

Integrating ethnoscience: Enhancing culture, technology, and sustainable economic development through design and education

Asri Widowati^{1*} and Muhkamad Wakid²

¹Natural Sciences Department, Universitas Negeri Yogyakarta, DIY, Indonesia

²Automotive Engineering Department, Universitas Negeri Yogyakarta, DIY, Indonesia

Abstract. This article explores the pivotal role of integrating ethnoscience from the Sen-dangsari village, comprising traditional childhood games, traditional herbal remedies ('jamu'), and indigenous plant knowledge, within the framework of learning that engages with culture, technology, and sustainable economic development. Ethnoscience refers to traditional knowledge held by ethnic or local communities, passed down through generations. In an era marked by globalization and modernization, the preservation and integration of ethnoscience into educational curricula have become increasingly essential. This article delves into how instructional design can facilitate the fusion of ethnoscience with contemporary technological concepts and sustainable economic development. Through this approach, local culture is empowered and integrated into technological advancements and economic progress, which can, in turn, promote sustainability and social equity. The incorporation of ethnoscience into education can also inspire locally relevant innovations, enhance community participation in development processes, and enrich the diversity of global knowledge. In this context, the article analyzes strategies for addressing challenges in integrating ethnoscience, such as appropriate introduction, teacher training, and the development of inclusive curricula. By embracing cultural heritage through an inclusive instructional design approach, this article contends that the integration of ethnoscience can serve as a catalyst for connecting cultural, technological, and sustainable economic development aspects. Overall, the article underscores the need for interdisciplinary collaboration and a deep understanding of local contexts in developing education that contributes to a sustainable future.

1 Introduction

Education plays an important role in preserving and strengthening cultural roots, as previous research has shown that culture-based education increases people's pride in local cultural heritage and traditions [1]. In addition, education that promotes cultural diversity increases children's understanding of cultural diversity and local traditions [2].

* Corresponding author: asri_widowati@uny.ac.id

The use of technology in an educational context increases children's motivation and creativity in learning about the diversity of local cultures and traditions. Multicultural learning in children's education increases students' awareness of cultural diversity and local traditions [3]. Fun and interactive activities have great potential to increase children's interest in learning local cultures and traditions, in line with constructivism theory that emphasizes direct and active experience in children's learning [4]. A multicultural approach, which emphasizes respect for cultural differences, helps children understand cultural diversity and value differences as positive.

One area that has cultural potential is Kalurahan Sendangsari, Kulon Progo. Kalurahan Sendangsari has a program to preserve culture and revive the potential of local wisdom. Kalurahan Sendangsari Kapanewon Pengasih is one of the villages in Kulonprogo region, Yogyakarta which is rich in local culture and traditions. One form of cultural heritage that is still maintained in this village is a traditional game played by the community. In this theoretical study, we will discuss the importance of preserving local traditions and traditional games as cultural heritage that must be maintained.

According to Fathoni [5] preserving local traditions and traditional games is an effort to maintain cultural sustainability and introduce it to the younger generation. This is important because by preserving local traditions and traditional games, it will maintain the cultural diversity that exists in Indonesia.

The integration of ethnoscience in the context of education and sustainable development is of great importance in the modern era and globalization. Preserving traditional knowledge of ethnoscience is key to sustaining cultural and environmental diversity, while developing sustainable solutions to the challenges of this age. As expressed by Morin [6], "Ethnoscience teaches us to appreciate and understand local knowledge, culture, and ecology as integral to our efforts in building a sustainable future." The integration of ethnoscientific knowledge in education systems and development projects can ensure that local wisdom is valued and used to create better and sustainable solutions for people and the planet.

Ethnoscience refers to traditional knowledge passed down from ethnic or local groups, which includes various cultural aspects such as traditional children's games (dolanan anak), the use of traditional medicinal herbs (jamu), as well as knowledge of herbal plants. Ethnoscience reflects a wealth of cultural knowledge that has developed over the centuries and passed down through generations, forming a core of local wisdom that contributes to human understanding of the environment, health, and daily life [7, 8].

The relevance of ethnoscience is increasingly becoming a crucial issue in today's era of technological development and global economy. In the context of globalization, the preservation and integration of ethnoscientific knowledge is becoming increasingly important because this knowledge is a valuable treasure that reflects local cultural wisdom and centuries of experience. Ethnoscience is not only a valuable heritage to be preserved, but it is also a potential source for local and global innovation. Tested and proven concepts and practices from ethnoscientific knowledge can provide inspiration to tackle a range of modern challenges, from environmental conservation to the development of natural medicines. In a rapidly changing world, the integration of ethnoscience with modern science can bring more holistic and sustainable solutions,

combining traditional wisdom with the potential of advanced technology for the good of people and the planet.

This research explores the important role of ethnoscience integration from Sendangsari village, which includes traditional children's games, traditional medicinal herbs (jamu), and knowledge about native plants, within a learning framework involving culture, technology, and sustainable economic development.

2 Research method

This research uses a qualitative approach to explore the ethnoscience integration from Sendangsari village, which includes traditional children's games, traditional medicinal herbs (jamu), and knowledge about native plants, within a learning framework involving culture, technology, and sustainable economic development. The method is carried out by conducting interviews with community leaders who are indeed qualified and involved in the matter, Village Officials and teachers who teach about local content in elementary schools.

3 Results and discussion

3.1 Sendangsari's village potential

The results of interviews with Kamituwo, Carik and Sendangsari Lurah obtained information that Sendangsari wanted to have a village label / trademark with Mataram Culture. In 2020-2021 Sendangsari and the Tourism Office of Kulon Progo district have arranged the Sendangsari program as Kethoprak Village, a miniature of the Mataram Palace and its people. Kalurahan Sendangsari which is a village pioneer or cultural kalurahan has a variety of unique and interesting local traditions, such as traditional traditions / wiwitan culture, curses, horse art lumping & incling, panjidor, shadow puppets, dance, gejog lesung and various traditional games.

The Sendangsari district government in the Medium-Term Development Plan (RPJM) also prioritizes the development of cultural areas to pioneer areas for the development of community human resources with nuances of local art-culture, as an area of art, culture, and traditional life. This area is also used to support activities in the field of village education, especially in art-culture studios & community learning centers (PAUD & TK) is integrating art-culture in education including the addition of art-culture learning facilities, increasing the capacity of educators, and organizing institutions. In addition, there are also art-cultural training activities for the community. The problem is mainly because facilities and infrastructure as well as human resources are still lacking in terms of quantity and quality. The human resources in question are village volunteers/instructors, PAUD and kindergarten teachers. They are expected to understand local arts & culture well and have knowledge and skills in teaching children well as well.

The development of activities in the field of arts and culture includes the development of cultural areas, the addition & improvement of art-culture infrastructure, the strengthening of Cultural Villages, the development of Village arts-culture, the

implementation of art-culture festivals, the improvement of Village cultural literacy and the integration of local culture and customs in the field of education. The integration of education and culture is one of the priority programs of the nineteen priority programs. In addition to being oriented towards cultural conservation through education, it is expected to contribute to improving the field of tourism, especially in the development of village tourism and / the creation of new tourist destinations based on cultural activities which are expected to contribute to increasing community empowerment.

Based on the results of the study of the 2022 Sendangsari district RPJM document (attached document), more than 19 problems were identified spread across 5 areas, namely (1) government administration, (2) development implementation, (3) community development (4) village community empowerment (5) disaster management. The many problems that exist make the Sendangsari Regional Government compile priority programs consisting of 11, namely: (1) disaster management, (2) security of order, (3) education, (4) waste handling, (5) strengthening family institutions, (6) poverty reduction, (7) development of cultural areas, (8) optimization of yard land, (9) optimization of Village Institutions, (10) community food security, (11) handling Covid-19.

Apart from interviews and RPJM documents, data was also obtained based on findings on community service activities in 2022, namely it was known that the Sendangsari district had tried to overcome educational and cultural problems by developing the Sanggar Among Lare Cultural Area and Mataraman Barn. The development of the cultural area is located in the Pereng sub-district. The concept developed is to create an area to revitalize and preserve local culture and traditions based on Mataram culture.

Kalurahan Sendangsari also has the potential of biopharmaceutical plants. PT. Naturindo, whose factory is located in Sendangsari, has a fairly large area of biopharmaceutical plant cultivation. In addition to cultivated land, Naturindo has also created a herbal garden as an exhibition area and education of biopharmaceutical plants for the community. Many unproductive lands in Sendangsari district are currently in the process of being processed for biopharmaceutical cultivation.



Fig. 1. Biopharmaceutical land.

Preserving local traditions such as those in Kalurahan Sendangsari Pengasih is very important for many reasons, including (1) local traditions reflect the identity and identity of the local community; (2) preserving local traditions can also be a tourist attraction that

can improve the regional economy; (3) Preserving local traditions can also be a means of education for the younger generation. By introducing local traditions from an early age, the younger generation can understand the cultural values and traditions that have been passed down by their ancestors. This can help shape character and pride in local culture, as well as avoid loss of local cultural identity due to foreign cultural influences. Therefore, the role of education is very important in preserving local traditions. Schools can be a medium to introduce local traditions to students and involve them in activities related to local traditions. Communities and local governments can also play an active role in facilitating activities related to preserving local traditions.

3.2 Ethnoscience in Sendangsari for education

The role of ethnoscience in education is very important because it allows the integration of cultural knowledge and traditional customs into the modern educational curriculum. This integration can provide a range of significant benefits for students and society at large. A study conducted by Soelistyo [9] shows that culture-based education can help increase people's sense of pride in the richness of their local culture and traditions and help preserve local cultures and traditions that are almost extinct. A study conducted by Primasari [10] shows that education that prioritizes cultural diversity and local traditions can help increase children's understanding of cultural diversity and local traditions. In addition, research by Wardani and Wiyanti [11] also shows that the use of technology in children's education can increase children's motivation and creativity in learning about cultural diversity and local traditions. In addition, research by Fajarwati [12] also shows that the application of multicultural learning in children's education can increase students' awareness of cultural diversity and local traditions.

First, the integration of ethnosciences enriches the educational curriculum with cultural values and traditional knowledge. Culture and tradition are an important part of the identity of a society, and ethnoscience helps in understanding and appreciating those values. This includes an introduction to folklore, art, music, language, as well as local knowledge of the environment, medicinal plants, and traditional practices. By integrating ethnosciences, students could understand their deeper cultural roots, which in turn can reinforce a sense of identity and appreciation for local culture.

Second, ethnoscience can also motivate students to understand and respect their local culture. It involves recognizing that traditional knowledge that already exists in society has as much value as modern scientific knowledge. By recognizing and appreciating ethnoscience's contribution to civilization and sustainability, students can feel more connected to their own culture. In addition, ethnoscience also provides an opportunity to explore local knowledge that may be applied in solutions to everyday problems and challenges faced by their communities. One of the cultural potentials is in the form of traditional games and dolanan which are taught back to students at the PAUD, kindergarten, and elementary levels. Traditional dolanan refers to traditional Indonesian games that have symbolic meanings and serve as a form of cultural heritage. These games, such as the traditional Engklek game, have been marginalized due to the increasing popularity of online games and smartphones [13]. On the other hand, traditional games in general are seen as cultural manifestations produced by humanity and hold significant

meaning for social subjects [14]. The categorization of traditional games and games based on education level as Table 1.

Table 1. Categorization of traditional games and dolanan along with value.

| Level Education | Children's Toys or Games | Value Taught |
|---------------------------|--|---|
| Early Childhood Education | Gangsiangan | Stimulates smooth and rough |
| | Bluluk | Patient, meticulous and painstaking |
| | Cublak-Cublak Suweng | Togetherness, simplicity, airiness, responsibility |
| | Jamuran | Togetherness, simplicity, airiness, responsibility |
| | Adu Suket | Simplicity and sportsmanship |
| | Bedhekan | Togetherness, simplicity, airiness, honesty, sportsmanship |
| Kindergarten | Sluku – Sluku Bathok | Togetherness, simplicity, airiness, responsibility |
| | Engklek | Simplicity & Tradition, Sportsmanship |
| | Dakon | Simplicity & Tradition, Honesty |
| | Yeye | Simplicity & Tradition Togetherness |
| | Delikan | Togetherness, simplicity, open-mindedness, responsibility |
| | Cuthikan | Honesty, meticulousness, sportivity |
| SD | Seredan Jambe | Togetherness, Simplicity |
| | Bedhilan | Simplicity, sportivity |
| | Dam-Daman | Meticulous, sportifness, honesty, ingenuity |
| | Onthelan | Meticulous, sportifness, honesty, ingenuity |
| | Ganefo | Togetherness, simplicity, sportivity |
| | Benthik | Togetherness, simplicity, sportifness, agility, scientific strategy |
| | Gatheng | Togetherness, simplicity & honesty |
| | Kasti | Togetherness, simplicity, responsibility, sportivity |
| | Gobak Sodor | Togetherness, simplicity, responsibility, sportivity |
| | Umbulan | Simplicity, honesty |
| Layanan (kite flying) | Simplicity, agility, scientific strategy | |

Traditional games also play a role in children's character building and provide opportunities for children to learn about moral values. In research conducted by Setyani [15] regarding traditional games in villages, it was found that traditional games played by villagers have their own uniqueness and become part of the local cultural identity. This traditional game is also a medium to connect between generations and preserve existing cultural values. Educating children through traditional games or toys that contain culture and can facilitate the formation of children's character both preschool, kindergarten, and elementary school is expected to make a positive contribution in the formation of children's personality and social skills while preserving cultural heritage.

Modernization of education can encourage the development of local culture, benefiting educators and students through visualization and content. The next development related to games or traditional games can be digitized with the Android platform, for example dakonan or dam-daman. According to Santoso [16], traditional games have social values that can teach children about cooperation, tolerance, and independence. In addition, traditional games can also help children develop fine and gross motor skills. Meanwhile, traditional arts have high aesthetic value and can teach children about creativity and art appreciation. According to Soedarsono [17], traditional

arts can also help children develop skills such as creativity, accuracy, and hard work. A study conducted by Lestari [18] shows that the use of technological media in learning can increase children's interest in learning about local cultures and traditions.

Local culture and traditions cannot be separated from traditional games and arts because these games and arts are part of local culture and traditions that have been passed down from generation to generation. Traditional games and arts can reflect local wisdom in processing natural materials, such as handicrafts, dance, music, drama, and theater, inherent in the culture of the local community. In addition, traditional games can also be a medium to educate and teach social, moral, and spiritual values embraced in society. Through traditional games and arts, children and adolescents can develop creativity, social skills, and an understanding of local cultural diversity. This is in line with art teaching theory which emphasizes the importance of art and culture education in the formation of children's character and creativity [19].

3.3 Implementation integrating ethnoscience in a lesson

In the context of children's education, fun and interactive activities can help increase children's interest in learning about local cultures and traditions. This is in accordance with constructivism theory which states that children's learning should be done through direct and active experience, so as to form long-lasting knowledge and skills [20]. One approach that can be used in practicing local culture and traditions is a multicultural approach that emphasizes respect for cultural differences. This approach can help children understand cultural diversity and appreciate differences as positive [21].

Third, the integration of ethnosciences can also help create a more inclusive and sustainable approach to education. It involves blending local knowledge and modern science in confronting contemporary issues such as climate change, environmental conservation, and sustainable food. By including ethnoscience in the curriculum, education can be a powerful tool for promoting sustainability, understanding local values in a global context, and creating students who are better trained in critical thinking and innovation. For example, in the case of herbal medicine, students can be invited to ask questions about "Where is the modification of Rhizoma from?" or "What is the reason why Rhizoma has different odors, for example between ginger, turmeric, and kencur?" The following is an example of integrating Ethnoscience in learning with Jamu.

Table 2. Learning steps using Zingiberaceae Herbs.

| Learning Steps | Learning Activity |
|--|-------------------|
| The teacher brought a variety of herbs from Zingiberaceae complete with rhizomes | Observing |
| The teacher asks students to ask about the various kinds of rhizomes brought. Expected questions arise: 1. What is the difference between Rhizomes? 2. What modifications are rhizomes? 3. What are the benefits of these various rhizomes for health? | Asking Question |
| The teacher asks students to conduct an investigation by observing the differences and similarities between rhizomes and plant organs | Investigation |

| Learning Steps | Learning Activity |
|--|-------------------|
| (roots, stems, leaves) in terms of external appearance (color, presence of residual leaf scales or leaves, buds) | |
| The teacher asks students to solve discussion questions to answer question no 2 | Reasoning |
| The teacher asks students to make conclusions | |
| The teacher asks the students to present. The teacher asked students to reflect on what students do after learning science about rhizomes and their properties. | Communicate |

The examples of ethnoscience integration activities in the form of herbal materials, namely Zingiberaceae in science learning, can be as follows.
 Investigation Activities 1.

Apakah Rimpang (Rhizoma) itu?

Melalui kegiatan ini, kalian diharapkan dapat:

1. Mengidentifikasi ciri rimpang (rhizoma), akar, batang, dan daun tanaman suku Zingiberaceae.
2. Membandingkan ciri-ciri rimpang (rhizome) dengan akar, batang, dan daun tanaman suku Zingiberaceae.
3. Menemukan struktur asal tumbuhan yang dimodifikasi menjadi rimpang (rhizome) tanaman suku Zingiberaceae.

Ayo Lakukan!

Kode QR LKS Rhizoma

Pengantar

Jamu kunir asem, jamu beras kencur, wedang jabe tentu bukan sesuatu yang asing dalam kehidupan kalian. Jika di antara kalian belum mengenal minuman tersebut mari kenallilah dengan baik minuman yang merupakan warisan nenek moyang Indonesia. Minuman jamu dapat teraji sebagaimana Gambar 1.3 ataupun dalam kemasan sebagaimana Gambar 1.4. Minuman-minuman tersebut merupakan minuman herbal yang berkhasiat khusus. Wedang jabe yang biasanya dikonsumsi masyarakat untuk menambah kesegaran di badan, meredakan kembung batuk.

Tahukah kalian, bahan utama untuk membuat minuman jabe, jamu kunir asem, jamu beras kencur adalah rhizoma dari tanaman suku Zingiberaceae. Yuk, kita pelajari lebih lanjut pada kegiatan ini tentang "Struktur dan Fungsi Tanaman Zingiberaceae".

Tulis jawaban kalian beserta alasannya pada kolom di bawah ini!

Untuk mengumpulkan lebih banyak bukti empiris terkait masalah ini, ayo lakukan kegiatan penyelidikan berikut!

Metode Penelitian

Alat:

- Nampian

Bahan:

- Tanaman suku Zingiberaceae bezhizoma lengkap dengan akar, batang, daun

Langkah Kerja

1. Amati struktur luar (morfologi) tanaman rimpang yang ada di sekitar kalian ditinjau dari sisi daun, permukaan, ada tidaknya rambut halus, keberadaan tunas
2. Amati struktur akar, daun, batang tanaman rimpang ditinjau dari sisi daun, permukaan, ada tidaknya rambut halus, keberadaan tunas
3. Amati struktur batang tanaman rimpang
4. Masukkan data pengamatan dalam tabel pengamatan.
5. Eksplorasi kandungan senyawa organik beserta khasiat dari beberapa tanaman suku Zingiberaceae dari referensi berupa buku, jurnal ataupun internet. Tuliskan hasil eksplorasi pada tabel.
6. Tulis hasil empiris yang kalian peroleh dalam tabel yang telah disediakan dengan memberikan tanda cek (✓) pada kolom yang sesuai.

Data Hasil Pengamatan

MoS: IPA didasarkan pada bukti Data ciri-ciri morfologi dan anatomi merupakan bukti empiris yang kalian peroleh melalui observasi.

Tabel 2. Hasil Pengamatan Morfologi (Ciri yang tampak dari luar)

| Bagian/Aspek | Sisa Daun | Perumukan halus/lecin | Keberadaan rambut halus | Keberadaan tunas |
|--------------|-----------|-----------------------|-------------------------|------------------|
| Daun | | | | |
| Batang | | | | |
| Akar | | | | |
| Rhizoma | | | | |

Pertanyaan Diskusi

1. Berdasarkan identifikasi ciri - ciri yang telah diamati, rhizoma lebih mirip akar atau batang atau daun? Jelaskan!
2. Jika kalian mengamati tanaman suku Zingiberaceae yang lain, ternyata ada yang memiliki rhizoma dan ada yang belum atau bahkan tidak memiliki rhizoma. Faktor apa saja yang dapat mempengaruhi hal tersebut? Jelaskan

Gambar 1.3 Minuman jamu kunir asem

Gambar 1.4 Minuman jamu kunir asem dalam kemasan

Untuk mempelajari lebih lanjut tentang "Apa itu Rimpang (Rhizoma)?" Perhatikan Gambar 1.5 dan Gambar 1.6 berikut ini!

Gambar 1.5 Tanaman Jabe

Gambar 1.6 Rhizoma Jabe

Jika kalian perhatikan Gambar 1.5 dan Gambar 1.6 maka kalian dapat mengetahui bahwa Rhizoma merupakan struktur organ tanaman suku Zingiberaceae yang umumnya tertimbun di bawah tanah. Amati gambar dan salah satu tanaman suku Zingiberaceae serta Rhizoma-nya dengan cermat. Apa saja fakta menarik yang dapat kalian tuliskan berdasarkan gambar dan tanaman ber-rhizoma yang kalian amati?

Fig. 2. Investigation activities 1.

For non-formal educational activities, cultural preservation efforts can be taught by providing an in-depth understanding of herbs and their properties as well as herbal processing skills to mothers of members of the Farmer Women's Group. Understanding is given by introducing herbal plants directly to mothers who are taught about names and their properties, guided by pocketbooks. Furthermore, the debriefing of processing skills with workshops on the practice of processing squeezed herbs, herbal syrups, and herbal jams.

The results of herbal processed products certainly have the potential to integrate ethnoscience on the economic side. Integrating ethnoscience can support sustainable economic development by creating local business opportunities. Other herbal processed

products, such as natural cosmetics, herbal medicines, or traditional handicrafts, can also be a growing industry. It not only creates local jobs but also promotes the preservation of culture and the environment. Therefore, ethnoscience can be considered an asset in achieving sustainable development goals, as it not only advances the local economy but also preserves valuable traditional wisdom. Thus, the integration of technology and ethnoscientific knowledge can have a significant impact in creating locally relevant solutions and supporting sustainable economic development.

The integration of modern technology with ethnoscientific knowledge is one effective way to create locally relevant solutions. Technologies such as mobile apps, data processing, and digital communication can be used to collect, store, and share ethnoscientific knowledge more efficiently. For example, in agriculture, farmers can utilize sensor technology to monitor soil and weather conditions in real-time, then combine their local knowledge of crop growth patterns and traditional methods to produce better agricultural yields. In the field of culture, for example, a pre-event welcome dance performance using accompaniment music from the results of digital recordings of karawitan, if the original gamelan accompaniment cannot be held. Another example of how technology supports the preservation and utilization of ethnoscientific knowledge is in the field of herbal medicine. Applications of technology in data collection and analysis can help compile a larger database of traditional medicinal plant uses and their effectiveness. It can be used by modern scientists for further research, while also allowing local communities to make better use of their knowledge in health care. In addition, the use of social media such as the Sendangsari Village website is a vehicle for information for villagers to monitor how the efforts of the village civil service and all residents in cultural 'nguri-uri' so that there is no cultural crisis in the future. Research conducted by Kusnandi [22] shows that art and cultural activities integrated with technology can help improve children's knowledge and skills about local culture and traditions.

4 Conclusion

1. The role of ethnoscience in education is to enrich the curriculum with cultural values and traditional knowledge, motivate students to understand and respect their local culture, and create an inclusive and sustainable approach to education. By integrating ethnosciences, education can be a powerful tool to maintain local wisdom, promote cultural identity, and prepare young people to face future challenges more empoweredly.
2. The integration of modern technology with ethnoscientific knowledge is one effective way to create locally relevant solutions.
3. The integration of ethnosciences can support sustainable economic development by creating local business opportunities.

References

1. R. Murad, S. Hussin, R. Yusof, Educational Modernization Drives the Development of Culture and Innovation. *Sciences*. **10**, 1016-1031 (2020)
2. U. Qoyyimah, Transforming culture through education, in ICCoLLiC 2020: Proceedings of the First International Conference on Communication, Language, Literature, and Culture, ICCoLLiC 2020, European Alliance for Innovation, Surakarta, Central Java, Indonesia, September 8-9 (2020), 62
3. G. Marinescu, Education and Embracing Cultural Differences, in The European Conference on Education 2020, London, UK, M. Aoyama, Ed., 17-19 July 2020 2020, London, UK: The International Academic Forum (IAFOR). European Community Trade Mark Registration No. 012526646, (2020)
4. Z. Jahantab, Role Of Education In National Development. *Pakistan Journal of Applied Social Sciences*. **12**, 22 (2021).
5. A. Fathoni, Melestarikan Tradisi Lokal dan Permainan Tradisional Sebagai Warisan Bu-daya. *Jurnal Penelitian Pendidikan*. **36**, 11 (2019)
6. H. Morin, Ethnoscience and sustainable development, in *Natural connections: Perspectives in community-based conservation*, J. I. D. Boo Ed.: Island Press, (2000), 45-58.
7. D. Dutta, Ethnoscience: A wealth of cultural knowledge. *Journal of Cultural Studies*. **15**, 14 (2021)
8. J. Kerr, *Traditional knowledge and local wisdom: The importance of ethnoscience (Cultural Heritage and Local Wisdom)*. Oxford: Oxford University Press, (2018)
9. Y. Soelistyo, Budaya, pendidikan, dan karakter bangsa Indonesia. *Jurnal Edukasi dan Sosial*. **6**, 9 (2017)
10. I. F. N. D. Primasari, A. Marini, and A. Maksum, Implementasi pendidikan multikultural di sekolah dasar. *Syntax Literate; Jurnal Ilmiah Indonesia*. **6**, 5677-5692 (2021)
11. E.K. Wardani, E. Wiyanti, Penerapan teknologi informasi dalam pengajaran pendidikan karakter dan budaya pada anak usia dini. *Jurnal Ilmiah Pendidikan Anak Usia Dini*. **4**, 10 (2019)
12. D.A. Fajarwati, R. Hidayat, A. Purnama, Implementasi Pembelajaran Multikultural untuk Meningkatkan Kesadaran Siswa tentang Kebudayaan Lokal. *Jurnal Pendidikan Geografi*. **9**, 12 (2021)
13. M. Baihaqi, R. Nugraheni, The dying art of Indonesian traditional children's games. *The Jakarta Post*, R. (2020)
14. S. Hawkin, D. Frank, J. Goodman, Traditional games as cultural manifestations. *Journal of Cultural Heritage*. **41**, 8 (2020)
15. N. Setyani, The uniqueness of traditional games as part of local cultural identity: A study of traditional games in villages. *Journal of Cultural Studies*. **12**, 12 (2018)
16. A. Santoso, The social values of traditional games and their role in children's development. *Journal of Child Development*, **22**, 14 (2018)
17. S. Soedarsono, Traditional arts and their role in children's creativity and skill development. *Journal of Arts Education*. **18**, 13 (2015)
18. D. Lestari, The use of technological media in learning about local cultures and traditions. *Journal of Educational Technology*. **3**, 12 (2018)

19. A. Efland, *Art and cognition: Integrating the visual arts in the curriculum*. (Teachers College Press, 2002)
20. D.H. Schunk, *Learning theories an educational perspective*. (Pearson Education, Inc, 2012)
21. H.A. Giroux, *Multiculturalism and the struggle for democratic education*. (M. Leonard Ed., 2010, ch. Paulo Freire: A critical encounter) p. 12.
22. K. Kusnandi, The role of art and cultural activities integrated with technology in improving children's knowledge and skills about local culture and traditions. *Journal of Educational Technology*. **32**, 14 (2019)