



Ethnopedagogy Approach in Chemistry Learning as an Effort to Strengthen Students' Cultural Identity

Yayuk Andayani^(✉), Yunita Arian Sani Anwar, Aliefman Hakim, and Ermia Hidayanti

Graduate Program of Science Education, University of Mataram, Mataram, Indonesia
{yayukmtr, yunita, aliefman}@unram.ac.id

Abstract. The purpose of this study is to describe the application of the ethnopedagogy approach in chemistry learning as an effort to strengthen the cultural identity of students. This qualitative research involved 122 students of eleventh grade at SMAN 1 and SMAN 2 Pujut, Central Lombok. The cultural identity of students is studied in 3 (three) indicators, namely characteristics, formation, and strengthening of cultural identity. An already feasible questionnaire is used to collect data at the end of chemistry learning with an ethnopedagogy approach. The results showed that the characteristic of students' cultural identity is the culture of the Lombok people, the formation of cultural identity is more dominant from parents, and the strengthening of students' cultural identity is formed through an ethnopedagogy approach. Through this approach, learners are increasingly interested in chemistry so that they can further develop an awareness of the preservation of local culture and, more importantly, the development of a tolerant attitude towards foreign cultures without having to imitate them. These findings provide input for teachers and schools so that the ethnopedagogy approach and cultural identity of students can be considered in carrying out learning in the classroom.

Keywords: Ethnopedagogy · Cultural identity · Chemistry learning

1 Introduction

Students' cultural identity in the learning process is still less considered an important strategy to accomplish educational goals. A recent study revealed that there is a positive connection between students' achievement with students' cultural identity [1]. This is because the similarity of cultural identity between teachers and students can build trust and increase learning motivation and create more enjoyable learning [2]. In addition, there is a positive relationship between cultural identity, student problems, and academic achievement [3]. The results of this study carry an important message that in designing learning, educators need to pay attention to the cultural identity of students.

The era of globalization has had a positive impact on many human lives, but on the other hand, it has become a threat to the erosion of local cultural values, which in the end, has an impact on the loss of national identity. [4]. The fading of culture and cultural identity in Indonesia [5] and the erosion of the values of nationalism in the

younger generation [6] were caused by the lack of culture-based learning guides [7]. This neglect of local cultural values can be improved through education [8], including an ethnopedagogical approach that can connect science with culture in learning. Several studies explain that through ethnopedagogy, students can identify their character can interact with other friends in the classroom and can find out how they learn. [9].

A study [10] found that most chemistry teachers in West Nusa Tenggara, Indonesia, have yet to use an ethnopedagogical approach to learning chemistry in the classroom or in the laboratory. This is also found in the results of observations at SMAN 1 and SMAN 2 Pujut, Central Lombok, that teachers have never linked chemistry with the existing culture even though most of the students are familiar with the surrounding culture. Another problem is that students' interest in learning chemistry still needs to be higher, thus affecting their learning achievement. The ethnopedagogy approach can be an alternative solution to the problem of the lack of culture-based learning strategies because this approach has stages that can connect chemical concepts with the existing culture. There are five stages of ethnopedagogy, namely: self-identification, integration of scientific and cultural content, collaboration, dialogue, and reflection [11]. Therefore, the purpose of this study is to describe the application of an ethnopedagogical approach in chemistry learning as an effort to strengthen the cultural identity of students.

2 Methods

Qualitative descriptive research is designed to describe the cultural identity of students after the application of the ethnopedagogical approach in chemistry learning. The cultural form that is integrated into this research is traditional Lombok food, namely *ares* and *poteng* vegetables, which are made as ethnochemical articles to be used in learning the reaction rate material. Classroom learning is carried out from July to September 2022, and at the end of the lesson, a questionnaire is distributed to collect data about the cultural identities of students. According to [12] Questionnaire is an effective instrument for collecting data in qualitative research.

2.1 Participant

This study involved 122 people who were registered as class XI students at SMAN 1 and SMAN 2 Pujut, Central Lombok district, West Nusa Tenggara province. Participant profiles in the form of gender and age are given in Table 1.

2.2 Instruments

The instrument used to collect data on the cultural identity of students is a questionnaire that has been validated by three experts in the field of chemistry education and analyzed using the Aikens agreement index to determine whether the instrument is suitable for use as a measuring tool. Instruments that are declared feasible are then given to students after they have received chemistry lessons with an ethnopedagogical approach. Student cultural identity data is measured from three indicators, namely: (1) characteristics of cultural identity, (2) formation of cultural identity, and (3) strengthening of cultural identity.

Table 1. Profile of participants

Identity	Amount	Percentage (%)
<i>Gender</i>		
Female	58	47.,5
Male	64	52.5
<i>Age</i>		
15 years old	9	7.4
16 years old	93	76.2
17 years old	20	16.4

2.3 Data Analysis

The average of each statement on each indicator is tabulated, and the percentage is calculated. An analysis related to the cultural identity of students was carried out based on gender per indicator, then it was used to describe the influence of the ethnopedagogical approach on the cultural identity of students.

3 Results and Discussion

The instrument used to collect data on the cultural identity of students is a questionnaire that has been validated by three experts in the field of chemistry education and analyzed using the Aikens agreement index to determine whether the instrument is suitable for use as a measuring tool. Instruments that are declared feasible are then given to students after they have received chemistry lessons with an ethnopedagogical approach. Student cultural identity data is measured from three indicators, namely: (1) characteristics of cultural identity, (2) formation of cultural identity, and (3) strengthening of cultural identity.

3.1 Characteristics of Cultural Identity

Cultural identity is a detail of the characteristics of a culture owned by a group of people whose boundaries are known when compared to the characteristics of other cultures. Cultural identity can be studied through the order of thinking, feeling, and acting [9]. In the learning process, learning outcomes, learning methods, and learning strategies will affect the development of one's thinking and thinking schemes [13]. In this study, the thinking order of students is described through ways of thinking to recognize their cultural identity through an introduction to the area of origin of students, parents, and the language used.

Understanding culture through self-identification of cultural identity using a questionnaire. Lifting some of the characteristics of traditions in Lombok from the perspective of indigenous knowledge and cultural practices such as *Poteng jaje tujak*, *Gendang*

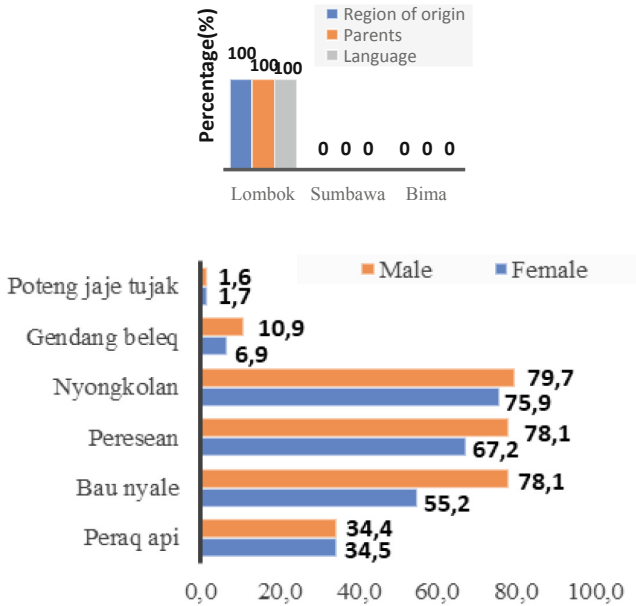


Fig. 1. Introduction of Cultural Identity Based on Order of Thinking

beleq, Nyongkolan, Peresean, Bau Nyale, dan Peraq Api. Table 2 shows the list of the cultural tradition of Lombok that are contained in the questionnaire.

The results of this study show that students all think their cultural identity is the culture of the Lombok people because they come from the Lombok area, their parents are also from the Lombok area and the language used in everyday life is *Sasak* language which is the local language. Lombok community area (see Fig. 1a). In addition, they are also very familiar with the culture around where they live, such as traditions *nyongkolan, peresean dan bau nyale* (see Fig. 1b). Tradition *nyongkolan* is part of a series of traditional Lombok wedding ceremonies which involve many young people in its implementation, so that this tradition has the highest response, especially by male students.

Based on the constructivism learning theory according to Vygotsky that the culture and social environment of students is important things that can affect the formation of knowledge. Culture also affects the learning process. Students learn through interaction and collaboration with other people and their environment [14]. Students can learn through songs, languages, arts, traditions, and games. Those kinds of activities were relevant to students' lives and students' habits, and then students were strongly engaged with school. According to [15], the learning activities should have relevance means that teachers should introduce topics that connect with students' interests and concerns. So, students culture they will recognize their cultural identity and will be more enthusiastic about learning science. Another research also said that school engagement is a major factor that has both direct and indirect influences on students' learning achievements [16].

Table 2. Lombok's cultural tradition contain in questionnaire

No	Culture	Tradition	Description
1	<i>Poteng jaje tujak</i>	This traditional food is usually served on the birthday tradition of the Prophet Muhammad, <i>Merariq</i> (marriage), and circumcision (circumcision).	This is a typical Lombok food consisting of two types of food, 1 <i>poteng</i> is the result of fermented glutinous rice, a little natural green coloring from pandan leaves or katuk leaves, and a little tape yeast. Fermented for at least 3–5 days to produce water and a distinctive aroma.
2	<i>Gendang beleq</i>	Traditional musical instruments are played in groups as musical accompaniment in traditional ceremonies such as <i>merariq</i> (marriage), <i>besunat</i> (circumcision), <i>ngurisang</i> (baby haircut or <i>aqiqah</i>), and <i>begawe beleq</i> (big ceremony).	<i>Gendang beleq</i> is a percussion instrument with an elliptical shape, made of a meranti tree with a hole in the middle, with both sides covered with goat, cow, or buffalo skin. It is called the <i>belief</i> drum because this drum is large compared to the size of the drum in general. When played, the <i>gendang beleq</i> is accompanied by other instruments consisting of several instruments such as <i>rampeng</i> , namely <i>petuk</i> (a small gong with a wooden frame that is draped) and <i>copeh</i> (a musical instrument in the form of a small <i>ceng-ceng</i> which is held with the left and right hands).
3	<i>Nyongkolan</i>	The procession of the bride and groom after the wedding procession in which the bride is made up of <i>Sasak</i> wearing traditional clothes flanked by rows of women (relatives) dressed in traditional clothes who walk hand in hand, whereas the groom is behind the line of the bride who is flanked by a row of men (relatives) dressed in traditional clothes.	<i>Nyongkolan</i> is a traditional activity that accompanies a series of events in the wedding procession of the <i>Sasak</i> tribe in Lombok, West Nusa Tenggara, Indonesia. This activity is in the form of the procession of the bride and groom from the groom's house to the bride's house, accompanied by the groom's family and relatives, wearing traditional clothes, as well as a <i>Gendang Beleq</i> music troupe. The goal is for local residents to know that the bride and groom have become legal husband and wife. This gossip ends with a ritual procession <i>Sorong serah Aji Krame adat Sasak</i>

(continued)

Table 2. (continued)

No	Culture	Tradition	Description
4	<i>Peresean</i>	<i>Peresean</i> tradition is a traditional art of the <i>Sasak</i> tribal community, which is one of the arenas for a <i>Sasak</i> youth (<i>terune</i>) agility competition by using rattan as a bat and <i>ende</i> (shield) as protection and using a broom as a head covering and a typical <i>Sasak</i> sarong.	<i>Peresean</i> is a tradition of fighting between two men from the <i>Sasak</i> tribe in Lombok. They use a rattan stick like a sword and a shield made of buffalo skin called <i>ende</i> . Fighters are only allowed to attack the opponent's back and shoulders. As a companion, traditional musical instruments are played, such as gongs, drums, and flutes. Injured <i>pepadu</i> will be treated with traditional medicine in the form of oil that does not cause pain when applied to the wound.
5	<i>Bau nyale</i>	<i>Bau Nyale</i> itself is a traditional event that emerged thanks to a legend about Princess <i>Mandalika</i> , the daughter of a famous king in Lombok. This traditional ritual activity is carried out every 20th of the 10th month (according to the calculation of the <i>Sasak</i> Calendar)	At the time of holding the <i>Bau Nyale</i> Festival, local residents who will catch <i>nyale</i> (sea worms) gather on the beach in the afternoon, and hold a <i>peresean</i> (making tents), then fill the evening event with various traditional arts such as <i>betandak</i> (reciprocating rhymes), <i>bejambik</i> (giving souvenirs to lovers) and surfing (cruise by boat). The process of catching sea worms starts at night and until dawn. The <i>Nyale</i> that has been caught will be cooked and eaten by the local community as a form of love for <i>Putri Mandalika</i> .
6	<i>Peraq api</i>	The <i>peraq api</i> tradition is one of the traditional ceremonies in the <i>Sasak</i> community that has been carried out for generations.	<i>Peraq api</i> is a naming ceremony for a baby who is 7 days old or a baby whose umbilical cord has been detached; the <i>Peraq Api</i> ceremony can be held. In the ceremony led by <i>belian nganak</i> (labor shaman), the shaman, with the family or the baby's parents prepares the equipment and tools that will be used in the <i>Peraq Api</i> ceremony. The <i>belian nganak</i> leads the event starting from the preparation, the process of the event until the event is finished.

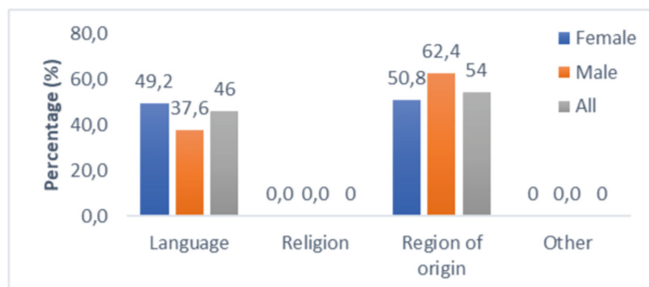


Fig. 2. Feeling orientation to recognize cultural differences with others

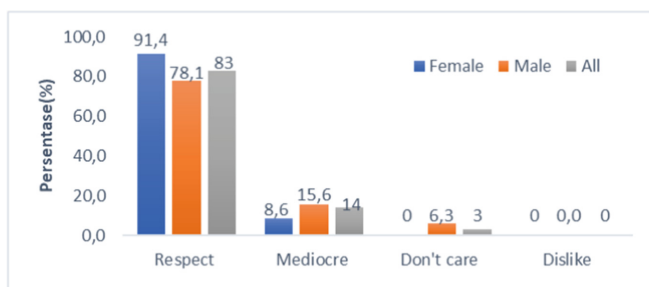


Fig. 3. How to act towards different cultures

Based on the constructivism learning theory of Vygotsky, the culture and social environment of students is important things that can affect the formation of knowledge. Students can learn through songs, languages, arts, traditions, and games. Culture also affects the learning process. Students learn through interaction and collaboration with other people and their environment (See Fig. 2).

Kenneth Burke explained that determining cultural identity really depends on 'language' [17]. Language explains the reality of all identities that are detailed, then compared. A person's identity always follows the concept of using language, especially to understand a word denotatively or connotatively. Several studies have shown that classrooms, where teachers and students share cultural identities can easily build trust and foster stronger relationships so that they can motivate students to learn together [1, 2].

The way students act when dealing with other people of different ethnicity, religion, or language shows that in general, they respect each other, although there are still those who respond normally or don't care. The way of responding between female and male students are slightly different. As many as 91.4% of female students agree to respect each other but male students are lower at 78.1% (See Fig. 3).

Based on the results of the analysis of the order of thinking, orientation of feelings, and ways of acting, it can be concluded that after learning chemistry with an ethnopedagogical approach, students are aware of their cultural identity from the similarities and differences in the culture around them. According to [18] identity in addition to containing the meaning of similarity also contains the meaning of difference, namely

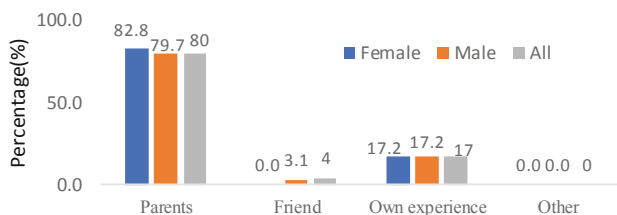


Fig. 4. Response to sources of cultural identity formation

a character that distinguishes an individual from other individuals. This awareness of cultural identity affects the way a person acts, in which case students state that the best way to address ethnic, religious, and linguistic differences is by respecting existing differences.

3.2 Cultural Identity Formation

The cultural identity of students is largely formed by their parents, some are formed through their own experiences or from friends (See Fig. 4). According to [17] formation of cultural identity through several stages, namely (a) unintentional cultural identity, (b) search for cultural identity, (c) acquired cultural identity, (d) conformity/internalization, (e) resistance and separatism, and (f) integration. In this study, students were teenagers aged 15–18 years, so most of their cultural identity was obtained through their parents. Only a few students obtained their cultural identity through their own experiences and formed interactions with friends from different cultures. The formation of this identity did not differ in terms of gender.

3.3 Strengthening Cultural Identity

Based on the results of the study, it is known that strengthening the cultural identity of students can be trained through an ethnopedagogical approach in classroom learning. Learning by elevating the culture that exists around students can have a positive effect on strengthening the cultural identity of students because it can increase interest in chemical materials, expand knowledge about local culture and foster an attitude of respect for foreign cultures without having to imitate their culture (See Figs. 5, 6, and 7).

Figure 5 shows the positive response of students to learning that raises culture, such as traditional *ares* and *poteng* foods. In general, they stated that the material was very interesting (55%) and interesting (28%), and only 4% were less interested. The response of female students was higher than that of male students. According to [19], students ‘understanding of their cultural identity can motivate them to learn more about scientific phenomena to understand their cultural identity to understand the factual reason behind every tradition. Students were excited to integrate cultural concepts with science. This means that integrated learning with ethnopedagogy will be more effective in raising awareness of interesting learning, especially in science learning.

Learning with a cultural approach not only can increase the attractiveness of the material being studied yet can make students more familiar with the local culture that

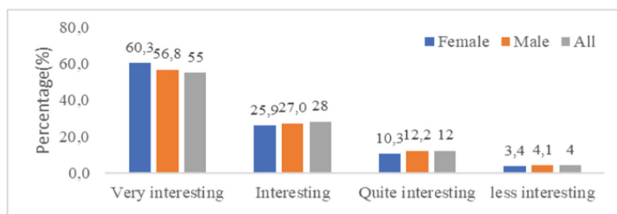


Fig. 5. Response to learning materials with an ethnopedagogical approach

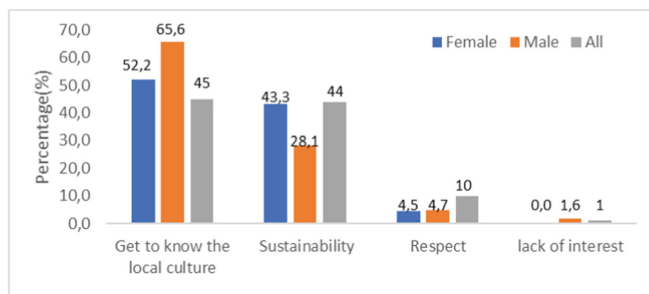


Fig. 6. Response to the benefits of learning with an ethnopedagogical approach

is around them, increasingly aware of their responsibility to preserve local culture and respect the cultural differences of other regions (See Fig. 6). This will be very valuable to form the character of students who are tolerant, able to work together and respect each other so that it strengthens the cultural identity of students and is expected to become a unifier of the nation.

Responses to the benefits of learning with an ethnopedagogical approach. There is a slight difference in students' responses to an ethnopedagogical approach based on gender. For female students, the ethnopedagogical approach makes them more aware of the importance of preserving local culture, while for male students, it is more useful to recognize the local culture around them. Mutual respect for cultural differences. This is in line with the opinion [20] that learning with an ethnopedagogical approach can foster positive attitudes towards traditional values and strengthen national culture.

Figure 7 shows that through learning with an ethnopedagogical approach, the cultural identity of students is increasingly strengthened because most students (62%) state that they can accept foreign cultures but do not imitate, although there are still some (28%) who feel normal and 3% feel indifferent to foreign cultures. From these results, it is also known that the tolerance attitude of female students is greater than that of male students.

The integration of ethnopedagogy in science learning, especially chemistry learning, should be applied in science education. After the students know their cultural identities and the learning content connected with their culture, they will easily be engaged with the learning and improve students' self-confidence. Based on the findings of this study, the ethnopedagogical approach to learning chemistry should be applied in classroom and laboratory learning.

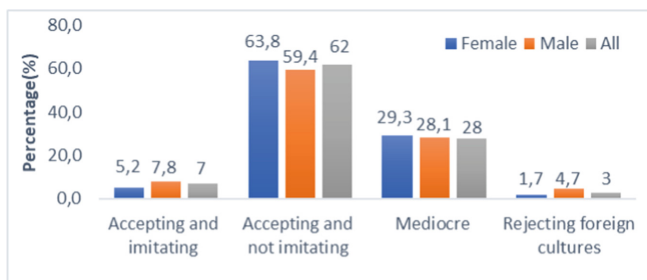


Fig. 7. Student response to foreign culture

4 Conclusion

Learning with an ethnopedagogical approach can be used to recognize the characteristics of students' cultural identities through the way they think, feel, and act. Although the formation of the cultural identity of students mostly occurs in the family, in fact learning with an ethnopedagogical approach strengthens their cultural identity because, through a cultural approach, they are increasingly interested in teaching materials, growing awareness of the preservation of local culture, and more importantly growing tolerant attitude towards foreign culture but still love the local culture. An important implication of this finding is a recommendation for schools and teachers to conduct chemistry learning that integrates with an ethnopedagogical approach and takes the context of tradition from their lives.

References

1. A. S. Altugan, "The Relationship Between Cultural Identity and Learning," *Procedia - Soc. Behav. Sci.*, vol. 186, pp. 1159–1162, 2015, <https://doi.org/10.1016/j.sbspro.2015.04.161>.
2. A. S. Altugan, "The Effect of Cultural Identity on Learning," *Procedia - Soc. Behav. Sci.*, vol. 190, no. November 2014, pp. 455–458, 2015, <https://doi.org/10.1016/j.sbspro.2015.05.025>.
3. S. Bennett, "文化认同的量表是 集体自尊 Cultural identity and academic achievement among Māori undergraduate university students .," *Natl. Maori Grad. Psychol. Symp.*, pp. 57–64, 2002.
4. I. N. Suardana, "Analisis Relevansi Budaya Lokal Dengan Materi Kimia Sma Untuk Mengembangkan Perangkat Pembelajaran Inkuiri Terbimbing Berbasis Budaya," *JPI (Jurnal Pendidik. Indones.)*, vol. 3, no. 1, pp. 337–347, 2014, <https://doi.org/10.23887/jpi-undiksha.v3i1.2916>.
5. A. S. Mubah, "Strategi Meningkatkan Daya Tahan Budaya Lokal dalam Menghadapi Arus Globalisasi," *Tahun*, vol. 24, no. 4, pp. 302–308, 2011.
6. H. Suryono, "Konfigurasi Identitas Nasional, Nasionalisme dalam Era Globalisasi Suatu Harapan dan Tantangan," *Miips*, vol. 7, no. 2, pp. 157–163, hlm 159, 2008.
7. I. Abramova and A. Greer, "Ethnochemistry and human rights," *Chem. Biodivers.*, vol. 10, no. 9, pp. 1724–1728, 2013, <https://doi.org/10.1002/cbdv.201300211>.
8. I. Yuliana, "Pembelajaran Berbasis Etnosains Dalam Mewujudkan Pendidikan Karakter Siswa Sekolah Dasar," *ELSE (Elementary Sch. Educ. Journal) J. Pendidik. dan Pembelajaran Sekol. Dasar*, vol. 1, no. 2a, pp. 98–106, 2017.

9. Y. Rahmawati, A. Ridwan, H. R. Baeti, M. Virginanti, and S. Faustine, "Improving students chemical literacy and cultural awareness through ethnopedagogy in chemistry education," *AIP Conf. Proc.*, vol. 2331, no. April, 2021, <https://doi.org/10.1063/5.0041918>.
10. Y. Andayani, Y. A. S. Anwar, and S. Hadisaputra, "Pendekatan Etnosains dalam Pelajaran Kimia Untuk Pembentukan Karakter Siswa: Tanggapan Guru Kimia di NTB," *J. Pijar Mipa*, vol. 16, no. 1, pp. 39–43, 2021, <https://doi.org/10.29303/jpm.v16i1.2269>.
11. Y. Rahmawati, A. Ridwan, S. Faustine, S. Syarah, I. Ibrahim, and P. C. Mawarni, "Pengembangan Literasi Sains Dan Identitas Budaya Siswa Melalui Pendekatan Etno-Pedagogi Dalam Pembelajaran Sains," *Edusains*, vol. 12, no. 1, pp. 54–63, 2020, <https://doi.org/10.15408/es.v12i1.12428>.
12. J. J. Wellington, *Methods and Issues in Educational Research*. London: Impact Graphics, 1996.
13. F. N. Isti'adah, *Teori-Teori Belajar dalam Pendidikan*. Tasikmalaya: EDU PUBLISHER, 2020.
14. W. Sumarni, *Etnosains dalam Pembelajaran Kimia*, Ke-1. Semarang: Semarang:UNNES PRESS, 2018.
15. G. Claxton, "EXPANDING YOUNG PEOPLE'S CAPACITY ORIGINAL," vol. 55, no. 2, pp. 115–134, 2007.
16. A. M. Dotterer and K. Lowe, "Classroom Context, School Engagement, and Academic Achievement in Early Adolescence," *J. Youth Adolesc.*, vol. 40, no. 12, pp. 1649–1660, 2011, <https://doi.org/10.1007/s10964-011-9647-5>.
17. A. Liliweri, *Makna budaya dalam komunikasi antar budaya*. Google Books, 2003. [Online]. Available: https://books.google.co.id/books/about/Makna_budaya_dalam_komunikasi_antarbudaya.html?id=U-1ckHCx7nYC&redir_esc=y
18. C. Tresna, "PRAKTIK HAMBATAN KOMUNIKASI ANTAR BUDAYA: Stereotyping DI OMETV," UPN Veteran Jakarta, 2022. [Online]. Available: upnvj.ac.id
19. Y. Rahmawati, A. Ridwan, U. Cahyana, and T. Wuryaningsih, "The integration of ethnopedagogy in science learning to improve student engagement and cultural awareness," *Univers. J. Educ. Res.*, vol. 8, no. 2, pp. 662–671, 2020, <https://doi.org/10.13189/ujer.2020.080239>.
20. R. Toleubekova and E. Zhumataeva, "The role of ethnopedagogy in shaping positive attitudes towards traditional values of Kazakh people among master's students majoring in education in Kazakhstan," *Probl. Educ. 21st Century*, vol. 76, no. 6, pp. 834–846, 2018, <https://doi.org/10.33225/pec/18.76.834>.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

