



Integration Of Technology and Local Knowledge Content Through Historical Tracing Models in The Context Of Sustainable Education

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Abstract. The Government of the Republic of Indonesia has included the concept of sustainability as one of the basic principles in its national education development. This means that all types of education in Higher Education, including History Education, are very important and strategic to contribute to achieving the goals of sustainable educational development. Through a dynamic learning process with a historical tracing model integrated with technology, it is hoped that it can be used as an alternative to help change the attitudes and behavior of graduates, whether as individuals, communities or professionals, to carry out their collective responsibilities and tasks in the future. This paper emphasizes the subject of the role of History education in higher education in producing communities or professionals who can bring change towards a sustainable future education. To achieve this goal, there are basic things that will be discussed in this article, namely: First, it is necessary for students to be equipped with local knowledge content and an understanding of sustainable educational development. Second, from the results of research into the development of learning models that have been carried out, an alternative model has been produced in the History class that can deliver knowledge, attitudes, skills and competencies to students that support sustainable educational development efforts. Third, how does history education integrate existing local knowledge content with renewable technological developments in supporting education for sustainable development.

Keywords: Technology, Integration, Sustainable, Education

1 Introduction

In order to enter the demands of the 21st century, in the era of industry 4.0 and Society 5.0. it has been agreed that education is a fundamental factor in achieving sustainable development goals. The Government of the Republic of Indonesia, like many other governments, has included the concept of sustainability as one of the basic principles in the development of its national education. This can be seen in the National Education

Law and the Strategic Plan of the Ministry of National Education for 2010-2014 which makes education one of the paradigms for Sustainable Development, Development and Development. UNESCO calls this paradigm Education for Sustainable Development (ESD) or in Indonesian Education for Sustainable Development (PUPB).

Analyzing educational practices, especially current history education, it is often found that students' understanding is less than encouraging. Although many students are able to present a good level of memorization, they do not understand what they can memorize. This means that most of them are unable to understand or utilize what they learn with new situations in their area [1].

Various studies on history learning show that students' interest and achievement increase when they are helped to build connections between information as new knowledge with the experiences they already have, or with other knowledge they already have. And almost all students learn more efficiently when they are allowed to work together (cooperatively). In practice, efforts made by teaching to implement contextual learning are greatly assisted by an adequate understanding of historical learning models that enable students. In such a context, efforts to develop an alternative historical learning model, Historical Tracing, are very urgent and strategic.

Until now, many types of historical learning models have been developed with their own characteristics and syntax. The development of historical learning models can go through an innovation process from adoption, modification, or development of new learning models. Joyce, Weil, and Calhoun [2] define a learning model as a contextual framework used as a guideline in conducting learning. A learning model is a conceptual framework that describes a systematic procedure in organizing learning experiences to achieve learning goals.

In accordance with Piaget's cognitive development theory [3], most cognitive participants are directed by the manipulation and interaction of active learners with the environment and existing physical experiences. Social interaction with peers, especially arguing and discussing, helps clarify thoughts which ultimately make those thoughts more logical. Furthermore, Piaget (1976) stated that logical thinking is interpreted as thinking about various things including complicated things, but on condition that these things are presented concretely (presented in a form that can be captured by the five senses). History learning also needs to be directed to encourage students to interact with local knowledge in the immediate environment and its surroundings, so that history learning becomes contextual and meaningful. An educator has a very important and strategic role in learning activities in order to determine and direct the teaching and learning process that is possible. Learning activities are directed and attempted to achieve the planned educational goals, not just a formality, but must be followed by the ability of the educator himself to be active according to his duties [4].

2 Method

The research was conducted by applying the Research and Development method within the Successive Approximation Model (SAM) framework. Research and Development

(R&D) is a process or steps to develop a new product, or improve an existing product, which can be accounted for. The product is not always in the form of an object or hardware, such as a book, module, learning aid in the classroom or in the laboratory. To carry out development that can produce a particular product, it begins with research that is in the nature of a needs analysis. Meanwhile, to test the effectiveness of the product so that it can function in the wider community, research is needed to test the effectiveness of the product. So research and development are longitudinal. SAM or Successive Approximation Model is an instructional design model developed by Michael Allen, an e-learning pioneer in 2012 in America, where SAM has eight small steps that are repeated in three stages, namely the preparation phase, the interactive design phase, and the interactive development phase (Jung H., et al., 2019). In the preparation phase, there are two activities, namely information gathering and SAVVY Start (brainstorming, sketching, and prototyping). In the interactive design phase, there are two activities, namely project planning and additional design, and in the interactive development phase, there are four steps, namely design proof, Alpha, Beta, and Gold. In the process described as such, SAM is more flexible than other development models, because evaluation is carried out continuously. So if an error is found, it can be repaired immediately and can be regressed to the previous step or phase and does not need to repeat everything from the beginning.

3 Finding and Discussion

3.1 Local Knowledge and Sustainable Development

Talking about local knowledge is very interesting, because on the one hand, human life has increasingly shifted to a global environment (globalization) which blurs national boundaries, but on the other hand, there seems to be a reverse movement towards the revival of local identity [5]. The emergence of the term sustainable development is a result of the growing awareness of the development of globalization. Globalization not only offers several new opportunities but also presents new challenges and problems for the Education community. Therefore, to achieve these expectations, Education for Sustainable Development (PUPB) is needed which combines various aspects such as social, economic and also the local environment.

The local environment is very important to explore its social values as the content of local knowledge taught to students. Only by having sufficient knowledge of local values, students will be responsive in taking attitudes and behaviors to maintain the sustainability of life in their immediate environment. This kind of awareness is expected to be the basis for the sustainable development process. Thus, social environmental values are an integral part of education for sustainability. These values are intended to understand the world view and perspectives of others in the local community. Understanding values, community values, and the values of the surrounding world is a central part of education for a sustainable future.

Awareness of sustainable development is learning to accept and understand. In this regard, the basic values of Education for Sustainable Development are respect and appreciation for the community, respect and appreciation for others, respect and

appreciation for the present and future generations. Therefore, values and ethics are a central part of the learning process in all existing scientific disciplines [6].

So it is clear that learning to live in a sustainable life plays an important role in helping the new generation face the challenges of providing and meeting the needs of life. Confidence in the future accompanied by holistic and comprehensive thinking is a necessity. This demand of course also touches on human resources provided by universities through learning practices that are always updated. Universities not only produce students who are successful in their lives, but also individuals who can participate in building communities and sustainable development according to their respective scientific competencies. Each individual must be responsive and contribute effectively to sustainable development. These needs require higher education to recognize and develop a better understanding of practices that can produce leading-edge outcomes, which are able to strive to move towards sustainability [7]. Therefore, it is very important to educate and train students as professional individuals in the future and are expected to become responsible citizens who strive to meet these needs. If students can understand the principle of sustainability as an aspect of social responsibility in their environment, then they will become citizens who see themselves as part of nature and other humans.

3.2 Development of Historical Tracing Learning as an Alternative Model

The Historical Tracing Learning Model has been successfully developed by Cahyo Budi Utomo, in 2022, through Research and Development [8]. Historical Tracing Learning is a learning model that involves students to have an independent, critical, creative, and innovative learning spirit and apply it in a real product. In the cognitive process dimension, critical thinking falls into the category of analyzing and evaluating. In the process of analyzing, students are taught to be able to break down material and its parts and determine the relationship between parts in the overall structure or purpose. While the evaluation process is the process of making decisions based on criteria or standards to find consistency or consistency of a process [9].

Historical Tracing Learning is a student activity carried out to deepen the knowledge and skills obtained by giving students a problem that can be solved with an activity related to the knowledge or competency possessed by the student. Historical Tracing Learning is a learning model that directly involves students in learning through several activities such as research to teach students until they can complete a useful learning task. Historical Tracing Learning is a learning model used to encourage students to actively learn by collaborating to solve a problem so that they can reconstruct learning based on the activities carried out. Historical Tracing Learning is a learning method that culminates in a training process based on real problems that are carried out independently through certain activities.

The Historical Tracing Learning learning model has a theoretical basis for constructivist learning that emphasizes the ideas of students who build knowledge based on their experiences. While empirically, the Historical Tracing Learning model is considered capable of making students understand meaningful learning and is

developed based on constructivism. Characteristics of the Historical Tracing Learning Model In implementing activity-based learning, there are characteristics that have.

The Historical Tracing Learning model has effective learning characteristics, including:

1. Directing students to investigate important ideas or concepts and questions.
2. Is a constructive inductive process.
3. Related to the needs of student interests to gain new knowledge.
4. Centered on students by creating artifacts or products and conducting presentations independently.
5. Using high-level thinking skills, namely critical, creative, by seeking information to conduct investigations, draw conclusions, and produce artifacts and products.
6. Related to real and authentic social environmental problems or issues.

The Historical Tracing model is related to the activity of seeking knowledge or understanding to satisfy curiosity so that students will become analytical, evaluative and creative thinkers who are able to solve problems. This Historical Tracing learning model provides insight to students that history is not only about the information obtained, but also explored and explored to create further information development [8].

This historical tracing model is a problem-solving model in solving information-based problems. Therefore, this model is flexible because this model can be applied to almost all human problems related to the use of information as a basis for making solutions.

The results of Utomo's research (2022) have produced a prototype of the Historical Tracing learning model as an alternative learning model by agreeing on 5 phases (features) as the syntax of the Historical Tracing model. The 5 phases or features are: Problem Identification, Collaborative Planning, Authentic Investigation and Analysis, Artifact Creation and Presentation, and Process Evaluation or Reflection. Based on the existing phases, a learning plan can be produced that can be used to utilize the Historical Tracing learning model. This learning model has advantages, namely that it can be used to explore difficult knowledge by solving it within a problem-solving framework, namely what was originally unknown is changed to knowing.

3.3 Integration of Local Knowledge Content with Technology

Currently, learning in the era of revolution 4.0 and society 5.0. integrating technology with knowledge content or curriculum content is a necessity. This integration process is known as TPACK (Technological Pedagogical and Content Knowledge). Integration of technology in learning refers to the use of technology to enhance students' learning experiences. Utilizing various types of technology in the classroom, including virtual classrooms, and the development of specific websites to create students who are actively involved with learning goals. The application of technology also creates a diversified learning path to meet the unique needs of students as individual learners in a broader and more dynamic classroom climate.

Website technology, for example, provides fast access to information, so its presence in the learning group is very important. Smartphones, computers, and tablets have

become elements of everyday life for students and educators alike. Thus, it is very natural that the use of technological devices in the classroom is explored to create meaningful learning experiences for students. Utilizing various types of technology in the classroom, including websites, will create students who are actively involved with meaningful learning goals. According to Drucker and Mayer [8], meaningful learning presents the knowledge and cognitive processes that students need to solve problems. Problem solving occurs when students think of ways to achieve goals that they have never achieved, namely understanding how to change a situation into a desired state. Mayer [8] further said that in solving the problem there are two main components, namely the problem description - students describe their problems in their minds - and Solutions - students make plans to solve the problem and implement them.

The application of renewable technology will also create different learning paths to meet the unique needs of students as individual learners in a wider classroom climate. The application of technology in teaching history classes, for example, will provide new experiences in learning and interpreting the social events they are studying. The historical tracing model based on technological pedagogical content knowledge with a web containing local knowledge values is projected to provide this learning experience, increase students' interest in the local environment, and make them enjoy every process in learning local social events. For this reason, from initial observations, this learning model is important to be developed through systematic stages.

By integrating local knowledge content into internet technology will also provide a database that can be accessed and discussed continuously with its many conveniences. Through such a learning process, it is expected that all learning activities from planning, implementation and assessment will provide strong support for the implementation of the Education for Sustainable Development paradigm.

4 Conclusion

In the development of the era in the world of education that continues to change significantly, so that it influences changes in the mindset of educators, from a lay and rigid mindset to a more modern one. Education is not only interpreted as a transfer of knowledge but also a transfer of values. The goal of education is to create someone who is qualified and has a personality so that they have a broad view of the future to achieve the expected ideals and are able to adapt quickly and appropriately in various sustainable development environments.

Local history learning that explores local social values through the application of the Historical Tracing learning model with its five phases as a supporter in the implementation of sustainable education, turns out to have a very central and real contribution because history learning has the following material scope knowledge content: (1) contains social values, heroic values, role models, pioneers, patriotism, nationalism, and an unyielding spirit that underlies the process of forming attitudes, behaviors, and personalities of students; (2) contains a repertoire of local social values and the culture of local, regional, and national communities; (3) instills awareness of appreciation, respect, unity and brotherhood and solidarity to become a united nation

facing future challenges; (4) contains moral teachings and wisdom that are useful in overcoming multidimensional crises faced in everyday life; and (5) instills and develops an attitude of responsibility in maintaining the balance of the surrounding environment in the context of sustainable development.

The application of technology in learning will provide a new experience in learning and also in interpreting the social phenomena being taught. The historical tracing model based on technological pedagogical content knowledge with a web containing local knowledge values is projected to provide this new learning experience, which will increase students' interest in the local environment, and make them enjoy every process and achievement in learning social phenomena at the local level. Furthermore, through such a learning process, it is hoped that all learning activities from planning, implementation and assessment will provide strong support for the implementation of the new paradigm of Education for Sustainable Development.

References

1. Utomo, Cahyo Budi. 2010. *Model-Model Pembelajaran Sejarah Yang Mengatiskan*. Semarang: Unnes press.
2. Joyce, Bruce, Marsha Weil, Emily Calhoun. 2009. *Models of Teaching. Model-Model Pengajaran. Edisi 8*. Terj. Achmad Fawaid & Ateilla Mirza. Yogyakarta: Pustaka Pelajar.
3. Widja, I Gde. 2002. *Menuju Wajah Baru Pendidikan Sejarah*. Yogyakarta: Lapera Pustaka Utama.
4. Barr, R.D, J. L. Barth, and S. S. Shermis. 1977. *Defining the social studies*. National Council for the Social Studies Washington, DC.
5. Piaget. J. 1976. "Piaget's theory," in *Piaget and his school*. Springer.
6. UNESCO. 2006. *Education-for-Sustainable-Development-Toolkit*. Diunduh 19 Juli 2024. https://hrea.org/wp-content/uploads/2021/04/Education-for-Sustainable-Development-Toolkit_English.pdf
7. Depdiknas. 2009. *Rencana Strategis Departemen Pendidikan Nasional Tahun 2010-2024*. Jakarta: Departemen Pendidikan Nasional.
8. Utomo, Cahyo Budi. 2022. *Pengembangan Model Historical Tracing Dalam Pembelajaran Sejarah Lokal SMA*. Laporan Penelitian. Semarang: Fakultas Ilmu Sosial dan Ilmu Politik. Universitas Negeri Semarang.
9. Anderson, Lorin W., David R. Krathwohl. 2010. *Kerangka Landasan Untuk Pembelajaran, Pengajaran, dan Asesmen. Revisi Taksonomi Pendidikan Bloom*. Yogyakarta: Pustaka Pelajar.

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