This work is licensed under a [Creative Commons Attribution-NonCommercial 4.0 International License](https://creativecommons.org/licenses/by-nc/4.0/).

THE IMPLEMENTATION OF STEAM INTEGRATED THEMATIC LEARNING BASED ON LOCAL WISDOM OF KAPUAS HULU IN ELEMENTARY SCHOOL

Oktoriyadi

SDN 10 Sengkuang Kuning, Kapuas Hulu, Indonesia

E-mail: oktoriyadisdp@gmail.com

Abstract

Kapuas Hulu is one of the districts in Indonesia whose children are still digitally discriminated against in the 21st century, especially disadvantaged villages. Nevertheless, students must think critically and creatively in responding to their limitations and socio-cultural conditions to solve the problems at hand. The principle of global thinking and acting locally and having 4C competencies (critical thinking, communication, collaboration, creativity) as 21st-century life skills are very much needed by students to face competition in the current and future industrial revolution 4.0 era. To prepare such students, one of them was by implementing STEAM integrated thematic learning based on local wisdom. STEAM-based learning could train the abilities and talents of students facing 21st-century problems (Danang Wijaya, et al. 2015: FP-87). The results of the study concluded that integrated STEAM thematic learning based on local wisdom was suitable for application in elementary schools. Implementation in learning was done through integrating the content and context of Kapuas Hulu's local wisdom with the scientific disciplines contained in STEAM and the basic competencies of the content of the lessons in the existing themes to produce designs or products of local wisdom. The impact of its implementation was to be able to develop students' cognitive, affective, and psychomotor abilities that support 21st-century life skills in facing competition in the industrial revolution era 4.0 with the principles of global thinking and acting locally.

Keywords: Implementation, Local Wisdom, STEAM, Thematic

Introduction

The demand for students' readiness in facing the acceleration of technological changes, economics, and even socio-culture at present and in the future is a challenge for a teacher. Teachers should practice the 21st-century life skills of students in learning from an early age, especially in low-grade elementary schools. Learning in the lower classes (classes I, II, and III) in the 2013 curriculum is carried out thematically, which includes the main content of subjects, namely religious education and character, Indonesian language, Mathematics, PJOK, and SBdP. However, to excel in competition in the 4.0 industrial revolution era and have 4C competencies (critical thinking, communication, collaboration, creativity) as of 21st-century life skills, thematic learning also needs to be integrated with science, technology, engineering, art, and mathematics. Agusta Danang Wijaya et al. (2015: FP-87) concluded that STEAM-based learning could train the abilities and talents of students facing 21st-century problems. Thus, learning in elementary schools, both low classes and high classes taught based on themes, the content of lessons in these themes should also be integrated with STEAM (Science Technology Art and Mathematics).

The final output in integrated STEAM thematic learning is a design or product made by students related to the learning theme. Learning themes that have been determined in the 2013 curriculum need to link the subject matter with the nearest world of students. It required the teacher's creativity in utilizing local resources as STEAM's integrated thematic learning media. Local sources that can be utilized in learning include produce, art creations, cultural traditions, human resources, products, or other works that are the regional superiority. Exploiting the local potential of an area in learning is known as learning based on local wisdom. Strengthening integrated thematic learning STEAM based on local wisdom aims to instill the character of students to love local products with the principle of global thinking and to act locally and to support the development of students' competence in facing current and domestic product competition that can be accessed without space and time limits.

Kapuas Hulu is one of the districts in Indonesia whose children are still digitally discriminated against in the 21st century, especially disadvantaged villages. However, inevitably students must think critically and creatively in responding to their limitations and socio-cultural conditions to solve the problems at hand, not to be reduced and avoided. The principle of global thinking and acting locally as well as having 4C competencies as 21st-century life skills were urgently needed for students to face competition in the current and future industrial revolution 4.0 era. To prepare such students, one of the steps of teachers as educational practitioners in the frontline is to implement STEAM integrated thematic learning based on local wisdom Kapuas Hulu in elementary schools.

The problem is whether thematic learning can be integrated with STEAM-based on local wisdom? How do you implement STEAM integrated local, thematic learning based on Kapuas Hulu's local wisdom in elementary schools? Furthermore, what are the benefits for both teachers and students by implementing STEAM integrated thematic learning based on local wisdom Kapuas Hulu in elementary schools?

The purpose of writing this article is to examine the implementation of STEAM integrated thematic learning based on local wisdom of Kapuas Hulu in elementary schools. Specifically, the purpose of this paper is as follows. (1) Identifying the suitability of implementation of STEAM integrated thematic learning based on wisdom in primary schools. (2) Describe an example of STEAM integrated thematic learning implementation based on local wisdom of Kapuas Hulu in elementary schools. (3) Identifying the benefits of implementing thematic learning based on local wisdom. Based on these objectives, it is hoped that this paper will be useful for teachers to design and implement integrated STEAM thematic learning based on local wisdom as an alternative to solving the problem of limited learning resources in schools and implementing 21st-century learning.

How to solve problems in writing this article by using a literature review. The literature review method in this paper is a critical study of the discussion of thematic learning topics, STEAM, and local wisdom that have been written by researchers in various sources. The writing steps are carried out as follows. (1) Collecting data on thematic learning, STEAM, local wisdom, and implementation of learning in elementary schools through books, journals, scientific articles, and various sources from the internet. (2) Analyzing data obtained. (3) Designing STEAM, integrated thematic learning concepts based on Kapuas Hulu's local wisdom in elementary schools.

Literature Review

Thematic Learning

Integrated thematic learning was first raised by the philosopher John Dewey (Unga Utari, et al. 2016: 38). The emergence of thematic learning is influenced by three streams of modern philosophy, namely the flow of progressivism, the flow of constructivism, and the flow of humanism (Prastowo in Unga Utari, et al. 2016: 38). The three streams, in the general view,

the learning process must be centered on the needs and characteristics of students. The flow of progressivism sees the learning process emphasizing the formation of creativity, providing activities, a natural learning atmosphere, and paying attention to the experiences of students. Learning that pays attention to and constructs the student's direct experience is also the main view of the constructivism flow. Likewise, with the view of the flow of humanism, that the learning process must pay attention to the uniqueness of the potential, uniqueness, and motivation of students.

Thematic learning, in general, is a learning process that is carried out based on the theme as the main topic in each learning activity. It is concluded from several expert opinions including Fogarty (in the Ngurah Laba Dek, et al. 2016: 3) which states that thematic learning is integrated learning with the use of themes to capture the linkages of subject matter from various fields of study and the theme must invite many concepts from various fields of study. The Directorate of Elementary School Development (2018: 15) also states that Integrated Thematic learning is carried out using themes as a unifying learning activity that combines several learning contents at one time to face-to-face, to provide meaningful experiences for students.

STEAM

STEAM stands for Science Technology Art and Mathematics or science, technology, engineering, engineering, art, and mathematics. STEAM is popular with countries such as the United States, United Kingdom, and China in the face of the 21st Century and the Era of the Industrial Revolution 4.0 marked by the emergence of supercomputer technology, artificial intelligence (AI), and other digital technology devices (Farinia Fianto, 2018: 8). STEAM is a development of the STEM (Science, Technology, Engineering, and Mathematics) approach by adding elements of arts, namely Design, creativity, and innovation (Agusta Danang Wijaya et al. 2015: FP-86). The art element is integrated into STEM so that the outcome or product produced from STEAM-based learning contains elements of art which will undoubtedly have a positive influence that is better and more interesting for anyone who enjoys it (Iik Nurhikmayati, 2019: 42)

The use of STEAM in the world of education is a learning approach that combines several scientific disciplines, namely science, technology, engineering, art, and mathematics, into one unit in the process of learning activities. Buiniconro (in Iik Nurhikmayati, 2019: 42) states that integrated learning in STEAM can provide new opportunities for students to create designs and products directly with the ability of creativity and good problem-solving. So, learning outcomes in integrated STEAM learning are designs or products, both original products and prototypes made by students.

Local culture

Local wisdom is a human effort by using the ability of his intellect (cognition) to act and behave towards something, object, or event that occurs in a particular space (Miranita Khusniati, 2014: 68). Local wisdom was born as a result of the creativity of a community in solving problems or meeting their needs by utilizing the potential of humans and natural resources found in their daily lives (Nadlir, 2014: 302). Local wisdom refers to the local knowledge that is used by the community in the scope of the local area to survive by utilizing all human and natural resources in an environment. The results of the local wisdom of an area can be in the form of a belief system, norms, law, culture and are expressed in tradition, the development of local potentials and products of local creations such as clothing, houses, weapons, or even the model of local area transportation.

Local wisdom-based education is education that utilizes local and global excellence in the school curriculum in the hope that it can be beneficial for the development of students' ability to face global competition (Nadlir, 2014: 310). Local wisdom-based learning is a learning process that constructs the concrete situations they face in their immediate environment. The

development of learning based on local wisdom is also a reflection and realization of Government Regulation No. 13 of 2015 concerning the Second Amendment to Government Regulation No. 19 of 2005 concerning National Education Standards which are Education Unit Level Curricula developed in accordance with education units, regional potentials, socio-cultural and learners.

Discussion

Thematic learning in Indonesia has been fully implemented in the 2013 curriculum, especially in primary schools. The themes in the school year have been determined by policymakers towards the 2013 curriculum in Indonesia. However, teachers are still given authority in developing learning materials based on these themes according to the needs, characteristics and conditions in schools both the initial ability of students, interests, motivation to learn, talent, potential, social abilities, emotions, learning styles, special needs, learning speed, cultural background, norms, values, and environment of students. It is also in accordance with the principles of thematic learning that prioritizes meaningful and joyful learning experiences. Hence, the teacher needs to associate learning material with the world closest to students or commonly known as contextual teaching and learning (Unga Utari, et al. 2016: 40). To contextualize thematic learning can be done by developing themes from the content and context of local wisdom. In accordance with the learning principles contained in Permendibud No. 22 of 2016 concerning the Standards of Basic and Secondary Education Process one is "recognition of individual differences and cultural backgrounds of students."

Thematic learning based on local wisdom in primary schools has done a lot of research and development. Dek Ngurah Laba Laksana et al. (2016: 1) in the research and development of thematic grade IV elementary school thematic teaching materials based on local wisdom, the Ngada community concludes the local wisdom content and context of the Ngada Community that is relevant to the thematic learning themes in IVth grade elementary school including regional potential, regional culture, traditional houses, regional arts. In the previous year, Stevanus Divan in 2015 (in Unga Utari et al. 2016: 42) also produced a teaching material that was adjusted to the characteristics of students in the "Manggarai" area. Both of these studies produce teaching materials that were feasible to use because they had been validated and tested in learning with the quality of the teaching materials produced received responses from teachers and students, including the excellent category. Thus, local wisdom could be used as a source of student learning. Learning that elevates the environment around students made learning more meaningful and motivates students to get to know the local wisdom of their area better.

Knowledge of local wisdom alone was not enough for students to undergo competition in the current 4.0 industrial revolution era. Students must also had skills in developing local wisdom in their area. The process of training students' skills could be through the integration of thematic learning based on local wisdom with STEAM. The implementation of thematic learning in the 2013 curriculum was suitable to be integrated with STEAM, which can help stimulate students' abilities and talents to face the challenges of the 21st century (Agusta Danang Wijaya et al. 2015: FP-87). The output to be achieved in integrated STEAM thematic learning based on local wisdom was a design or product made by students related to the local wisdom of their area. Based on the process and learning outcomes to be achieved, integrated STEAM thematic learning based on local wisdom was suitable for application in elementary schools.

STEAM integrated thematic learning based on local wisdom was a learning approach that combines learning themes with the fields of science, technology, engineering, arts, and mathematics based on content and the context of local wisdom. The implementation of integrated thematic learning STEAM based on local wisdom starts from analyzing the

relevance of the theme to the content and context of the local wisdom of the community where students were located. After conducting the analysis, the teacher could described the content and context of local wisdom that could be integrated into the theme chosen based on the level of relevance. The content and context of selected local wisdom were developed into teaching material. Teaching materials were integrated with STEAM integrated thematic learning activity steps contained in the Learning Implementation Plan (RPP).

Implementation of STEAM integrated thematic learning was carried out in an integrated manner, meaning that the approach taken was to connect the disciplines contained in STEAM with the concept of lesson content in existing themes to produce an idea, idea, solution or product. In the implementation of integrated thematic learning STEAM based on local wisdom, a teacher will have a challenge on how to encourage students to be able to use their understanding and logic actively, think critically, and creatively and used skills to develop content and context of local wisdom being studied. The teacher was not only a facilitator but must participate in building the understanding of the content and context of local wisdom that was being discussed with students to make an inter-disciplinary relationship contained in STEAM. At the end of learning, students could created original products or prototypes of local wisdom content and context of learning outcomes that were linked to the discipline of science contained in STEAM.

Content and context of local wisdom that can be implemented in integrated thematic learning STEAM based on local wisdom Kapuas Hulu district was a map of the Kapuas Hulu district, boundaries of the district and sub-district in Kapuas Hulu, regional songs and dances, Kapuas Hulu typical handicrafts made from rattan or natural materials others, the folklore of the Kapuas Hulu people, and realistic mathematical concepts using examples of traditional cultural events such as slaughtering pigs (the legs are divided equally into ...), traditional houses, and traditional district games.

Some examples of the implementation of integrated thematic learning STEAM based on local wisdom of the Kapuas Hulu district in primary schools include the following.

1. Learning in class IV on the theme of the Regional Area of My Stay with its local wisdom material map of the Kapuas Hulu district, the boundaries of the district and sub-districts in Kapuas Hulu. The technology element, which was a discipline of science in STEAM, could be done with students looking for information about Kapuas Hulu district map images using the google map application or other browser applications online. The element of science can be done by identifying Kapuas Hulu's natural resources and explaining the importance of efforts to balance and preserve natural resources in the environment (Content of Science Competencies Basic Competencies 3.8 and 4.8). Students can also identify the characteristics of space and utilization of natural resources for the welfare of the Kapuas Hulu district community (Content of Social Sciences Basic Competency Learning 3.1 and 4.1). Learners make a map of the Kapuas Hulu district, district, and sub-district boundaries in Kapuas Hulu (engineering element). Students could and add elements of art by coloring the map to make it more interesting. In making maps, of course, students must also determine the scale of the map, which was an element of mathematics in STEAM (Contents for Mathematics Lessons KD 3.2 and 4.2).
2. Learning in IIIrd grade on the theme of Growth and Development of living things with the local wisdom material of Kapuas Hulu was a lampit (mat made of woven rattan blades) handicrafts of the Kapuas Hulu Dayak community. The STEAM element that can be integrated in this learning was science, namely students looking for information about the growth and development of rattan and how to preserve it (the content of Indonesian lessons KD 3.4 and 4.4). In the engineering element, students could made a prototype of a lampit (SBdP KD 3.4 and 4.4). Students could add elements of art to the lantern prototype by coloring the lanterns to make it more interesting. Students then calculate the area of the

lampit prototype (the content of mathematics lessons KD 3.10 and 4.10). The learning activity ended with documenting the product of the students' work, which was made by students used a mobile camera, then made posters and published on social media as a means of disseminating and promoting local products in the Kapuas Hulu district.

Examples of the implementation of integrated thematic learning STEAM based on local wisdom Kapuas Hulu above was part of all thematic learning that can be done on the local wisdom based STEAM approach. There was still much content and context of Kapuas Hulu's local wisdom that can be implemented in STEAM's integrated thematic learning in elementary schools. STEAM integrated thematic learning based on local wisdom could also be implemented in local wisdom of other regions in Indonesia.

STEAM integrated thematic learning based on local wisdom that integrated the local wisdom of students' regions with several disciplines in one integrated learning becomes very interesting to do. Students will be more motivated in learning because of the variety of learning that included elements of science, technology, engineering, art and mathematics, and even the content of the lessons contained in the 2013 curriculum. Therefore, teachers were required not only as facilitators and conveyers of knowledge but more persistent in identifying and determining what kind of learning will be used in STEAM integrated thematic learning based on local wisdom. Implementation of STEAM integrated thematic learning based on local wisdom was very useful and beneficial for students that not only cognitive aspects were developed in learning, but the ability and skills of students to face the challenges of the globalization era in the future and instill an attitude of love and develop local products.

Students obtain many benefits through learning based on local wisdom. Local wisdom-based learning has high relevance for the development of life skills (life skills) by relying on local skills and potential (Nadlir, 2014: 306). The model of science learning based on local wisdom is also useful in fostering the conservation character of students (Miranitas Khusniati, 2014: 73). Thematic learning based on local wisdom is intended to maintain local knowledge in the face of the development and advancement of education and increasingly stringent competitiveness in the MEA era, (Unga Utari, et al., 2016: 43). Febriamti (in Unga Utari et al., 2016: 43) conducted research and development based on local wisdom for IVth grade elementary school students describing the benefits gained in thematic learning, giving more contribution to activating learning in the classroom. Based on the benefits of local wisdom-based learning, the implementation of STEAM integrated thematic learning based on local wisdom is expected to support the development of students' competence in facing competition in the industrial revolution era 4.0 with the principles of global thinking and acting locally.

Conclusions and Suggestions

Conclusions

STEAM integrated thematic learning based on local wisdom Kapuas Hulu was very suitable to be implemented in the 2013 curriculum at the elementary school. Basic Competence each subject matter taught based on the theme can be integrated with the topic of Kapuas Hulu's local wisdom and even other regions in Indonesia. There was a lot of content and context of local wisdom of the Kapuas Hulu district that can be applied with STEAM integrated thematic learning including maps of the area, lampit (typical handicrafts of the community), traditional houses, folklore, traditional cultural events, traditional games, songs and regional dances of the Kapuas Hulu region. The output to be achieved in integrated STEAM thematic learning based on local wisdom was a design or product made by students related to the local wisdom of the region.

Implementation of STEAM integrated thematic learning based on local wisdom is very useful in developing cognitive, affective, and psychomotor abilities of students that supported

21st-century life skills in facing competition in the 4.0 industrial era with the principles of global thinking and acting locally.

Suggestion

To instill an attitude of love and develop local wisdom towards students, the need to implement STEAM integrated thematic learning based on local wisdom. In integrated thematic learning STEAM based on local wisdom, a teacher should instill the mind in students that inevitably they have to think critically and creatively in responding to their socio-cultural conditions to solve problems faced by the industrial revolution era 4.0 especially for students who are still discriminated digital, not to be reduced and avoided.

References

- Direktorat Pembinaan Sekolah Dasar. (2018). Modul Bimbingan Teknis Instruktur Kurikulum 2013 di Sekolah Dasar. Jakarta: Direktorat Jenderal Pendidikan Dasar dan Menengah Kementerian Pendidikan dan Kebudayaan.
- Fianto, F.(2018). Seri Manual GLS Literasi Numerasi dalam Pengembangan Klub Steam dan Wirausaha di Sekolah. Jakarta: Direktorat Jenderal Pendidikan Dasar dan Menengah Kementerian Pendidikan dan Kebudayaan.
- Khusniati, M. (2014). Model Pembelajaran Sains Berbasis Kearifan Lokal dalam Menumbuhkan Karakter Konservasi. *Indonesian Journal of Conservation*, Vol. 3, No. 1, Juni 2014, hlm. 67–74.
- Laba, D. N. dkk. (2016). Pengembangan Bahan Ajar Tematik Sd Kelas Iv Berbasis Kearifan Lokal Masyarakat Ngada. *Jurnal Ilmiah Pendidikan Citra Bakti*, Vol. 3, No. 1, Maret 2016, hlm. 1-10.
- Nadlir. (2014). Urgensi Pembelajaran Berbasis Kearifan Lokal. *Jurnal Pendidikan Agama Islam*, Vol. 2, No. 2, November 2014, hlm. 300-330.
- Nurhikmayati, I. (2019). Implementasi STEAM dalam Pembelajaran Matematika. *Jurnal Didactical Mathematics*, Vol. 1, No. 2, April 2019, hal. 41-50.
- Peraturan Menteri Pendidikan dan Kebudayaan Nomor 22 Tahun 2016 tentang Standar Proses Pendidikan Dasar dan Menengah.
- Peraturan Menteri Pendidikan dan Kebudayaan Nomor 24 Tahun 2016 tentang Kompetensi Inti dan Kompetensi Dasar Pelajaran pada Kurikulum 2013 pada Pendidikan Dasar dan Pendidikan Menengah.
- Peraturan Pemerintah Nomor 13 Tahun 2015 tentang Perubahan Kedua Atas Peraturan Pemerintah Nomor 19 Tahun 2005 tentang Standar Nasional Pendidikan.
- Utari, U. dkk. (2016). Pembelajaran Tematik Berbasis Kearifan Lokal di Sekolah Dasar dalam Menghadapi Masyarakat Ekonomi ASEAN (MEA). *Jurnal Teori dan Praksis Pembelajaran IPS*, Vol.1, No.1, April 2016, hlm. 39-44.
- Wijaya, A.D., dkk. (2015). Implementasi Pembelajaran Berbasis STEAM (Science, Technology, Engineering, Art, Mathematics) pada Kurikulum Indonesia. *Prosiding Seminar Nasional Fisika dan Aplikasinya*, Bale Sawala Kampus Universitas Padjadjaran Jatinangor: Sabtu 21 November. hlm.85-87.