

Spatial modeling vocational education development to support regional potential

Agus Wiyono¹, Abdul Hakim², Endah Setyowati² and Agus Suharyanto³

¹*Doctoral Program of Environmental Science, Brawijaya University Malang Indonesia and Department of Civil Engineering, Faculty of Engineering, Surabaya State University, Surabaya, Indonesia.*

²*Department of Public Administration, Faculty of Administrative Science, Brawijaya University, Malang, Indonesia*

³*Department of Civil Engineering, Faculty of Engineering, Brawijaya University, Malang, Indonesia*

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ABSTRACT

Vocational education is education that provides life skills as needed rather than potential in a region, so the most important is how to formulate a vocational education that provides the necessary competencies in an effort to support the potential of the region and the public interest. Vocational education has an important role in overcoming the human resource crisis so that development needs to be done to meet the needs of the labor market in the business world and industry with reference to increasing the potential of a region. Given the potential of a region required spatial modeling, so that each region can be known spatial development of vocational education. This study aimed to determine factors affecting vocational education development to support regional potential were found by using Delphi method. To see regional potential spatially using geographic information system tools, those factors found were distance (between resident and school), population, number of junior high school students, road network, public transportation, land price, disaster prone, natural resource production, society participation, government commitment (policy-making), human resources of school managers.

Key words : Vocational education development, Vocational Senior High School, Regional potential

Introduction

According to data obtained from the Education Department in 2016, there were 2 units of public vocational schools, and 46 units of private vocational schools. Based on equal access to education, it showed unevenly in each region or sub-district. Hence, government's necessary to build vocational senior high schools especially in areas without any access to vocational education. From preliminary survey at two Vocational senior high school, it was obtained that 2 units of public vocational senior

high school were located in Kalianget District, and Batuan subdistrict.

This location was selected because total population aged 16-18 years was 46,635 people or 31.38% of 148,632 people in Sumenep remain in those two areas, whereas the remaining 68.62% or equivalent to 101,991 people were spreaded in other 25 districts. These numbers shows that comparing between total area and population, the vocational senior high school is inadequate.

Research Question

It is necessary to develop vocational education solu-

*Corresponding author's email : aguswiyono02@gmail.com

tions by inventorying factors affecting the development of vocational education in order to support the potential of the region. Thus the formulation of the problem as follows: What is spatial modeling the development of vocational education to support the potential areas?

Scope and Limitations of the Study

Scope of research area in Sumenep Regency Madura, while the substance of this research is limited to make spatial modeling of vocational education development in support of region potency in Sumenep Regency. The vocational education here is Vocational High School (SMK).

Literature

Policy in Education Development

Education is a very important, because in the era of knowledge-based economy, quality of education is possibly to elevate the nation in many ways, for examples in economy, health, prosperity, competitiveness and technology. In the social context, the purpose and content of vocational education is linked to the growing needs of the Business World and the Industrial World. Vocational education plays an active role by determining the level and direction of community change in the field of vocational. Education with dual functions is as a means of cultural preservation and as a medium for the occurrence of social change.

Education is inseparable from human life that always grows and changes. Education is a basic and absolute necessity and is always needed. Education policy deals with decisions relating to the improvement and improvement of the organization of education. The long-term education development refers to Law Number 17 Year 2007 on the National Long-Term Development Plan for 2005-2025. The alignment of the education development focus in each stage was formulated in the Long-Term National Development Plan 2005-2025. In medium-term planning, it was possibly adjusted or improved according to the current condition through the National Medium-Term Development Plan.

Education for Sustainable Development

Human Resource Development shows a paradigm shift in education by emphasizing and promoting processes such as critical thinking, problem-solving, developing holistic vision, thinking systems and

logical-oriented futures-related relevance extends also to inter-sectoral and interdisciplinary approaches that are translated into identifying interconnection in teaching, learning and research. It showed interdisciplinary links assisting general skill development in 'connecting-thinking' which was transferred to practical situations (UNESCO, 2008).

In the last decade, many researchers and practitioners had called for evaluation of HRD programs (Jacobson *et al.*, 2006; Carleton-Hug and Hug, 2010; Zint, 2011). Monitoring and evaluation are identified as key strategies for implementing ESD (UNESCO, 2005) and national policy initiatives and HRD related strategies were underway (Erdogan and Tuncer, 2009). The effectiveness and value of this initiative, together with the measurement and evaluation of their progress, remains open questions for policymakers, academic researchers and practitioners (Reid *et al.*, 2006).

Education in Local and Cultural Relativism Context

The general methodology of program evaluation included the National Foundation for Research (NFER) by implementing "citizenship" Curriculum in the UK (Kerr, 2006), or BLK "21" Program in Germany (de Haan, 2006) as well as the generic EFS checklist (Schroter, 2010). However, it was unclear whether national evaluation studies or examples of best practice were universally applicable in other countries, as many anthropologists have pointed out (Owens, 2012). A broad work on class ethnography involving ethnographers to enter the "lesson" world through participant observation has not been fully employed in formal educational settings to address ESD.

How ESD practiced greatly differs in their socio-political priorities, as do democracies surrounding their educational institutions, as well as a number of other historical, socio-cultural, political, ecological and economic factors. Some types of ESD focusing on social and health justice are more appropriate in some circumstances, for example, issues related to reproductive health in developing countries; while more environmental-effects of the problem are more appropriate to others, such as the problems concerned with the consequences of high levels of consumption in the more affluent West society. The diversity of institutional arrangements was interpreted in the context of broader socio-cultural influ-

ences in which both formal and informal learning takes place (eg see recent work by anthropologists in the EE field (Zarger, 2010; Efird, 2011; Kopnina 2013; Anderson, 2012).

Competence Education

The term “competence” in the context of educational issues, is technological progress and globalization coupled with new challenges that must be mastered: enhancing individualization and developing social diversity, accompanied in parallel by expanding economic and cultural uniformity, availability of rapidly growing information, to cope with increasing complexity and uncertainty. This term is used to describe “in the future the ability to modify and shape the futures of our societies through active participation in sustainable development”. “*Gestaltungs kompetenz*” includes the following eight key competencies among others a) Competence in foresighted; b) Competence in interdisciplinary work; c) Competence in cosmopolitan perception, cross-cultural understanding and cooperation; d) Participatory skills; e) Competence in planning and implementation; f) Capacity for empathy, compassion and solidarity; g) Competence in self-motivation and motivating others; and h) Competence in reflection distances on individual models and cultures.

Sustainable development requires social modernization and can only be realized through the active participation of competent citizens; Therefore the concept of “*Gestaltungs kompetenz*” is characterized in particular with the major competencies necessary for future and autonomous participation in shaping and developing continuing education. Competent education here adapted to the needs in the development of potential areas of course.

Human Resource Education Development through Vocational Education

One of the policies of the Ministry of Education and Culture in developing human resources at Vocational Senior High School introduced in 1993/1994 was the education of Link and Match, meaning that Vocational Senior High School education must be link and match to the needs of students and community to create a suitability between education programs and the needs of community. The link and match policy for vocational secondary education was carried out using Dual System Education program. For vocational education institutions, DSE

is necessary as it influences the graduates to face working world. DSE program is a policy to prepare vocational students to be ready and understand the demands of working world.

In contrast to Singapore and Hong Kong State policy efforts, the establishment of an educational center was a natural platform in recruiting foreign workers especially students and researchers. Singapore pursued it more aggressively than Hong Kong because of the implications of declining birth rates and the nearest economic competition (Government of Singapore 2013). Meanwhile, Hong Kong had China to buffer shortages in urban manpower planning. (Lee, 2014).

Public Interest in Vocational Education

Based on Constitution of the Republic of Indonesia Year 1945, one of the national goals is to educate the life of the nation and to equally obtain the best education according to one's interests and talents without differentiating in social status, race, ethnicity, religion, and gender. Thus, the development of education should concern to learners interest. Interests can be interpreted as the power emerging within the individual to act. Interests greatly affect individual in accepting a certain object and those are influenced by 2 factors, namely:

- a) Internal factors, such as Individual talents and Academic achievement
- b) External factors, such as: family social-economic condition, including Education background of parents, Family income and parents' professions and Number of family

Although attention is directed to the recruitment of international students, developing local talent remains a fundamental goal of educational relationships. Talent development including workforce planning and inclusive provisions that support different interests of local students. On the other hand, the educational relationship does not share the purpose of attracting foreigners and repatriating diaspora talents. Contextual factors such as different political economies and ethnic sensibilities mediate the recruitment of external talents. (Lee, 2014). By allowing foreign providers to build campus, host countries are eager to massify higher education, increase research capacity, and enhance the overall excellence of the education system. Importantly, the educational relationship is also interested in developing human talent to compete in the global knowledge economy (Cheng, 2010; Knight and Lee, 2014).

Previous studies on educational relationships provide limited analysis of talent development or focuses only on foreign talent (Chan and Ng 2008; Knight and Morshidi, 2011).

Research Methodology

Explorative study is to examine the relationship amongst the regional potential in order to define the concept of vocational education development in Sumenep. Case study was carried out in conducting this study strated from problems arisen from vocational education development in potential areas in Sumenep.

Sampling and Population

Sampling used in this study was purposive sampling due to (1) background of the respondents (experts) in local education and economy as well as (2) limitation of time, cost and power. Purposif sampling was conducted by determining certain targets or predefined respondents. These are the sampling according to defined technique, including Education Department of Sumenep, BAPPEDA Sumenep (Social-Cultural division), and Scholars. People who graduated from university or had high intelligence

- Community organizations (educational board)
- Regional House of Representative of Sumenep

(D division of education)

- Education and Culture Department of East Java Province (Vocational Education Division)

Data Analysis

Gradually, the accumulated data was interpreted into the general picture for subsequent analysis according to data allotment in the analysis. This study applied blending quantitative technique. Quantitative technique used hierarchical process analysis.

Analisis Scoring

Scoring method used is to multiply the weight value of each factor and sub-factor of AHP results with the existing condition. This multiplication is intended to obtain the most objective weight value that is the opinion of experts and the existing conditions in the field, so that the inaccurate determination of the location of Vocational High School in the area can be minimized. To determine the degree of conformity of SMK location in Sumenep Regency done by giving score weight on each factor and sub-factor which influence on Vocational High School location determination.

Determination of Location vocational high School in support of area potency by using Geographic Information System

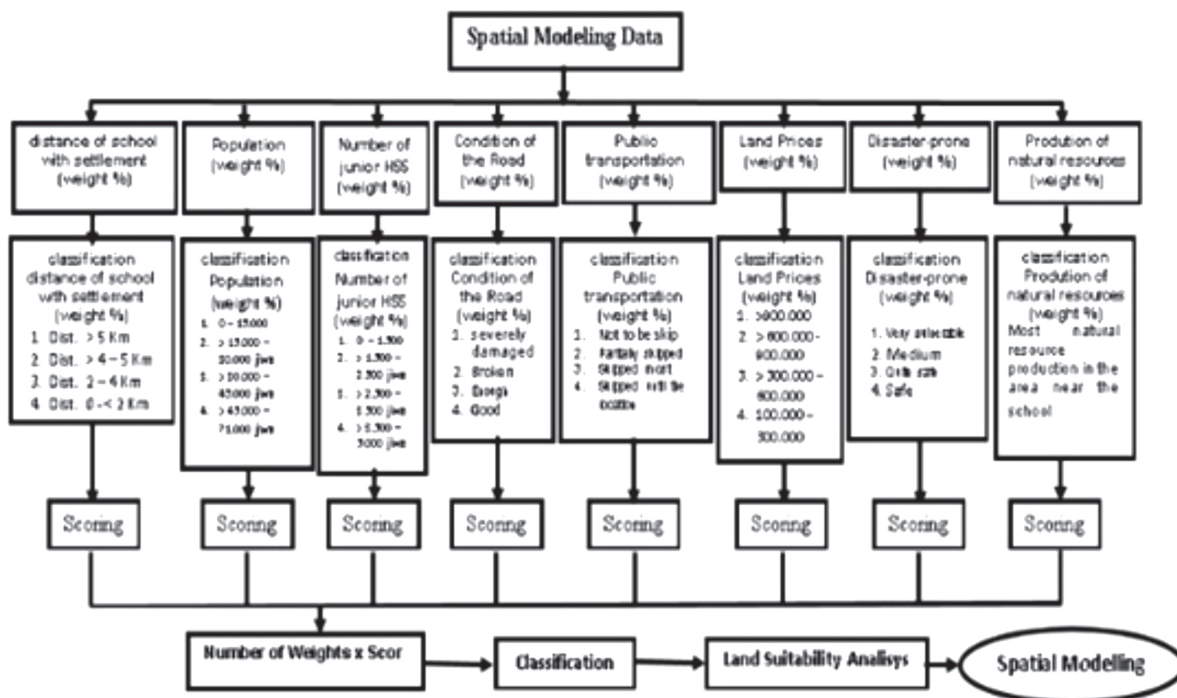


Fig. 1. Spatial Modeling Flow Chart

Determining the location of vocational high school development in supporting the potential of the region in Sumenep district using geographic information system analysis by including influential factors with graphical data (spatial) and data attribute. Spatial data is a thematic map of the district, sub-district and village administrations, as well as thematic data of contour road network and river network. This data is taken from BAPPEDA of Sumenep regency. While attribute data include data number that we take from survey result of Central Bureau of Statistics of Sumenep Regency which summarized in Sumenep Regency in Figures 2017.

Graphic data and attribute we qualify by giving 4 categories and multiplied by the weight of the results of Analytical Hierarchy Process using MS. Excel. Spatial Factor analysis process is done by using Geographic Information System Software (GIS) to determine the location of Vocational High School Development. Conducted Description to determine the Location of Vocational Education Development by compiling non-spatial factors and analysis results Geographic Information System (GIS)

Inserting distance factor

The proximity of the location of SMK with the settlement makes one of the factors that influence the development of vocational schools in the area because it can increase community motivation in studying with affordable distance school.

Inserting population factor

The number of population is the factor that influences the determination of the location of Vocational High School; this is because access to get service or service coverage should be evenly distributed to all communities, especially remote areas or islands.

Inserting number of Junior High School students factors

From the result of factor analysis of the number of junior high school students seen good locations exist in the district Sumenep, Guluk-guluk, Pragaan, Arjasa, Ra'as, Sapeken, Lenteng, and Bluto. It will be better if the Vocational High School is established in a region with a large number of junior high school students and upper secondary school is less so that in accordance with the goals and objectives of education.

Inserting Public transport availability factor

The availability factor of public transport is a decisive factor because the community desperately needs faster access if something happens, for example, students have to complete the parental duties at home and late or wake up late they really need quick access to school or vice versa at home from school.

Inserting of Road Condition Factor

The factor of road conditions becomes decisive because access to schools should be good, both for the benefit of the community and the need for access to their own schools to be comfortable and fast. The location with an average road network is good except for the heavily damaged Arjasa sub-district, while the minor damaged in the sub-district area; Pasongsongan, Lenteng, Mandingand Gapura.

Inserting Land use factor

Land use becomes the determining factor of location of a vocational high school construction because the location of the school construction should not violate the spatial and territory set by the local government. The location is very appropriate located in the sub-district areas; Kangayan, Ra'as, Sapeken, Nonggunong, and Gayamserta Ambunten and Pasong-songan. Besides the area is the appropriate category except in the sub-district; Kalianget and Sumenep.

Inserting Land condition factor

The land condition factor determines the location of the vocational high school, since the school to be built should meet the comfort and safety element of the disaster threat. Both flood and landslide disaster, the land should be free so students feel safe and comfortable in the learning process.

Vocational High School of distribution factor

The factor of vocational High School distribution becomes the factor of determining the location of vocational high school development because it is related to equality of access to vocational education in all areas in Sumenep regency. From result of spatial analysis of factor of Vocational High School distribution in get location that very suitable and suitable cover almost all districts area, except that not suitable only at Pragaan sub-district and less suitable consist of sub-districts; Guluk, Lenteng and Bluto.

Inserting of Potential of Natural Resources Factor

Natural resource potential factors make the benchmark of the school location used to print human resources that support the potential of the region, so that the potential of natural resources can be improved, and the competitiveness and production output also increases with the competent human resources in accordance with the areas of expertise needed.

Spatial Land suitability analysis uses geographic information systems

The degree of land suitability of all spatial factors can be determined that the appropriate sub-districts include; Pragaan, Guluk-guluk, Sumenep, Batang-batang, Ambunten, Arjasa, Gayam, Bluto, Rubaru, and Sapeken. These ten sub-districts are a priority of vocational high school development on the basis of equal access to vocational education. The results of the land suitability analysis can be seen in the figure 11 below. The result of spatial analysis will be compiled with modeling based on scoring analysis, so got the result that is the location of Vocational High School development by looking at the potential of its area as the basis for determining the field of expertise to be opened.



Fig. 2. Result of Land Suitability Analysis

Conclusion

The result of spatial analysis using geographic information system obtained location with land suitability with priority scale exist in sub-district; Pragaan, Guluk-guluk, Sumenep, Batang-batang, Ambunten, Arjasa, Gayam, Bluto, Rubaru, and Sapeken. These ten sub-districts are a priority of vocational high school development on the basis of equal access to vocational education. The result of spatial analysis

will be compiled with modeling based on scoring analysis, so that the result obtained is Vocational School Location by looking at the potential of the area as the basis for determining the area of expertise to be opened.

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