISTICS: MEASURE ORDER

ENTRY NUMBER	TOTAL SCORE	TOTAL COUNT	TOTAL MEASURE	MODEL S. E.	INFIT		OUTFIT		PT-MEASURE		EXACT MATCH		Item
					MNSQ	ZSTD	MNSQ	ZSTD	CORR.	EXP.	OBS%	EXP%	
8	1112	301	1.23	.16	1.07	.7	.85	-.9	.90	.92	81.6	82.1	LW8
1	1135	301	.59	.17	1.39	2.9	1.41	2.0	.90	.92	79.0	83.5	LW1
7	1140	301	.44	.17	1.09	.7	.72	-1.6	.92	.92	86.5	83.8	LW7
5	1148	301	.20	.17	.80	-1.7	.55	-2.6	.94	.92	88.8	84.0	LW5
4	1149	301	.17	.17	.91	-.7	.71	-1.6	.92	.92	85.4	84.1	LW4
6	1150	301	.14	.17	.76	-2.1	.63	-2.1	.93	.92	88.8	84.2	LW6
9	1155	301	-.01	.18	.71	-2.6	.53	-2.8	.93	.92	89.9	84.3	LW9
2	1159	301	-.13	.18	.90	-.8	.71	-1.6	.93	.92	88.4	84.6	LW2
10	1176	301	-.66	.18	.75	-2.1	.44	-3.7	.94	.92	91.0	84.9	LW10
11	1180	301	-.79	.18	1.27	2.0	.99	.0	.92	.92	85.8	84.9	LW11
3	1193	301	-1.19	.17	1.11	.9	.85	-.8	.93	.92	86.9	84.6	LW3
MEAN	1154.3	301.0	.00	.17	.98	-.3	.76	-1.4			86.6	84.1	
S. D.	21.5	.0	.65	.00	.21	1.7	.25	1.5			3.4	.7	

The findings of the test results using the Rasch Model above were confirmed by the results of the teacher's FGD. FGD participants, as many as 18 teachers stated that the use of local wisdom in learning related to financial and economic management, deep understanding of concepts and paradigms of thinking of local communities such as forest prohibition (*Leuweng Larangan*), Badui walking barefoot, *silih asah*, *silih asuh*, *silih asih* and *silih wangi*, and disaster mitigation (tsunami in Sundanese is called *Sagara Sabadarat*) had not been implemented in school learning. FGD respondents (women, working period above five years, having certification, graduate, and teaching in elementary schools low class) stated, "..... *it may be difficult for teachers to agree on the use of local wisdom values in the practical context of today's life because teachers need a deeper understanding of how to integrate traditional values into today's life...*" The results of observations on learning tools confirm that teachers have not utilized local wisdom in learning. It was indicated that eight teachers stated that their RPP did not contain local wisdom, and ten teachers stated that they had RPP containing local wisdom but could not confirm the evidence. Ten teachers claimed no corner of local wisdom was in the classroom, and eight others stated that none could approve the proof. Seven teachers claimed to have never visited a particular place to understand the local culture, and 11 teachers said there was a visit. Still, only one teacher was able to confirm the evidence.

Eight teachers stated that there were no specific mottos of local wisdom in the classroom, and ten said there was local wisdom but could not confirm the evidence.

Regarding 301 teachers' perceptions of the use of gamification in learning, 301 teachers showed that they found it most difficult to agree on three items, namely: GM4 (*I prepare prizes in learning*), GM6 (*I give rewards according to student achievement*), and GM1 (*I use games in learning*). The three items that are easiest to get approval for are GM2 (*I apply rules/rules in learning*), GM3 (*I do multi-directional communication during learning*), and GM8 (*I create a pleasant atmosphere in learning*). These findings indicate that teachers already know the importance of implementing gamification principles such as rules in class, multi-directional communication, and creating a pleasant learning atmosphere. However, teachers have difficulty implementing gamification related to preparing rewards for students. The following table shows the results of the gamification instrument test in learning using Winstep in the item measure section.

Item STATISTICS: MEASURE ORDER

ENTRY NUMBER	TOTAL SCORE	TOTAL COUNT	MEASURE	MODEL		INFIT		OUTFIT		PT-MEASURE		EXACT MATCH		Item
				S.E.	MNSQ	ZSTD	MNSQ	ZSTD	CORR.	EXP.	OBS%	EXP%		
4	1072	301	1.52	.13	1.47	4.4	1.85	6.1	.86	.90	69.9	72.3	GM4	
6	1082	301	1.34	.13	1.48	4.4	1.84	6.0	.86	.90	76.3	72.8	GM6	
1	1146	301	.14	.14	1.20	1.9	.98	-.1	.89	.90	78.6	76.6	GM1	
7	1165	301	-.25	.14	.67	-3.6	.60	-3.4	.92	.90	84.6	77.8	GM7	
5	1172	301	-.40	.14	.71	-3.0	.59	-3.6	.92	.90	85.7	78.1	GM5	
8	1185	301	-.67	.15	.76	-2.4	.68	-2.6	.92	.90	85.7	78.3	GM8	
3	1189	301	-.76	.15	.81	-1.9	.71	-2.4	.92	.90	85.7	78.3	GN3	
2	1196	301	-.91	.15	.82	-1.8	.70	-2.5	.91	.89	86.8	78.4	GM2	
MEAN	1150.9	301.0	.00	.14	.99	-.2	.99	-.3			81.7	76.6		
S.D.	45.1	.0	.88	.01	.32	3.1	.50	3.8			5.7	2.4		

The test results on the Rasch Model above were confirmed by the results of the teacher's FGD. FGD participants, as many as 18 teachers, said it was most difficult to agree with the statement that they implemented gamification related to preparing rewards for students who reach a certain level of learning (*rewards*) and using various games (games) in the classroom. FGD respondents (Women, teaching 5-10 years, graduate, not certified, low grade) stated, "... *sometimes rewards are needed for children to grow their enthusiasm and curiosity and feel rewarded with their efforts. When learning, there is a saying learn while playing, playing while learning; these words can make teachers more creative in teaching children with an educational play style...*" Other respondents (Male, teaching over 15 years, S1 Education, already certified, teaching high class (4-6)) stated "...*The main obstacle to gamification is the awarding of rewards. The point is that if every lesson rewards students, it will be burdensome for the teacher. Unless the reward only gives plus value to the learners...*" Observations on teacher teaching equipment illustrate that teacher have not maximally used games in learning. Eight teachers participating in the FGD stated that the RPP did not contain steps to make games, and ten others stated that there were steps to make games but did not show evidence.

Discussion

First, teachers are familiar with learning models and their functions, among others, to motivate and create a pleasant atmosphere in learning. Still, teachers do not know how deeply they master or use multicultural learning models. This situation gives birth to a need for teachers to better understand, master, and use learning models. Teachers perceive they are professional teachers if they can use a multicultural learning model. Teachers' need for a



multicultural learning model is genuine. Still, the lack of learning is explained from the opinion of an expert school principal in learning models (women, age 50, doctoral, experience in education more than 20 years) stating, “...*this happens because teachers do not map the needs and profiles of students. Teachers do not conduct and utilize diagnostic assessments to prepare appropriate learning designs for their students. Teachers focus on carrying out learning according to their capacity, not on students. The desire to finish quickly in completing learning material also becomes the teacher’s not preparing the learning with a good design.*” Teachers must implement a multicultural learning model to create a life of mutual respect and growth through multicultural education in schools and non-schools (Jayadi et al., 2022; Koh & Harris, 2020).

Second, the highest need for the development of a multicultural learning model specifically for female teachers, teachers ages between 40-50, and elementary school teachers in low (1-3) and high (4-6) grades; this model is needed by all teachers who teach Civics and non-Civics, schools with state status, and teachers with civil servant / P3K status. This finding can be explained by cultural experts (male, age 40, Education S2, lecturer, experience in education over 15 years) stating “...*The position of teachers demographically is still dominated by the female gender group. If the above age groups need to develop multicultural learning models, this may be because they have limited access to these things. In addition, historically, they have also experienced two political eras, namely the New Order, which is quite (although not completely) accommodating diversity, and the Reform Era, which, on the one hand, provides space for freedom of expression but, on the other hand, also strengthens certain cultural identity barriers. In other words, they experience confusion and challenges in terms of diversity and changing curricula, especially related to culture ..*”. This research shows that all teachers need to develop a multicultural learning model (Soriano Ayala et al., 2019); more specifically, women teachers need a multicultural model of education (Parker, 2011). Research shows that all schools require multicultural education, especially public schools; they are more responsible for developing multicultural education (Chandransu, 2019; Saihu et al., 2022).

Third, the use of local wisdom in the multicultural learning process by teachers has not been optimal. This research found that teachers already know the importance of upholding and respecting the values of a local community, instilling local fan awareness and high tolerance. However, teachers find it challenging to implement the values of local wisdom, especially local wisdom related to economic-financial management, a deep understanding of the concepts and paradigms of thinking of local communities, and the ability of teachers to use local wisdom in disaster mitigation. This finding can be explained by a multicultural education expert based on disaster mitigation (women, age 50, doctoral, lecturers, experience in education over 20 years) stating, “...*this is all related to their limited literacy in understanding local wisdom, homogeneous social conditions have their challenges in implementing multicultural learning, lack of financial support because its implementation requires funding, high awareness of school leaders and teachers to build a school environment that is inclusive of cultural diversity..*”. Expert opinion is reinforced by several research findings that state local wisdom can help the community manage finances (Maman et al., 2022; Priyambodo et al., 2022; Rizkiwati et al., 2022). Other studies have shown that local wisdom can help communities mitigate disaster (Astuti et al., 2022; Maman et al., 2022; Priyambodo et al., 2022).

Fourth, the use of gamification in learning by teachers is well understood. This can be seen from the teacher’s understanding of implementing gamification principles such as rules in class, multi-directional communication, and creating a pleasant learning atmosphere.



However, teachers have difficulty implementing gamification related to preparing rewards for students who reach a certain level of learning and using various games in the classroom. Teachers and gamification observers recognize the difficulty of implementing gamification in learning. Observers of gamification-based learning models (women, age 50, doctoral, lecturers, experience in education over 20 years) stated, “...*In addition to technical preparation in terms of daily learning plans that can be done by following education and training related to learning methods and the like, this is also related to financial support from the school because this requires funds, and this can be thought of through school budget policies.*”. In line with the observer above, cultural experts (male, age 40, master, lecturer, experience in education more than 15 years) stated “...*because rewards in the form of gifts are understood in the form of goods only not in larger things such as praise, celebrations, stickers, stars, etc. Awards also should be given to the slightest process of change occurs...*” Providing gifts to spur enthusiasm for learning in students is very important (Beemer et al., 2019). Research says that gifts to students do not have to be concrete objects but in other forms, such as symbols, praise, and others (Cortés-Pérez et al., 2023; Rincon-Flores & Santos-Guevara, 2021).

Research on the development of multicultural learning models has practical benefits such as stimulating student interest, enabling students to see the reality of the world, and developing intercultural skills such as tolerance, empathy, and intercultural communication. It also helps to minimize stereotypes and prejudices, while preparing students to contribute to diverse work environments and societies. Theoretical benefits include supporting contextual approaches, building students' understanding of a diverse world, and fulfilling the principles of equality and justice

Conclusion

The results of this study demonstrate a high demand for teachers at all levels of education to develop multicultural learning models that are based on local wisdom and integrated with gamification. The demand is even higher for public schools and female teachers. This research suggests that further efforts are required to develop multicultural learning models that can be implemented in different schools.

Recommendation

The research suggests the creation of a multicultural learning model that incorporates local wisdom and gamification. It is recommended to provide teachers with training and opportunities for sustainable development. The model should include materials from various cultures, establish an inclusive environment, involve parents and communities, and utilize digital resources and online platforms to access information from various cultures and communicate with students from diverse backgrounds.

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