Learning media SWAY based on digital literacy: revitalizing climate change awareness in social studies classroom

Kirana Prama Dewi*
Department of Elementary Teacher Education, Universitas Ahmad Dahlan, Yogyakarta
*Corresponding author: kirana.dewi@pgsd.uad.ac.id

Abstract

Climate Change is a human issue requiring social, technological, and scientific solutions. Revitalizing climate change awareness in social studies classrooms is a positive thing that needs to be applied. Therefore, this research describes applying learning media SWAY based on digital literacy in social studies classrooms. The design of this study was descriptive qualitative research. In its study, the subjects are students in elementary teacher education. The analysis technique used is descriptive-analytic obtained from an interview, observation, questionnaire, and documentation during the learning process. The data analysis technique used the interactive model of Miles & Huberman with the stages of data collection, data reduction, data presentation, verification, and conclusion drawing. This study indicates that the learning media SWAY based on digital literacy is easy to understand and interactive in its presentation, gives a positive impression, and gets high enthusiasm from the students. In addition, climate change awareness can also be identified in the highly aware category. The finding implication of this study is that learning media SWAY based on digital literacy has a positive potential to be applied in social studies classrooms through the Studysaster learning model that is identification, search, plan, create, share, and Practice.

INTRODUCTION

The global environmental concern of the 21st century is human-induced climate change caused by the release of greenhouse gas (Masson-Delmotte, 2020). IPCC has an expected increase in the global temperature by about 2 – 3 degrees Celsius by the end of the 21st century (Intergovernmental Panel on Climate Change, 2014). This condition implies more frequent environmental disasters of higher intensity in the future. Human activity such as poor management of plastics, other non-biodegradable wastes, deforestation, industrialization, agricultural emission, and unsustainable use of non-renewable resources have been recognized as causes of climate change (Hounslow, 2018; Saha et al., 2017; Ussiri & Lal, 2017). The increasing content of greenhouse effects contributing to climate change can change the balance of seasonal temperature changes in many parts of the world (McNutt, 2015; Schuur et al., 2013). In May 2019, the earth's climate system sounded simultaneous alarms (Samenow, 2019), tagged by a warming arctic because of greenhouse gas release, stored methane, and carbon dioxide (Yumashev et al., 2019). Earth's extreme heat episodes are expected to increase dramatically. Ice on land continues to melt, including rapidly shrinking glaciers and reduced continental snow cover, increasing sea level rise (Pittock, 2017). Climate change is a condition that is required attention from all walks of life.

Basic knowledge about Climate change should focus on the young generation (Moser, 2010), whose lives will be more affected by climate change than any generation before (Ojala, 2012). Furthermore, the young generation should make effective decisions (Shapiro Ledley et al., 2017). To date, relatively few studies have been conducted on the desire of young people to

adapt to changes caused by climate change (Ratinen, 2021). The younger generation, as future educators, will be responsible for being able to create students to become challenging students with high integrity and the ability to adapt to all changes, including dealing with the environmental and social consequences of climate change (Corner et al., 2015; Hufnagel, 2015; Moreno-Fernández, 2020). The main aims of climate change education are revitalizing the young generation's climate change awareness, knowledge, attitude, and behavior to equip them with what they need to analyze and address climate change.

Climate change as an environmental issue has become part of the science classrooms (Carman et al., 2021; Siegner & Stapert, 2020). While science education is the most common channel for delivering and researching climate change education, several studies also emphasize that climate change education should be holistic, included in cross-curricular projects, and required to include in social studies classrooms (Kumler & Vosburg-Bluem, 2014; Pinto et al., 2019; Shapiro Ledley et al., 2017; Siegner & Stapert, 2020). The social studies classroom is ideal for incorporating climate change because of its media spotlight and politicized nature to engage students (Kumler & Vosburg-Bluem, 2014). Social studies classrooms play an essential role in injecting human capital awareness about climate change issues (Kumler & Vosburg-Bluem, 2014). Additionally, climate change's complexity and abstract concepts are relevant to social studies learning. Most importantly, climate change is a great topic to help students get good social studies learning outcomes. Furthermore, some studies suggest that the association between cognitive knowledge about climate change and behavioral implications, for example, adaptive personal lifestyle, adopting mitigation, and climate change awareness is not linear (Dijkstra & Goedhart, 2012; Rahman et al., 2014). The students should be motivated towards an environment-friendly lifestyle by calculating informed awareness in them to influence adopting a better climate policy by choosing pro-environment behavior.

Unfortunately, revitalizing climate change awareness is a challenging endeavor. First, many climate change issues are partly or entirely invisible, for example, greenhouse gases. Greenhouse gases are invisible to the naked eye, so that is difficult for students to grasp the concept. Second, many environmental degradations often occur far away from students' environment. This temporal, spatial, and social distance leads to a psychological disconnect, which has led to a lack of personal concern due to underestimating the severity of climate change issues (Duan et al., 2022). The third challenge is experiencing nature firsthand to develop connectedness with nature which is central to climate change awareness and pro-environmental behavior (Bruni et al., 2012). A final challenge is an instructional method and learning media, allowing students to gain information, knowledge, and behavior better than through the traditional classroom method (Brewer & Movahedazarhouligh, 2018; damico et al., 2015; Molthan-Hill et al., 2019; Yllana-Prieto et al., 2021).

Climate change awareness is essential for students in elementary teacher education. In addition to understanding the impact of climate change, providing knowledge about climate change is also one step to building awareness of protecting the environment. If students understand the climate change knowledge, students can know some of the impacts of climate change and the threats that will occur to identify positive and negative behavior that affect climate change. Numerous studies have shown that it is necessary to research further the appropriate awareness-raising of students of climate change in university education through innovative learning media, methods, and exercise as a class activity (Artal-Sevil et al., 2018; Jeong et al., 2021; Mochizuki & Bryan, 2015; Onuoha et al., 2021; Siron et al., 2021). The previous research used learning media with electronics-based, interactive graphs, text, audio, video, animation, and quizzes in one link, for example, Microsoft office Sway and Gamification, to instill climate change awareness patterns (Ardian et al., 2020; Betaubun & Nasrawati, 2020; Zutiasari & ., 2021). Several studies also use learning materials and indoor and outdoor activities to encourage behavioral change (Mbah et al., 2021; Onuoha et al., 2021; Ouariachi & Wim, 2020;

Siron et al., 2021). In general, previous research has focused on encourage the subject's behavior-related climate change issues through learning media, material, and methods. However, only a few studies have looked at expanding the scope of the application of digital literacy through learning media Microsoft Office SWAY and the *Studysaster* learning method on the issue of climate change.

This study describes how to implement learning media Microsoft Office SWAY based on digital literacy in social studies classrooms and explored perspectives to awareness of climate change for students who gained implement learning media SWAY based on digital literacy. The development of the use of technology spread to various fields, one of which is literacy. Digital literacy has a great deal and meaning because it is bound to humans influenced by behavior and personal use (Damico et al., 2018; Rowsell et al., 2016). Digital literacy is also a social practice involving the connecting through digital technology, such as Microsoft office SWAY. The benefits of Microsoft Office SWAY are that the material presented in learning can be interactive media, attractive, practical, and easy to use. According to a previous study, SWAY is a form of software that can create products that combine text, sound, video, and images when the presentation is run (Ardian et al., 2020; Zutiasari & ., 2021).

RESEARCH METHOD

This research is a descriptive qualitative study. Researchers describe the implement learning media Microsoft Office SWAY based on digital literacy in social studies classrooms and explored perspectives to awareness of climate change for students who gained implement learning media SWAY. Respondents in this study were students and lecturers. This research was conducted in elementary teacher education Universitas Ahmad Dahlan Yogyakarta. The data was collected using interviews, observation, documentation, and questionnaires. The instrument used in this study was the non-test instruments in a questionnaire, interview guide, observation sheet, and documentation list. A questionnaire is a data collection technique using questions in written form for respondents to get answers. Researchers conducted pilot testing to measure reliability and asked experts from the environmental field to validate the instrument of a questionnaire.

Furthermore, the measurement of reliability and validity was used SPSS 16 software. The reliability test result was 0.51, and the validity test was 0.72, categorized into reliable and valid instruments. The questionnaire can be categorized into the four multifaced dimensions of climate change awareness: knowledge, dispositions, competencies, and environmentally responsible awareness. Each of the dimensions consists of 17 questions with five points Likert scale. The questionnaire was translated into Indonesian and distributed via Google Form. The total response from the questionnaire distributed amounted to 80 responses from social studies classrooms who get the learning media sway through the studysaster learning model.

The data analysis technique used the interactive model of Miles & Huberman with the stages of data collection, data reduction, data presentation, verification, and conclusion drawing. In the climate change awareness, the framework is applied in the range of mean 1.0-3.0 = lowly aware, 3.1-4.0 = moderately aware, 4.1-5 = highly aware (ADB, 2011).

RESULTS AND DISCUSSION

Learning Media SWAY based on digital literacy

Learning media is helpful to complement, maintain, and even improve the quality and learning process. Learning media will increase student activity, learning motivation, and student learning outcomes. The accuracy of the use of learning media has a somewhat significant meaning. Materials that are difficult to explain can be conveyed through the media. The complexity of the material can also be simplified with the help of learning media. The abstraction of teaching materials can be concretized with the presence of learning media. The communication process in

learning will be more meaningful if supported by the delivery of good material assisted by learning media. With the development of information technology, software-based learning media applications have been widely used in learning. However, not all of them can be used simultaneously. So, it is necessary to have criteria and steps for media selection. The criteria for selecting learning media must be developed following the learning objectives to be achieved, conditions, and limitations.
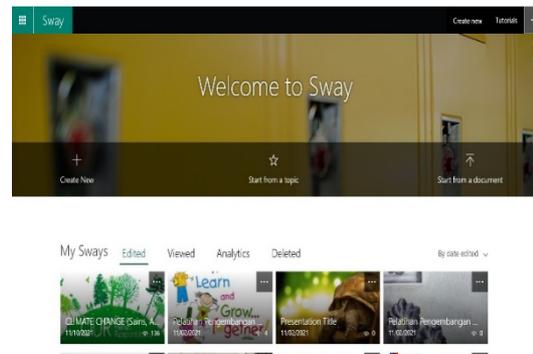

Figure 1. Sway menu interface

(a)

(b)

(c)

(d)

Figure 2. Sway Menu Interface (a) & (b), Content Presentation Interface with moving images and still images (c) & (d).

This study uses one program in Microsoft Office 365, namely the SWAY application. The SWAY learning media used in this study is based on digital literacy. This learning media help collect, format, and share ideas, materials, and presentations. With the Sway application, lecturers can easily add text, images, documents, videos, charts, links, and other types of content. The display of the sway learning media based on digital literacy used in this study can be seen in Figure 1 and figure 2.

Based on the analysis of interview data to students of the primary school teacher education, Ahmad Dahlan University, it was found that sway learning media based on digital literacy from aspects of content, media, and design received positive responses. Students stated that the digital literacy-based sway learning media improves the atmosphere in learning, increases interest in learning, is easy to use, the material is easy to understand, and is very effective in learning. These results are consistent with the previous research (Istiqomah, 2016; Sudarmoyo, 2018; Usman, 2020).

Microsoft Sway, moreover, allowed to showcase and to demonstrate students' digital literacy skills rather than another document with a picture and texts. The concept of digital literacy, in this study, is the ability of students to use digital devices and facilities to identify, process, evaluate a digital source to create new content that is communicated through certain specific contexts with others. Across this study, the students have continually pushed us to examine fundamental questions about identifying, process, and evaluating the reliability of online sources about climate change in learning media Sway. There are similarities to the findings from this study with the findings from previous studies, which stated that the learning media and instructional model emphasizes four components: select diverse sources, make thinking visible, traverse source multiple times, evaluation source used an online tool (Damico et al., 2018; Tang & Chaw, 2016).

Learning Media Sway Based on Digital literacy: Revitalizing Climate Change Awareness in Social Studies Classroom

The application of Microsoft sway learning media based on digital literacy is carried out in learning the Social Studies Elementary School Learning Materials subject by using the syntax of the Studysaster learning model. This learning model was chosen so that students have real experience mitigating climate change, revitalizing climate change awareness, and conducting a mini-project at the climate change project, namely the ecological project. The following is a description of the learning syntax in this study.

1. Identification. In the first steps, students discuss various existing disasters and the causes of disasters, one of which is climate change. The discussion was conducted through the zoom conference. Students have studied the material and received an explanation from the lecturer using learning media assisted by Microsoft Office Sway based on digital literacy. Students identified the definition, causal factors, symptoms, impacts, and mitigation of climate change disasters from this discussion.

2. Search. In the second step, students search for references in books, journals, web and then look for cases related to climate change in Indonesia. Then analyze the cases found and provide alternative solutions based on references or journals.

3. Plan. The third step is Plan, an ecological project that can reduce the impact of climate change, starting from individual behavior and then to families and communities. Students start this ecological project from simple concrete actions, such as saving water, saving electricity, doing 3R (Reduce, Reuse, Recycle), and reducing plastic waste. Then proceed to a broader stage, such as planting trees, having a craft day from used materials to sharing knowledge in the community.

4. Create. In the ecological planning project, in the third step, the students will create the design. In this step, students follow up on the ecological project that has been planned.

5. Share. In the fifth step, students shared an ecological project to educate others widely in the next step. Students invite their families and communities around their homes to participate in ecological projects.

6. Practice. In the last step, ecological projects that have been prepared must be practiced in everyday life so that what students do is not only at the conceptual level. At the end

of the lesson, students make reports related to ecological projects that have been implemented and presented in the classroom.

The Studysaster learning model in this research aims to provide systematic learning in organizing learning experiences, to maximize the integration of disaster education (pre-disaster, emergency response, and post-disaster) in learning activities. This finding broadly supports previous studies' findings, which stated that the studysaster learning model had a positive impact in the classroom and one of the strategies for disaster prevention and management (Puspitarini, 2021; Suparmita, 2021; Widyasari, 2021).

Based on table 1, the results of data related to climate change awareness vary based on questionnaires that have been distributed to students. In general, respondents' climate change awareness related to knowledge dimensions, especially those indicators correlated to climate change and global warming, the community situation, human being involved and responsible for climate change, are categorized as highly aware (M = 4.4). Respondents have strong beliefs related to the cause of climate change that cannot be separated from automobiles, industry, air pollution, fossil fuels, and deforestation. There are similarities related to findings from this study with the findings from previous studies that stated that automobiles, industry, and deforestation had impacted global warming and climate change (Hogarth, 2017; Olanrewaju et al., 2018).

Table 1. Climate Change Awareness Scores

Dimensions	Indicators	Mean
Knowledge	Being environmentally literate requires some degree of knowledge of climate change: the impacts climate change, the effects of climate change and global warming, the community situations, human being involved and responsible for climate change.	4.4
Dispositions	This dimension includes sensitivity, attitude toward the environment, assumption of personal responsibility, self-efficacy, motivation, and intention to act.	4
Competencies	In this, dimension are skills and abilities such as identifying, analyzing, evaluating, and making personal judgments concerning environmental issues, along with strategies to resolve these environmental issues.	4.2
Environmentally responsible behavior	This dimension includes behaviors people engage in both individually or in a group toward solving current environmental issues and preventing new ones (related to the action): inspiring the community to prevent climate change, encourage through forestation, energy conservation, 3R (reuse, reduce, recycle) programs.	4.1

Respondents' climate change awareness related to dispositions dimension is presented in Table 1. On average, they had a moderate climate change awareness (M = 4). There are interesting findings from the data related to the forestation program. Respondents' perceptions indicate preventing climate change through forestation and alternative energy usage. Respondents also have the perception to reduce the use of automobiles to prevent climate change. Meanwhile, recycling and energy-saving activities are seen as the last option. There is a consistency between the results of this study and previous studies. Previous studies discuss forestation programs to help prevent climate change (Carfora et al., 2017; Grønhøj & Thøgersen, 2017).

Respondents have highly categorized the competencies dimension to prevent climate change (M = 4.2). The recycling and alternative energy use program are more attractive to respondents. Respondents have a moderate concern to urge the government to reduce industry emissions, followed by issuing regulations related to the environment to prevent climate change. Moreover, respondents prefer the government to issue environmental laws instead of the reduction of automobile emissions, encouraging the government to reduce emissions in the industrial world. The reason for the respondents having such an awareness level is probably caused by the learning media sway based on digital literacy through the studysater learning model, which is proven to strengthen the level of awareness related to environmental issues and change individual behavior. The findings reflected the usefulness of digital literacy to increase the awareness of climate change (Tang & Chaw, 2016).

Regarding respondents' data in the environmentally responsible behavior dimension, the average respondent is high awareness (M = 4.1). Respondents are highly concerned related to the actions of respondents in inspiring the community to prevent climate change. Moreover, respondents are highly concerned about encouraging communities to act through forestation actions. Respondents were also concerned related to energy conservation and factory emission cessation programs. The recycling and fossil fuel reduction programs were highly concerned. Forestation occupies the highest position related to the actions suggested by respondents to the community, followed by energy conservation.

Meanwhile, respondents also encouraged the community to stop industrial pollution, followed by 3R (reuse, reduce, recycle) programs and reducing fossil fuels. Based on this data, respondents are highly concerned about encouraging the community to implement the ecological project in the studysaster learning model. This result aligns with previous research, which found that the studysaster learning model can motivate and attract students to encourage the community to carry out the ecological project (Puspitarini, 2021; Widyasari, 2021).

Based on the results obtained from this study, several implications can be applied to higher education. Policies in the form of focusing learning on the issue of climate change awareness can be applied primarily to social studies classrooms through various approaches, including environmental literacy, learning media sway, and the studysaster. In addition, the results of learning models can be developed to increase awareness of climate change which also encourages the action of climate change awareness. With the intervention to increase awareness of the environment, students are expected to become initiators of change in environmental conservation.

CONCLUSION

This study generally found that the level of climate change awareness among students in elementary teacher education Universitas Ahmad Dahlan who had applied to learn media sway based on digital literacy through the studysaster learning model was the highly aware category. This study indicates that learning media sway based on digital literacy is limited to two meetings in the social studies class, resulting in high climate change awareness. This research underscores the potential usefulness of digital literacy and the studysaster learning model to increase climate change awareness of being able to act concerning environmental issues. The limitation of this research is the application of learning media sway based on digital literacy through the studysaster learning model that is only done at two meetings. Further research can assess the long-term effects of digital literacy and the studysaster learning media applied to social studies classes with environmental themes. Another possibility of further research could be to develop learning models that emphasize the element of digital literacy. The use of Microsoft office SWAY or other application through the studysaster learning model in social studies classrooms with environmental themes increases student awareness and concern to act on climate change issues.

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