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Etnochemistry: Analysis Relevance Of Cultural "Pacu Jalur" In Chemical Materials As Learning Sources

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Abstract

Explanation of chemistry that only focuses on concepts makes students have difficulty understanding the material. So there must be an integration of chemical material with the daily lives of students to better understand the material The purpose of this study was to analyze the relationship between culture of "pacu jalur" and chemistry for learning sources. This type of research is an ethnographic research. Data collection techniques are observation, interviews, and documentation. The data obtained were analyzed using a qualitative analysis technique which is a combination of the Miles & Huberman model. Based on the results of the study, it was found that the form of cultural of "pacu jalur" relevance with chemical materials can be implemented into 4 subjects reaction rate, elemental chemistry, atomic structure of the periodic system of elements, and chemical bonds.

Keywords: Culture, Ethnochemistry, Pacu Jalur.

1. Introduction

Facing progress in the era of globalization, graduates from a university chemistry education must develop a comprehensive attitude and psychomotor with knowledge (microscopic, macroscopic, and symbolic) [1]. Relevant research proves that many educators have difficulty integrating chemistry learning in learning so that students have difficulty understanding chemical concepts which have an impact on student learning outcomes [1][2]. Referring to these problems, lecturers are expected to be able to apply chemistry learning that is supported by chemistry learning resources that are integrated with students' daily lives and experiences so that the objectives of chemistry learning can be achieved optimally through constructivism-based learning practices.

Constructivism-based learning equipped with learning resources that are relevant to the daily lives of students will make learning more meaningful. In addition, the essence of constructivism learning theory is that the knowledge and experience gained by students is the result of construction that has been carried out through the active involvement of students, both physically and mentally to gain new knowledge and experiences [3][4][5]. This knowledge and experience is obtained through sensory experience, both listening, observing, carrying out motor activities, scientific thinking processes, and finally formulating it in the mind as knowledge [6][7][8]. The principle of learning based on constructivism is very relevant to Vygotsky's theory of cognitive development which emphasizes the organization of classroom situations, the application of strategies, and the interaction between educators and students, as well as the importance of the influence of the social environment on the development of students' [4][9]. The intended social environment can be in the form of objects and symbols of culture, social institutions, and language. Symbols produced by culture help students to think, communicate, and solve problems to adapt their own thinking processes [4][5][10]. Therefore, through the application of constructivism-based learning (active and innovative learning models) equipped with learning resources that are integrated with local wisdom, it is hoped that it can activate students in constructing new knowledge through scientific thinking processes and involving problem solving skills so as to be able to develop aspects of cognitive, affective, and psychomotor students. However, the development of chemistry learning resources that are integrated with local wisdom is still very rarely carried out, moreover the currently available learning resources are still focused on abstract concepts without being integrated with the daily experiences of students so that chemistry material is still the most difficult material for students to understand. students at every level of education [11]. Thus, one of the efforts that can be made to make it easier for students to understand chemical material is through the availability of learning resources that are relevant to the daily lives of students, one of which is by integrating chemical material with local wisdom of an area which is the application of ethnochemistry.

The problem in learning chemistry lies not only in the low understanding of students' concepts, but also the limited resources for learning chemistry that are contextual and relevant to the daily lives of

students, one of which is ethnochemistry-based learning resources. It is possible to integrate chemical materials with local wisdom by providing examples of chemical concepts that are integrated with cultural products, as well as through the use of cultural products as natural laboratories [12][13].

Ethnochemistry is a variety of cultural practices that exist in society and are chemically related which describes the chemical practices of cultural groups that can be identified as the study of chemical ideas that can be found in any culture [14][15]. In other words, ethno refers to members of a community group in any cultural environment that can be identified through cultural traditions, codes, symbols, myths, and certain ways that are used to consider and conclude. Various previous studies that applied ethnochemistry in learning through the use of cultural products showed positive results such as the results of research conducted by using cultural products as a learning resource which had an impact on increasing students' cognitive learning outcomes, affecting students' scientific attitudes, and human rights [14][15][16]. However, based on the results of the study, it shows that the integration of culture in chemistry learning and practicum is still very rarely done [16].

Other chemistry learning problems are also reinforced by the era of globalization which greatly affects the personality of students, which is marked by the erosion of cultural values and local wisdom which is a sign of a threat to the fading of Indonesian national identity. In addition, the impact of the globalization era has also led to the emergence of behavioral deviations, as well as a lack of cultural-based learning guidance [17][18]. Therefore, it is very urgent to apply ethnochemistry in learning through the use of cultural products and the surrounding environment as learning resources and natural laboratories. However, current factual conditions show that the integration of ethnochemistry with curriculum, learning tools and in the preparation of teaching materials is still very rarely done [19], and research results show that the trend of research in the field of chemistry from 2004-2013 that raised local culture into a study was only 1.7% [5].

Moreover, the factual problem that occurs is the availability of chemistry teaching materials that are integrated with local wisdom in the Basic Chemistry course. The advantages of ethnochemical-based chemistry teaching materials can make it easier for students to understand chemical concepts because they are directly related to students' daily experiences which are the implementation of constructivism learning theory. Constructivism learning theory has the essence that the construct of knowledge and experience obtained is a combination of the results of the construction of old knowledge and experience obtained with new knowledge that is being experienced so as to be able to develop the cognitive and psychomotor abilities of students [3][4][12]. Likewise, the results of relevant research also prove that the learning process refers to the context of students' lives with cultural heritage (local wisdom values) as a substance in understanding chemistry, a reference in developing aspects of attitudes and skills, as well as a reference in conducting laboratory-based scientific investigations. nature can improve students' cognitive, affective, and psychomotor learning outcomes [20].

The Pacu Jalur tradition or known as a boat race is a form of tradition that has long been preserved by the people of Rantau Kuantan. Pacu lane is not just a speed race between one boat and another, but is also a tradition that has been ingrained and rooted among the people of Rantau Kuantan, who carry out the tradition of Rantau Kuantan. Pacu Jalur, which each boat is piloted by about 60 people, is as old as other traditions of the Rantau Kuantan community such as silat, batobo, randai, rarak, and kayat, which are involved with students on a daily basis [21]. Thus, research is very urgent to be carried out to be a solution to the problem of not achieving the objectives of learning chemistry optimally because there are not enough chemistry learning resources that are relevant to the context of students' lives.

2. Research Methods

The approach used in this research is a naturalistic/qualitative approach with an ethnographic type of research. The research stages of ethnography consist of the description stage, the analysis stage, and the interpretation stage. Data collection techniques used in this research are observation, interview, and documentation techniques. The use of these techniques is based on the type of data taken. In analyzing the data, the researcher used qualitative data analysis techniques combined with the Miles & Huberman and Spradley models. The use of this technique is based on its suitability with the type of data to be analyzed, namely data collected by observation, interview, and documentation techniques. Techniques for analyzing ethnographic research data [22] there are four analyzes, namely; (1) domain analysis; (2) taxonomic analysis; (3) componential analysis, and (4) analysis of cultural themes. Based on the analysis model that has been determined, the stages of data analysis carried out by researchers are as follows; after the data is collected, the researcher performs data reduction. At this data reduction stage, the researcher selects, simplifies, or sorts the rough data that has been

collected or recorded in observation and interview sheets, as well as discarding unnecessary data. The data is then sorted and grouped by type. After the data is reduced, the researcher then arranges the data into a systematic arrangement and then analyzes it by consulting it with relevant theories and previous research results.

3. Results and Discussions

Results

Based on the research findings, it is proven that the spur of the track consists of cultural products and local wisdom values that have a strong relevance to chemistry material that can be used as a source of chemistry learning. Chemical concepts can be integrated with track culture that is viewed from the perspective of analogy, representation, apperception, visualization, and interpretation so that it can make it easier for students to understand chemical concepts by using culture as a learning resource. The implementation of an analogous perspective between domains in chemical learning based on boat race can be applied to chemical bonding materials. The spur culture that has relevance to the chemical bonding material is the opening of the Boat Race.

Figure 1. Boat Race Opening Ceremony

The opening of the Boat Race as shown in Figure 1 includes a carano worship dance and an umbrella dance. The cultural values of the spur of the line that underlie the concept of chemistry in this opening are the handover of betel nut to guests from the host through offering dancers. The concept of handover of betel nut is in line with the theory of ionic bonding, namely the handing over of electron pairs to achieve stability [23]. An example of an ionic bond that is easily found in the daily life of students is NaCl. The formation of NaCl compounds through the transfer of electrons, namely the sodium atom loses a valence electron to form a Na+ ion and a chlorine atom accepts an electron to form a Cl- ion.

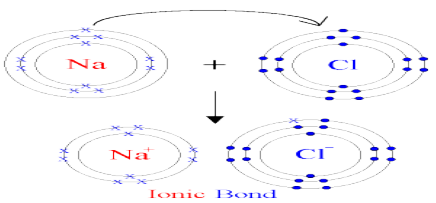

Figure 2. Ionic Bonds

The culture of boat race begins with designing the boat and then heating it over a fire.. It aims to make Boat stronger, better and lighten Boat. This heating process is relevant to the chemical material, namely chemistry and its changes. Wood is an object that has a hard texture and is included as an example of an organic object. When wood is burned, there will be a chemical reaction that produces a reaction of H2O and CO2. The reaction will be formed if it runs perfectly. If not, it will form residual substances such as charcoal [23].

The Boat that has been completed through the heating stage will be larger than the initial state. This will make it easier for athletes to sit on the track in competition. The larger the track size, the more athletes that can participate. This is relevant to the periodic system of elements where as the atomic number increases, the size of the atomic radius also increases [23]. Some Boat sizes can be seen in Figure 3.

Figure 3. Other “Jalur” sizes

The relevance of the chemicals to this tradition of boat racing is also apparent at night after the boat race finishes. Randai art is played by the community by dancing in a circle. This is closely related to the atomic radius, where there are electrons that move around it. The relevance can be seen in Figure 4.

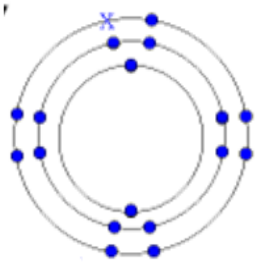

Figure 4. Relevance Of The Chemicals And Randai Art

The chemical elements involved in the implementation of spur culture are numerous. For example, in water there is a bond between the elements H and O. The bond that occurs is a covalent bond [23]. To add value to the Boat art must be added paint. The carvings and Boat names used are in accordance with the results of the meeting. Don't forget to also give the Lane the name, date it was made, and the name of the village

as an identifier for the route. If the entire process has been completed, then the Boat is ready to be raced. The new painting is carried out when the motif or color of the paint after obtaining approval according to the results of the meeting, means that the value contained is the value of deliberation. The chemical elements involved include calcium carbonate (CaCo), titanium dioxide (TiO), PVAC (Poly Vinly Acrylic), kaolin, pigment, and water [24]. The process of painting the boat can be seen in Figure 5.

Figure 5. painting the boat

In the competing, each athlete is given their own rower. The strength of the power and the number of paddles will determine the speed of the boat. This is in line with the concept of reaction rate where based on collision theory, the more collisions that occur, the faster the reaction rate [23]. Rower path can be seen in Figure 6.

Figure 6. The process of rowing boat

Discussion

The analogy approach can explain a comparative relationship which refers to the relationship between two different concepts, but has a relevant meaning. The application of an analogous approach between domains in chemistry learning can be done by integrating everyday life situations that have relevance to the concept of chemistry [25]. The results of relevant research prove that students who have high motivation will be more active in doing assignments and constructing knowledge so that it has a positive impact on learning outcomes obtained [2][14]. The motivation and high curiosity of students are one of the important factors that influence the success of science learning to be more effective and meaningful [7]. Giving real examples in everyday life makes learning more interesting and meaningful so that it can develop students' representational abilities in learning chemistry in universities [26].

The findings of the research prove that spur-of-the-moment culture has a very relevant potential to be integrated with basic chemical materials, namely matter and its changes, atomic structure, periodic system of elements, elemental chemistry and chemical bonds. motivation, and activeness of students in understanding Chemistry material that has relevance to students' daily lives so that learning becomes more meaningful. The meaning of learning is realized by integrating chemical concepts with the values of local wisdom of the community which factually in their daily activities apply chemical concepts. The constructs of new knowledge and experience gained by students will be more meaningful when associated with the old knowledge and experiences they have experienced so that they have a positive effect on increasing students' cognitive, affective, and psychomotor abilities [27][28]. One example is the formation of ionic bonds through the transfer of electron pairs between positive and negative ions to achieve a stable electron configuration or resemble the electron configuration of noble gases [29][30].

The advantages of applying analogies in learning make learning more meaningful so that learning becomes more fun and students are more motivated to be actively involved in the learning process. The application of an analogous approach in chemistry learning makes learning more interesting and meaningful so that it can improve chemistry learning outcomes [30]. The findings of this study are strengthened by previous research which proves that ethnochemistry-based learning processes or activities have an effect on improving learning outcomes, scientific attitudes, and students' science process skills [31]. Chemistry learning activities that are supported by the availability of ethnochemistry-based chemistry learning resources refer to the context of students' lives which are local wisdom values that have relevance to chemical concepts can be used as supporting learning resources and references in conducting scientific investigations. Likewise, various relevant research results also show that the implementation of ethnochemistry in learning, whether in the form of integration with learning models, integration with learning strategies, or as a source of learning and scientific investigation can develop scientific attitudes, critical thinking skills, scientific process skills, and improve cognitive learning outcomes of learners [20].

4. Conclusion

The relevance of chemistry material with the culture of the “pacu jalur” is viewed from the perspective of analogy, representation, apperception, visualization and interpretation. Culture of the “Pacu jalu” as a source of learning chemistry is found in 4 materials, including reaction

rates, elemental chemistry, atomic structure of the periodic system of elements, and chemical bonds. Teaching materials for Integrated Chemistry and culture as a source of learning chemistry based on ethnochemistry and relevant to the daily lives of students so that it affects the improvement of students' cognitive learning outcomes.

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