Geographic information system in education

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Abstract. The purpose of the study this is to know how to work Geographical Information System (GIS) which can in be applied in educational vocation. The method of writing a paper is done through a literature study. The author analyzed 30 papers from the years 2014 to 2019 on the role of GIS in education vocational. Search results illustrate that GIS is a system of information-based computer that combines the elements of the map (geographically) and the data on the map of the (data attribute) that is designed to insert, processing, analyzing and displaying the data spatially are referencing the condition of the earth. The role of GIS is very reliable in helping the activities of learning are related to aspects of spatial.

1. Introduction
Technology gives contributed to the improvement of the efficiency of the work of man, has been duly every form of activity to adapt and maximize the breakthrough of changes in technology, do not close the possibility also in the process of learning. Educational vocation is education that is designed to develop the skills, abilities / skills, understanding, attitudes, habits of work, and appreciation are needed by workers in entering work and make progress in the work of the full meaning of d late productive [1-8].

A recent breakthrough relating to how to process information is presented in the form of a geographic information system (GIS) that can be used in vocational education. System Information Geographic (GIS) is a system of information that is based on a computer, is designed to work by using the data that has information about a spatial (referenced spatial). The system is capturing, checking, integrating, manipulating, analyzing, and displaying data that is spatially referenced to condition earth [9-11].

Technology GIS integrating the operations of public databases, such as query and analysis of statistics, with the ability of visualization and analysis that is unique which is owned by mapping. The ability of this that distinguishes GIS with System Information others who made it into useful various circles to explain events, to plan strategies, early to predict anything that happens [6,12].

The author analyzed 30 papers from the years 2014 to 2019 with the method of study literature about the role of System Information Geographic (GIS) in substance utilization. The purpose of the study this is to know how to work Geographical Information System (GIS) which can in be applied in educational vocation.

2. Method
The research method uses "Systematic Literature Review". The first process is a journal search that is used to identify several proceeding journals from 2014 to 2019 from a data base source through the Google search engine. Journal results obtained are then identified and analyzed for data and content. The final process provides conclusions and analysis results.
3. Results and discussion
The application of GIS in vocational education is expected to be the basis for curricular decisions. The use of GIS in education vocational them organize the data and informant who displayed are geographically so it can be known distribution and patterns that form and can inventory the education infrastructure, GIS also provides a convenient in informing the elements - simple elements associated with daily educational activities - Today, such as zoning schools were informed within the school closest to settlement. GIS is a way that is easy to connect multiple eyes lessons to map [2,13]. Ideally, GIS in the educator's vocation can deliver information accurately the source of data that can be in validity and modified by linking the elements of the data spatially, so easily understood by the public users and decisive policy [14].

Data Spatial is the data point to position the geography of where each characteristic has a location that should be defined right in a way that is unique in determining the position is absolute based system of coordinates. For areas smaller, the system coordinates the simplest is ordinary rectangular grid [15].

Characteristics of GIS is the ability to analyze a system such as the analysis of statistics and overlay the so-called analysis of spatial. Analysis by using the System Information Geography that is often used with the term analysis of spatial, not as system information that the other is to add dimension 'of space (space') or geography. Combination describe attributes-attributes in a variety of phenomena such as the age of a person, the type of road, and so on, which are together with information such as where a person lived or location of a road [5,12].

Presenting GIS in learning, in a specific aspect of science and skills especially in vocational education can increase knowledge about spatial thinking [14]. Thinking spatial is one of the forms of thought among the forms of thinking more, such as verbal, logical, statistical, hypothetical and so on. Thinking spatially, it itself is a set of capabilities cognitive, consisting on three elements, namely space (space), tools (tools), and the process of thought or consideration (process of reasoning) [5-7,16,17]. The understanding would be the sense of space, for example, its size, its proximity, can be used as a tool for composing problems, find answers, and communicate the solution. By expressing relationships within the structure of spatial, for example a map, then we can perceive, remember, and analyze the properties of static and dynamic objects and the relationship with objects other.

Spatial thinking can be learned and can be taught at various levels of education. The importance of spatial thinking is conveyed in education [16], namely:

- Spatial thinking is a set of cognitive skills.
- Spatial thinking is integrated in everyday life. People, natural objects, man-made objects make up the space and interactions between people and objects must be understood in the context of location, distance, direction, shape, and pattern.
- Spatial thinking is very powerful in solving problems by managing, transforming, and analyzing data, especially complex and large-volume data and communicating the results of the process to himself and others.
- Spatial thinking is a daily place for experts and engineers, and is a supporter of many scientific and technical breakthroughs.
- Spatial thinking is a skill that can and should be learned by everyone.
- Spatial thinking develops uniquely for each person depending on one's experience, education and tendencies.
- Spatial thinking is a complex, very powerful, challenging and support system that provides an interactive environment where spatial thinking can take place by helping students spatialize data sets, visualizing work and end results, and demonstrating analytical functions.

GIS is a reliable support system for spatial thinking. GIS can act as a tool to support spatial thinking. In it is the integration of hardware and software as well as the procedures that have the capability for collecting the data, management, manipulation and analysis, modeling and display the data that has reference space [4].
Downs and Desouza [7] suggests that GIS is a tool that is very useful in conjunction with education as a system support (support system) to think spatially. According to him the key to spatial thinking consists of three elements namely the nature of space, a tool or method for representing spatial information, and the process for giving reasons. By understanding the meaning of space, such as size, sequence / continuity, closeness, separation and others, it can be a means to formulate problems, find answers and submit solutions.

The effect of learning-based GIS on spatial skills has researched by Lee and Bernarz [5]. Tests ability or skill spatial used to test the effect of learning with the use of GIS to the ability of spatial. Although carried out on students of a college high, but at least can give a picture of the relationship between activity and experience using GIS with the ability to think spatial. Score results of the test the ability of spatial between before and after the activity showed a change that significant.

In school secondary, reported that the school that students using GIS have score more high in tests analysis of spatial compared with students who use the methods of traditional. The group of students who use GIS shows the ability is high in identifying, synthesize, and describe patterns of human and physical [18].

Based on the results of the survey were conducted by Kerski [16] of the 1520 teacher school secondary showing most substantial (80%) agree that GIS provides advantages in spatial teaching, approximately 1.8% stated not provide profit sharing as well, and others (10%) not giving any opinion.

GIS has become a component essential that sangat neeeded in education in the process of learning, especially in education vocation to boost the ability to think spatially [14]. Given that the technology geospatial has evolved into a technology flows principal, approach to education that is only based on the science of computer/information-related disciplines of science particular does not affect in of the overall education of GIS [19], because of the technology that is used in the technology of geospatial requires deepening on understanding of geographical concepts [19].

4. Conclusion
The central role of GIS as a device for processing and presenting spatial information has become important in the technological era. Application of GIS in learning by using the approach of learning technology succeeded in improving think spatially. SIG has been able need for learning and the purpose of learning for students that improve cognitive abilities, affective and psychomotor. The ability to think spatially as the core of learning the condition of the earth is greatly assisted by GIS.

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