

IMPROVEMENT OF ECOLOGICAL INTELLIGENCE THROUGH EDUCATIONAL COMICS AS A OF LEARNING RESOURCES

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Abstract. Ecological intelligence is applied in everyday life. To maintain environmental balance. Referring to the regulations that follow the 2013 curriculum recommends innovative learning sources and is in learning objectives. This article aims to describe the increase in ecological intelligence through comics as a learning resource. This article uses a literature approach to describe the topic systematically. Ecological intelligence is formed after students and society receive education to build awareness about the importance of being part of nature. In the end, they can make the right decisions. Comics that are packed with funny characters and colorful pictures are more interesting for learning. Comics offer a visual aspect with short explanatory text. As a source of principles for the development of learning resources.

Keywords: Ecological intelligence, comics, and learning resources

1. PRELIMINARY

Humans and the environment are a unit that is bound to one another. Humans experience birth, growth, development, death, and so on is the essence of the natural law they have. Humans are manifested as a physical and spiritual unity that characterizes their autonomy (Muhaimin, 2014). The process of physical growth and spiritual development, to the benefit of its natural abilities for the benefit of the individual himself (Anurrahman, 2009). However, humans in a social context are social creatures where each growth and development is used not only for personal gain (Odum, 1993; Mufid, 2010).

As perfect beings, humans are endowed with a mind that develops and can continue to be developed over time (Gilbert, 2003). This uniqueness is what makes humans different from other living things on earth. Humans can maximize the environment in the form of utilization for the benefit of their lives. Over time the human population on earth is increasing. This phenomenon is an essential factor in environmental problems. The needs for housing, food, fuel, and family waste have become environmental damage problems to date. It takes environmental awareness values that are applied in everyday life. To maintain ecological balance, the use of the earth's resources can be done through environmental education (Weber, 2020). Environmental education or environmental education according to the Union for the Conservation of Nature and Natural Resources (IUCN) 1970 Defined as:

"The process of recognizing values and clarifying concepts to develop skills attitudes necessary to understand and appreciate the interrelatedness among man, his culture, and biophysical. Environmental education also entails practice in decision making and self-formulation of code of behavior about issues concerning environmental quality" (Palmer, 1998).

The definition above explains that Environmental Education is encouraged to understand how to understand the relationship, concern between humans, culture, and the environment. Environmental awareness for all human beings on earth is done at the school level. *Environmental education* can be responded to by various subjects without exception Economics which is presented at the high school level (SMA). It is understood that economic subjects have material content regarding resources that have limitations to meet unlimited human needs. In simple terms, it is called scarcity (Zulkifli, 2014).

The aim is that in economic learning, students can understand several economic concepts to link economic events and problems with everyday life; displays a curious attitude towards several economic concepts; forming a wise, rational, and responsible attitude by having knowledge and skills in economics; and making responsible decisions regarding socio-economic values (Weber, 2020). Thus, students can develop the ability to



become economical by recognizing various economic facts and events, understanding concepts, and relating events to economic problems in everyday life.

To understand the concept of scarcity, which is presented in economics, of course, students must have insight into ecological intelligence. This is intended so that students not only focus on meeting needs but also keep the environmental sustainability. Therefore we need material content directly related to students, one of which is local wisdom (Sanjaya, 2007). In addition to content designed to dance, digital-based learning resources are needed.

Digital-based learning resources are a trend in learning in the millennial era. Based on the research results of Ani Nurwijayanti, Budiyo and Laila Fitriana (2019) in the Journal on Mathematics Education entitled "Combining Google SketchUp and Ispring Suite 8: A Breakthrough to Develop Geometry Learning Resources" explains that learning resources for geometry on solid-curved objects use Ispring Suite 8. with 3D effects that are supported by Google SketchUp, effective and easy for students. Thus, teachers do not need to be "allergic" to renewal. The design of learning resources can be adjusted according to the competencies achieved. Therefore, to provide ecological intelligence skills, it must be responded to from various subject disciplines.

Contextual learning through regulatory references that follow the 2013 curriculum recommends innovative learning sources and is in learning objectives. However, conventional sources are still loved because they are relatively cheap and easy to use (Muhaimin, 2014). Such a view forces learning innovation not only to be based on demands for changes in learning models and textbooks as in previous research. In contrast to this view, this study offers comics as learning resource development. This article aims to describe the increase in ecological intelligence through comics as a learning resource.

2. METHOD

This article is based on a literature study. A literature study is a theoretical study based on references, books, and related journals describing the increase in ecological intelligence through educational comics as a source of economic learning. Literature review using books and journals. The article is descriptive, using a structured narrative (Gunawan, 2014; Nasution, 2009). However, besides the literature study, this article uses the author's empirical approach. Thus, it is expected that ideas are rational, formed by individuals through experience (Nasution S., 2003).

3. RESULTS AND DISCUSSION

Ecology means knowing living things in their homes or knowing where living things live (Miller in Sumaatmadja, 2012). Kandeigh (in Juslan, 2015, p. 15) explains that ecology is studying the interrelationships between organisms and their environment. Sumaatmadja (2012, p. 29) describes that ecology has three main elements, namely:

"1) Elements of Organisms (living things), namely plants and animals (humans are included in the group of animals). The group of plants and animals (non-human) includes macro organisms and microorganisms. 2) Elements of relationships (relationship interactions). 3) The environmental element of a living organism is everything around the organism that affects its life.

In the concept of ecology in general, the environment is distinguished between an abiotic environment and an abiotic or organic environment. The concept of ecology cannot be separated from the environment. The position of the environment in the ecological concept is significant (Zulkifli, 2014). So people sometimes, when talking about ecology, are often identified with the notion of the environment. The environment contains a comprehensive understanding. The environment can mean all conditions, situations, objects, and living things (organisms), which affect life, growth, and the traits of character of creatures (Sumaatmadja, 1989).

Ecology is the fundamental science for questioning, investigating, and understanding how nature works; how the existence of living things in living systems; what they need from their habitat to sustain life; how do they make ends meet; how do they interact with other components and with other types; how individuals of this kind adapt; how living things face limitations and must be tolerant of various changes; and how individuals of one kind experience growth as part of a population or community.

A conceptual framework that integrates biological, cognitive, and social dimensions is associated with the concept of eco-literacy to foster environmental awareness (Mufid, 2010). Orr's and Capra in McBride et al. (2013, p. 14) define ecological intelligence, namely "... eco-literacy, defined as an understanding of the principles

of the organization of ecosystem and application of those principles for creating sustainable human and societies .." Amirullah argues that ecological intelligence combines cognitive skills with empathy. He said:

Ecological intelligence combines cognitive skills with empathy for all forms of life. Social and emotional intelligence is built on the ability to see others' point of view, feel what others feel, and show our care. Ecological intelligence extends this capacity throughout natural systems. We show such empathy when we feel sad at the signs of the earth's "suffering" or are determined to make things better. This pervasive empathy enhances rational analysis of causal elements and influences motivation to help (p. 3)

Stone (2010) explains that forming a sustainable society is closely related to ecological intelligence. Understanding the basic principles of ecology is closely related to the value of skills and beliefs to act on this understanding. To achieve the goal of ecological intelligence, education is needed that emphasizes aspects of knowledge and meaningful learning that unites knowledge, skills, attitudes, and culture.

Ecology and culture form a framework of thought and attitude towards the local environment and the natural surroundings where each element is interrelated. Ecology and culture both in theory and practice result from self-awareness and through various elements of environmental education as expressed by Reid et al. (2010, p. 429) that "... ecologies and culture serve to enframe the discourses of environment, place, and nature in the educational setting, and how each is inflected therein; that is how they provide both the context and text for a social- ecologically grained selfhood engaged through and by the possibilities of environmental education".

Ecological intelligence is formed after students and society receive education to build awareness of the importance of being part of nature. In the end, they can make the right decisions (Mutiani M., 2017; Hidayanti, Syaharuddin, & Mutiani, 2020). Ecological intelligence emphasizes the role of scientific knowledge and ecological thinking in identifying causal effect relationships in environmental, social systems, allowing greater clarity in decision making (Mutiani & Utami, 2014). Therefore, the main pedagogical goals are cognitive and experimental. Ecological intelligence can be included in learning through appropriate learning sources, namely comics.

Comics as a source have their characteristics. If an artist says, "A picture is a thousand words," and a writer says, "A word is a thousand pictures." Comics have both "image power" and "word power." Because comics are source imagery between films and books, comics are a Visual Literary language that fills the spaces between the two sources. Comics are an art form that uses immovable images arranged in such a way as to form a storyline. In this case, images draw a cartoon character (a character can forget an animal, plant, or an inanimate object). Comics are printed on paper and equipped with text (Nasar, 2006).

Comics can be published in various forms, from strips in newspapers published in magazines to separate books. Or some think that comics are a world of speech, a series of pictures that tell a story in reading this image. The value is the same as reading maps, symbols, diagrams, and so on. Comics is a powerful source of communication. The functions that can be used by comics include comics for educational information. Comics for advertising, as well as entertainment. Each type of comic has specific criteria that must be met so that the message to be conveyed can be clearly understood. Comics for educational information, both stories, and designs are specially designed to convey educational messages. The core of the message must be received clearly.

4. CONCLUSION

Ecological intelligence is the human ability to adapt to the ecological niche in which humans exist. Ecological intelligence is an ability or competence that students have to respond to conditions that occur around their environment and apply them in their daily lives—ecological intelligence in terms of naturalist intelligence. According to him, naturalist intelligence is the human ability to understand natural phenomena, show ecological awareness, and demonstrate sensitivity to natural forms. Ecological intelligence combined with learning. Factual sources used are comics. The source of the comics is by presenting pictures with a series of storylines. The pictures presented are, of course, inseparable from comic principles.

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