



Ethnoscience Instructional Resources and Practices for Basic Science in Abua/Odual Local Government Area of Rivers State

¹Rowland, M. I., ²Obafemi, D. T. A.

¹Department of Curriculum Studies and Educational Technology,
University of Port Harcourt, Rivers State, Nigeria

²Department of Science Education,
University of Port Harcourt, Rivers State, Nigeria

ABSTRACT

The study investigated the Ethnoscience resources and practices available for the instruction of Basic Science concept of Sound energy in Abua/Odual Local Government Area of Rivers State. The design for this study was descriptive survey design. The population for the study consists of all the 17 Basic Science teachers in the twelve (12) public and three (3) Private Junior Secondary Schools in the Local Government Area. Census technique was used to select all the seventeen (17) Basic Science teachers for the study. The research instrument was a validated researcher-constructed questionnaire titled 'Ethnoscience Resources and Practices Questionnaire'. Cronbach alpha was used to obtain a reliability coefficient of 0.70 was obtained for the instrument. Mean was used to analyze the data. The study identified ethnoscience resources and practices for the teaching of sound energy in the study area, such as the use of traditional musical instruments at cultural ceremonies and festivals, as well as the loud sound produced from the gong (Ugelu) to give a signal to people within and outside the community (such as fishing port and farm) when there is emergency or danger. The study thus recommended that teachers should be resourceful and creative enough to identify and take advantage of the ethnoscience resources and practices in the culture and tradition of the learners for the teaching of science subjects.

ARTICLE INFO

Article History

Received: November, 2021

Received in revised form: December, 2021

Accepted: February, 2022

Published online: April, 2022

KEYWORDS

Ethnoscience, Instructional Resources, Practices, Basic Science, Sound energy.

INTRODUCTION

Basic science is a very important foundation for science subjects in Nigeria. It provides the pillar on which the learning and success of learners in sciences in later years rests. As indicated in NERDC (2012), some of the objectives of Basic science in Nigeria are to develop learners' interest in science and technology; as well as acquire basic knowledge and skills in science and technology in order to be able to apply the scientific and technological knowledge and skills to meet contemporary societal needs.

The science taught in Nigerian schools has so much of seemingly foreign content and application, and this makes the science in Nigerian culture, which can foster a better understanding of scientific concepts to be overlooked and relegated. There is so much prospect in every tradition and culture for the teaching and learning of science. Resources and practices abound in the processes and

materials involved in local professions such as farming, hunting, making of artefacts, traps (for animals and fish), traditional soap and palm oil making, pottery, cane furniture, basket weaving, carving, making of tie and dye clothing, clothes weaving, cooking and making of local wines; traditional ceremonies and local musical instruments. It then behoves the science teachers to get acquainted with the science embedded in the resources and practices of the community of the learners for the teaching of science.

Ethnoscience is derived from the Greek word 'ethnos' which means 'nation', 'race', 'people' or 'culture', and 'science' from the Latin word 'scientia' which means 'knowledge'. It is therefore the knowledge of the learners' nation, ethnic group or community in terms of culture, tradition and beliefs. Lestari and Fajar (2016) defined ethnoscience as a cross-disciplinary science that connects human/cultural anthropology with science



learning. It is a science knowledge gained by examining the local knowledge contained in the culture of a community or ethnic group (Lestari and Fajar, 2016). The branches of ethnosience include ethnoarcheology, ethnoastronomy, ethnobiology, ethnobotany, ethnochemistry, ethnoecology, ethnomathematics, ethnopharmacology, and ethnozoology.

Ethnosience-based instruction is an instruction that involves the socio-cultural influence of learners' ethnic group or community on learning since the development of a learner cannot be detached from his social and cultural experiences. It reveals the science in the everyday life of an ethnic group or community, and as such, links culture and science. Ethnosience-based instruction is a variant of the experiential learning method. This is because it involves the everyday experiences of the learners in their culture and tradition. It is a form of instruction in which the learner is fully involved. Atmojo et al. (2021) noted that ethnosience-based learning enables students to express their curiosity and creativity in exploring and analyzing their culture in order to find answers leading to a conclusion.

In designing ethnosience-based instruction, the indigenous and traditional knowledge of the locality in which the school is located is integrated into the science lesson. This is because learners come to science class with an understanding of their cultural resources and practices which can be leveraged upon for a better understanding of scientific concepts. Presmeg (1998) noted that the ethnicity of students is a resource for teaching, hence advocated for ethnomathematics in teacher education. Abonyi et al. (2014) pointed out that ethnosience-based learning involves designing a practical model in balancing local knowledge and western science. Sumarni (2018) thus emphasized the need for educators to identify resources in local content that are relevant to the study of science in content, context and competence while Fitria and Wisudawati (2018) advocated for the development of ethnosience-based enrichment books which contain cognitive, affective and psychomotor domains as source of knowledge in science.

Researches abound on the identification of ethnoscientific (cultural and traditional) resources and practices for the teaching of science. Nuroso et al. (2018)

explored the ethnosience in the indigenous science of block making which is applicable in environmental physics and discovered that the processes involved enabled the students to understand local wisdom and culture while learning to integrate scientific concepts into everyday life. In the same vein, Fadilah et al. (2019) explored and discovered the science in the Adat Melayu Jambi wedding procession as ethnosience resource for the learning of science. Asiyah et al. (2021) also constructed ethnosience-based science learning module on the interaction of living things with their environment in junior high school science in order to instill the spirit of conservation in the learners.

Literature is replete with the evidence of the effect of ethnosience-based instruction in science. Parmin and Fibriana (2019) found that ethnosience learning improved students' problem-solving skills and scientific literacy. Alim et al. (2020) found that ethnosience-based guided inquiry learning gave a significant influence on the mastery of scientific literacy and students' character. Sholahuddin et al. (2021) found that project-based learning in ethnosience setting helped students build mental images of abstract concepts and as such improved their performance in scientific literacy. Sumarni (2018) found that ethnosience-based learning improved scientific literacy in contents, contexts and competences in learners. Ibe and Nwosu (2017) found that the use of ethnosience facilitated the acquisition of science process skills in students. Abiam et al. (2016) found that ethnomathematics-based instructional approach enhanced the achievement of students in geometry. Ajayi et al. (2017) found that the use of ethnochemistry approach enhanced the achievement and retention of students in the concept of standard mixture separation technique. Rahmawati et al. (2017) found that the use of ethnochemistry culturally responsive teaching enhanced the understanding of chemistry concepts in students.

Ugwu (2018) found that when ethnochemistry-based practices were incorporated into curriculum delivery, a significant improvement was discovered in the interest of the students in Chemistry. Fasasi (2017) found that ethnosience instruction had a significant positive effect on students' attitude to science. Khoiri et al. (2019) found that



ethnoscience learning had a significant positive effect on students' creative and thinking abilities. Gunawan et al. (2019) found that ethnoscience instruction enabled learners to discover scientific concepts and phenomena around them thereby increasing their enthusiasm, curiosity and critical thinking skills. Rahmawati et al. (2017) found that the use of ethnochemistry culturally responsive teaching developed among other things, motivation to learn, curiosity, creativity, and high order thinking skills in students. Atmojo et al. (2018) found that science learning integrated ethnoscience improved students' scientific literacy, character of hard work, curiosity, environmental care, social care and responsibility.

Sound energy is a form of energy produced by vibrating objects. It is a concept taught in the Junior Secondary School 3 (JSS3) Basic Science curriculum. The content to be taught under it include production of sound, transmission of sound, reflection of sound and hearing. It is expected that by the end of the learning process, the learners should be able to:

1. Use objects to produce sound by making them vibrate.
2. Explain production of sound from a vibrating medium.
3. Indicate how sound is reflected.
4. Identify objects that reflect sound.
5. Explain how sound is heard by the ear.

The suggested instructional materials for the concept are empty bottles, cans, whistles, tuning fork, strong stick, and metre rule, sketch of a deep or empty well reflecting sound (echo) and a chart or model of the ear. The fact however is, that the teacher is a modifier of the curriculum. The curriculum can be positively modified in terms of addition or upgrading of the suggested instructional materials. This can be done by sourcing ethnoscience resources and practices in the locality of the learners by the teacher.

The teaching and learning of Basic science are being confronted by a myriad of challenges. One of the challenges that affect teachers and students in the subject is the difficult nature of some of its concepts. Such is the concept of Sound energy as confirmed by Fisher (2009), and Obafemi and Onwioduokit (2013). Another challenge is that of lack of the availability and utilization of instructional

materials for the subject (Osuolale, 2014; Eriba & Samuel, 2018). Instructional materials occupy a very important place in the study of Basic science. Instructional materials aid teaching and bring to life, concepts taught in science. Without them, understanding scientific concepts will require a very high level of imagination, which is not possessed by many learners. Can cultural/traditional (ethnoscience) resources and practices come to the rescue? Aderonmu and Telima (2021) found that the concept of Sound waves is one of the scientific concepts that could be taught and learned using ethnoscience. What ethnoscience resources and practices are available for the instruction of the Basic science concept of sound energy in Abua/Odual Local Government Area of Rivers State, Nigeria? This was the question answered by this study.

Aim of the study

The study investigated the Ethnoscience resources and practices available for the instruction of Basic Science concept of Sound energy in Abua/Odual Local Government Area of Rivers State.

Research Question

What ethnoscience resources and practices are available for the instruction of Sound energy in Abua/Odual Local Government Area of Rivers State?

METHODOLOGY

The study investigated the Ethnoscience resources and practices available for the instruction of Basic Science concept of Sound energy in Abua/Odual Local Government Area of Rivers State. The design for this study was descriptive survey design. The population for the study consisted of all the 17 Basic Science teachers in the twelve (12) public and three (3) private Junior Secondary Schools in the Local Government Area. Census technique was used to select all the seventeen (17) Basic Science teachers for the study. The research instrument was a researcher constructed questionnaire titled 'Ethnoscience Resources and Practices Questionnaire' (ERPQ). It was intended to obtain the views of the teachers on the Ethnoscience resources and practices available for the instruction of Sound energy in Abua/Odual Local Government Area of Rivers State. Ethnoscience Resources

and Practices Questionnaire' (ERPQ) was divided into two sections, A and B. Section A gathered the demographic information of the respondents, while Section B consists of twenty (20) items rated on a 4-point Likert scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) scored 4, 3, 2, and 1 respectively with a criterion mean of 2.50. ERPQ was validated by two Science educators, two Basic Science teachers and two Curriculum development experts while a reliability coefficient of 0.70 was obtained for it using the Cronbach alpha formula. ERPQ was administered to the teachers of Basic Science and their responses formed the data for this study. The data were analyzed using mean. Any item which has a mean value that is less than 2.50 is rejected while any item that has a mean value that equals 2.50 and above is accepted as an Ethnoscience resource or practice available for the instruction of Basic Science concept of Sound energy in the Local Government Area.

Study Area

The study area is Abua-Odual Local Government Area of Rivers State, Nigeria.

Abua-Odual Local Government Area which is made up of fifty-five villages is located in the Western part of Rivers State and lies between latitude 40 38'N and Longitude 60 42'E in the Niger Delta area of Nigeria with an area of 272 sq mi (704 km²). The headquarters of Abua/Odual Local Government Area is Ayama (Abua-Central). The Local Government Area which has a population of 282,988 at the 2006 census, shares boundaries with Ahoada East in the North, Emohua Local Government in the East, Degema in the South and Bayelsa State in the West. In the Local Government Area, Abua and Odual are the spoken dialects alongside English Language. The major occupation for most (technologically unskilled) Abuans is the production of palm oil and palm kernel. They also engage in hunting and fishing, farming and trading. The Abuans/Oduals are known for their different cultural activities involving both old and young such as wrestling, dancing and singing with all kinds of musical instruments (Okama, Ikiriko, Ogumogum, Ealugh, Ugelu, Oja, etc.) which are forms of entertainment and competition in the study area.

Some musical instruments in the study area.



amazon.com
Xylophone (Iguma)



imagenesmy.com
Ikiriko



amazon.com
Thumb Piano (Ogumogum)



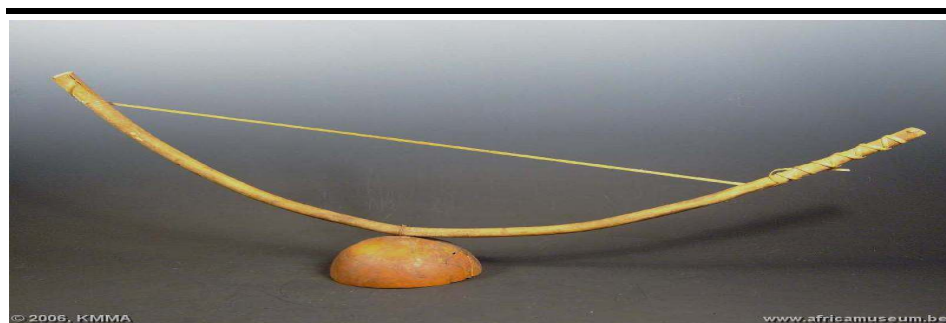
topsimages.com
Gong (Ugelu)



contemporary-african-art.com
Cultural drums (Arakama Inugh)



spirittourism.com
Cultural drums (Arakama Eaphek)



Akumugh Eaphek



streamafrica.com

Flute (Oja)



streamafrica.com

Horn (Ealughe)

RESULTS

Research Question: What ethnoscientific resources and practices are available for the

instruction of Sound energy in Abua/Odual Local Government Area of Rivers State?

Table 1: Mean values of responses on Ethnoscientific resources and practices in Abua/Odual culture for the instruction of Basic Science concept of Sound energy.

S/N	Ethnoscientific Resources/Activities	\bar{x}	Decision
1	Screaming in an open field	3.00	Accepted
2	The use of the Oja (Flute) to reverence a wrestling champion	3.00	Accepted
3	Public announcements by the town crier using the Gong (Ugelu)	2.35	Rejected
4	The melodious sound produce through the Xylophone (Iguma) during ceremonies and festivals	3.58	Accepted
5	Melodious sound from the Ogumogum (Thumb Piano) when played	3.41	Accepted
6	The sound emanating from rainfall	3.11	Accepted
7	Thunderstorm	2.29	Rejected
8	The blast of a bloated balloon/nylon bag	3.35	Accepted
9	Different sounds produced by different cultural musical instruments (such as Ikiriko, Ugelu, Okama, Oja)	2.18	Rejected
10	Screaming in an enclosed room	2.06	Rejected
11	Having a conversation when there is heavy rainfall	2.76	Accepted
12	The loud sound produced from the Ugelu to give a signal to people within and outside the community (such as fishing port and farm) when there is an emergency or danger	3.41	Accepted
13	Shouting in an enclosed hall	3.06	Accepted



S/N	Ethnoscience Resources/Activities	\bar{x}	Decision
14	The recurring sound of the Ugelu in the river band when making announcements by the town crier	3.17	Accepted
15	Screaming while standing on the shoal of the river	2.88	Accepted
16	Model of the human ear using mud and clay	3.18	Accepted
17	Chart/ pictures showing different parts of the human ear	3.11	Accepted
18	Whispering	2.82	Accepted
19	Screaming	2.94	Accepted
20	Playing different strings of the thumb piano at different time intervals	3.06	Accepted

In Table 1, items 1 to 10 addressed the contents of production of sound energy and transmission of sound energy, items 11 to 15 addressed the content of reflection of sound energy while items 16 to 20 addressed the content of hearing. The results in Table 1 show that items 3, 7, 9 and 10 with mean values of 2.35, 2.29, 2.18 and 2.06 respectively which are less than 2.50 (the criterion mean) were rejected as ethnoscience resources and practices for the instruction of production and transmission of sound energy.

Items 1, 2, 4, 5, 6 and 8 with mean values of 3.00, 3.00, 3.58, 3.41, 3.11 and 3.35 which are greater than 2.50 (the criterion mean) were accepted as ethnoscience resources and practices for the instruction of production and transmission of sound energy. Similarly, items 11 to 15 with mean values of 2.76, 3.41, 3.06, 3.17 and 2.88 which are greater than 2.50 (the criterion mean) were accepted as ethnoscience resources and practices for the instruction of reflection of sound energy. Also, items 16 to 20 with mean values of 3.18, 3.11, 2.82, 2.94 and 3.06 which are greater than 2.50 (the criterion mean) were accepted as ethnoscience resources and practices for the instruction of hearing.

DISCUSSION OF FINDINGS

The findings of this study revealed that the ethnoscience resources and practices available in the study area for the instruction of production and transmission of sound energy are screaming in an open field, the use of the Oja (Flute) to reverence a wrestling champion, the melodious sound produce through the Iguma (Xylophone) during ceremonies and festivals, melodious sound from the Ogumogum (Thumb Piano) when played, the sound emanating from rainfall and the blast of a bloated balloon/nylon bag. The respondents of this study however disagreed that public announcements by the town crier using the

Gong (Ugelu), thunderstorm, different sounds produced by different cultural musical instruments (such as Ikiriko, Ugelu, Okama, Oja) and screaming in an enclosed room could be used for instruction of production and transmission of sound energy. These findings may be because they are not aware of the potential of these resources and practices in teaching the concept of sound energy.

The findings of this study further revealed that the ethnoscience resources and practices available in the study area for the instruction of reflection of sound energy are, having a conversation when there is heavy rainfall, the loud sound produced from the Ugelu to give a signal to people within and outside the community (such as fishing port and farm) when there is emergency or danger, shouting in an enclosed hall, the recurring sound of the Ugelu in the river band when making announcements by the town crier and screaming while standing on the shoal of the river.

The findings of this study also revealed that the ethnoscience resources and practices available in the study area for the instruction of hearing are model of the human ear using mud and clay, charts/pictures showing different parts of the human ear, whispering, screaming and playing different strings of the thumb piano at different time intervals.

These findings agree with the findings of Nuroso et al. (2018) who explored and discovered the ethnosience in the indigenous science of block making, and Fadilah et al. (2019) who explored and discovered the science in the Adat Melayu Jambi wedding procession as ethnosience resource for the learning of science. The findings are supported by Abonyi et al. (2014) who pointed out that ethnosience-based learning involves designing a practical model in balancing local knowledge and western science. The findings are similarly supported by Sumarni (2018) who emphasized the need for educators to identify



resources in local content which are relevant to the study of science in content, context and competence. This is because the ethnicity of students is a resource for teaching just as Presmeg (1998) submitted.

CONCLUSION

This study has identified ethnoscientific resources and practices for the instruction of the concept of sound energy and by extension, Basic science. The onus then lies on the science teacher to endeavour to identify the ethnoscientific resources and practices through resourcefulness and creativity. The learners should also be involved in identifying these ethnoscientific resources and practices in order to make learning experiential and participatory. This will also go a long way in demystifying the difficult scientific concepts and solving the problem of lack of instructional materials for the teaching and learning of science.

RECOMMENDATIONS

It was recommended that:

1. Teachers should be resourceful and creative enough to identify and take advantage of the ethnoscientific resources and practices in the culture and tradition of the learners for the teaching of science subjects.
2. Teachers should design instructions based on the ethnoscience resources and practices that abound in the locality of the learners.
3. Ethnoscience-based instruction should be included in the curricula of science subjects.
4. Ethnoscience-based instruction should be included in the curricula of pre-service teachers.

REFERENCES

- Abiam, P. O., Abonyi, O. S., Uganwa, J. O. & Okafor, G. (2016). Effects of ethnomathematics-based instructional approach on primary school pupils' achievement in Geometry. *Journal of Scientific Research and Reports*, 9(2), 1-15.
- Abonyi, O. S., Achimugu, L. & Njoku, M. I. A. (2014). Innovations in science and technology education: A case for ethnoscience based science

classrooms. *International Journal of Scientific and Engineering Research*, 5(1), 52-56.

- Aderonmu, T. S. B. & Adolphus, T. (2021). Thinking through ethnoscience scenarios for Physics teaching: Implication for curriculum implementation. *International Journal of Trends in Scientific Research and Development (IJTSRD)*, 5(2). www.ijtsrd.com
- Ajayi, V. O., Achor, E. E. & Agogo, P. (2017). Use of ethnochemistry teaching approach and achievement and retention of senior secondary students in standard mixture separation techniques. *International Center for Science, Humanities and Education Research (ICSHER)*, 3(1), 21-30.
- Alim, Sarwi & Subali, B. (2020). Implementation of ethnoscience-based guided inquiry learning on the scientific literacy and the character of elementary school students. *Journal of Primary Education*, 9(2), 139-147. <https://journal.unnes.ac.id/sju/index.php/jpe/article/view/29189>
- Asiyah, Sapri, J., Novitasari, N., Saregar, A., Topano, A., Walid, A. & Kusumah, R. G. T. (2021). Construction of ethnoscience-based learning environment material in scientific knowledge. *Journal of Physics: Conference Series*, 1796, 012034 [doi:10.1088/1742-6596/1796/1/012034](https://doi.org/10.1088/1742-6596/1796/1/012034)
- Atmojo, S. E., Kurniwati, W. & Muhtarom, T. (2018). Science learning integrated ethnoscience to increase scientific literacy and scientific character. *Journal of Physics: Conference Series*, 1254, 012033, [doi:10.1088/1742-6596/1254/1/012033](https://doi.org/10.1088/1742-6596/1254/1/012033)
- Atmojo, S. E., Lukitoaji, B. D. & Muhtarom, T. (2021). Improving science literacy and citizen literacy through thematic learning based on ethnoscience. *Journal of Physics: Conference Series*, 1823, 012001. [doi:10.1088/1742-6596/1823/1/012001](https://doi.org/10.1088/1742-6596/1823/1/012001)
- Eriba, J. O. & Samuel, R. I. (2018). Challenges affecting the effective teaching and



- learning of secondary school Basic science and Technology in Nasarawa State, Nigeria. *International Journal of Innovative Social and Science Education*, 6(2), 71-75.
- Fasasi, R. A. (2017). Effects of ethnoscience instruction, school location and parental educational status on learners' attitude towards science. *International Journal of Science Education*, 39(5), 548-564.
- Fadilah, I., Sari, R. I., Ramadhani, V., Basuki, F. R. & Fitaloka, O. (2019). Ethnoscience study of the application and delivery procession of Adat Melayu Jambi as science learning resources. *Scientiae Educata: Jurnal Pendidikan Sains*, 8(2), 141-153.
- Fisher, N. J. (2009). Identification and examination of physics concepts that students find most difficult. <http://www.central.org/items/detail.cfm?ID=4387>
- Fitria, M. & Wisudawati, A. W. (2018). The development of ethnoscience-based chemical enrichment book as a science literacy source of students. *International Journal of Chemistry Education Research*, 2(1), 50-57.
- Gunawan, Y. Y., Sawanto & Nurosyid, F. (2019). The analysis of students' critical thinking skill through ethnoscience instruction integrated on the topic of magnetic field. *AIP Conference Proceedings* 2194, 020033. <https://doi.org/10.1063/1.5139765>
- Ibe, E. & Nwosu, A. A. (2017). Effects of ethnoscience and traditional laboratory practical on science process skills acquisition of secondary school Biology students in Nigeria. *British Journal of Multidisciplinary and Advanced Studies*, 1(1), 35-46.
- Khoiri, A., Nulngafan, Sunamo, W. & Sajidan (2019). How is students' creative thinking skills? An ethnoscience learning implementation. *Jurnal Ilmiah Pendidikan Fisika Al-BiRuNi*, 8(2), 153-163. doi:10.24042/jipfalbiruni.0i0.4559
- Lestari, N. & Fajar, F. (2016). Physics education based ethnoscience: Literature review. *International Conference on Mathematics, Science and Education (ICMSE 2016)*, 31-34.
- NERDC (2012). *9 year Basic Education Curriculum: Basic Science and Technology JSS 1-3*. Lagos: NERDC Press.
- Nuroso, H., Supriyadi, Sudarmin, S. & Sarwi (2018). Identification of indigenous science in the brick-making process through ethnoscience study. *Journal of Physics: Conference Series*, 983, 012172. doi.10.1088/1742-6596/983/1/012172
- Obafemi, D. T. A. & Onwioduokit, F. A. (2013). Identification of difficult concepts in Senior Secondary School two (SS2) Physics curriculum in Rivers state, Nigeria. *Asian Journal of Education and e-learning*, 1(5), 317-322.
- Osuolale, O. J. (2014). Problems of teaching and learning science in junior secondary schools in Nasarawa State. *Journal of Education and Practice*, 5(34), 109-118.
- Parmin, P. & Fibriana, F. (2019). Prospective teachers' scientific literacy through ethnoscience learning integrated with the indigenous knowledge of people in the frontier, outermost, and least developed regions. *Jurnal Penelitian dan Pembelajaran IPA*, 5(2), 142-154. doi:10.30870/jppi.v5i2.6257
- Presmeg, N. C. (1998). Ethnomathematics in teacher education. *Journal of Mathematics Teacher Education*, 1(3), 317-339. doi:10.1023/A:1009946219294
- Rahmawati, Y., Ridwan, A., Nurbaiti (2017). Should we learn culture in Chemistry classroom? Integration of ethnochemistry in culturally responsive teaching. *AIP Conference Proceedings* 1868, 030009. <https://doi.org/10.1063/1.4995108>
- Sholahuddin, A., Hayati, N., Iriani, R., Saadi, P. & Susilowati, E. (2021). Project-based learning on ethnoscience setting to improve students' scientific literacy. *AIP Conference*



- Proceedings 2330, 020051*
<https://doi.org/10.1063/5.0043571>
- Sumarni, W. (2018). The influence of ethnoscience-based learning on Chemistry to the Chemistry's literacy rate of the prospective teachers. *Unnes Science Educational Journal*, 7(2), 198-205.
- <http://journal.unnes.ac.id/sju/index.php/usej>
- Ugwu, A. N. (2018). Effects of ethno-chemistry-based curriculum delivery on students' interest in Chemistry in Obollo-Afor Education zone of Enugu State. *Journal of the Nigerian Academy of Education*, 14(2), 129-139.