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GIS-BASED VIRTUAL SHORT COURSE TO STRENGTHEN URBAN AND REGIONAL PLANNING STUDIO PRACTICE STUDY

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Abstract

Department of Urban and Regional Planning in Open University (DURP OU) have practical studies, namely Process of Planning, Urban Planning and Regional Planning Studios. This course aims to create student competencies in the preparation of planning products such as detailed spatial plans and regional spatial plans. Consists of various aspects studied in this course, namely environmental, socio-cultural, population, infrastructure, and institutional aspects. All aspects of it can be visualized in the form of thematic maps or products based on geospatial technology. In improving the skills that are used for some analysis in the planning studio, students are expected to master gis-based tools. DURP OU lecturers have initiated the availability of skill development by holding a short course Geographic Information System (GIS)-Based for each semester. In this research, refers to quantitative research design. A total of 61 selected students were involved in this study. All of these students have taken a GIS-based virtual short course. The data collected through online surveys is by using a google form device. The analysis carried out was by the Pearson correlation method between post-test variables as theoretical studies and map products as a practical study and Multi Criteria Analysis (MCA) of GIS operating skills carried out by students. They were enthusiastic enough that a pearson correlation value of 0,943 was obtained with the strengthening of skills between theoretical and practical studies. In this study, the percentage was also found to be 24,59% at level 1, 54,10% at level 2, and 21,31% at level 3. So that students are able to produce informative thematic map products. In the future, lecturers will continue to develop material not only GIS for basic but also GIS for advanced and other planning analysis methods.

Keywords: DURP OU, short course, GIS, Pearson Correlation, Multi Criteria Analysis.

1 INTRODUCTION

The Covid-19 pandemic has changed the way of learning at every level of education in Indonesia, from elementary to tertiary level (Azzahra, 2020). Almost all educational institutions are migrating conventional systems to distance learning systems. Distance learning is distance learning guided by facilitators by utilizing information technology media (Schneider & Council, 2021). Distance learning allows learners to study at home without having to physically go to class. With the help of electronic media such as PCs/smartphones and internet networks, learning can continue using online learning applications. Distance learning has benefits including reducing the operational costs of education because there are no face-to-face meetings (BERG, 2020). In addition, it is able to encourage the interest in learning e-learning participants to play an active role in participating in learning. The question is, how to run an online learning system in the Urban and Regional Planning Study Program, which requires more field data collection and group work? The Urban and Regional Planning Study Program or URP is a study program under the Faculty of Science and Technology that focuses on analyzing/formulating the potential and problems of regional and urban development. The learning process is aimed at producing scholars who are visionary,

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creative, innovative, able to view conflict positively, and able to work in teams and as a team. There are many challenges in running each course with an online system, especially the main lecture activities in this study program, namely studio practice courses. The challenges of distance learning of DURP OU are increasingly complex because students spread across all corners of the country have not all received good internet network service facilities. The distribution of DURP OU body students can be seen in Figure 1.

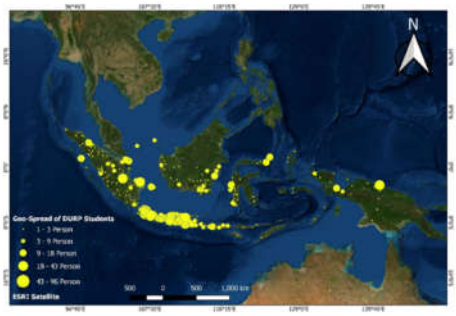

Figure 1. Geo-Spread of DURP OU Body Students.

The studio practice study in Department of Urban and Regional Planning in the Open University at Indonesia is a course that aims to provide an integrated introduction to the geospatial planning process, study more specific location-based materials and build the skills needed for studios and further professional practice. The studio curriculum is designed to equip students with regional problem-solving skills and spatial planning processes as a solution to spatial problems in an area. This course requires studies from various aspects, both Geospatial and A-Geospatial. It can be said that the studio practice course consisting of the Process of Planning, Urban Planning and Regional Planning Studio is the estuary of all courses studied in DURP OU. Therefore, to support the process of implementing studio courses, all students in the open university urban and regional planning study program must be able to master the basic concepts of mapping, spatial analysis and including the use of Geographic Information Systems (GIS) applications (Buchori, 2007).

GIS has a very important role in urban and regional planning (Buchori, 2011). Arranging the space of a region requires the support of accurate and up-to-date data and information. GIS can help describe the condition of a region . Changes in the condition of the territory in the area to be compiled, need to be well understood because the quality of the spatial plan is largely determined by understanding the physical condition of the planning area. Unfortunately, not all DURP OU students know and understand the use of every tool in GIS.

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The importance of increasing understanding and skills in Geospatial and A-Geospatial analysis by using the Geographic Information System (GIS) application, especially in terms of the basic concepts of mapping, Geospatial Information/Data, and GIS operations, it is necessary to have a short course of ArcGIS application for DURP OU students. The short course aims to assist and provide assistance to students of DURP OU in the concept and use of applications based on Geographic Information Systems as a basis for analyzing spatial information in the case of Urban and Regional Planning Studios. Thus, students can apply it to studio practice courses so that the expected output can be achieved. The short course GIS based of the DURP OU has been running for 4 series since it was rolled out in the middle of 2021. This training on the use of ArcGIS Application contains in-depth materials and practices such as basic explanations of mapping concepts, Geographic Information System concepts, arcgis application installation, geospatial data surfing, data input in ArcGIS software, data management, and layouting.

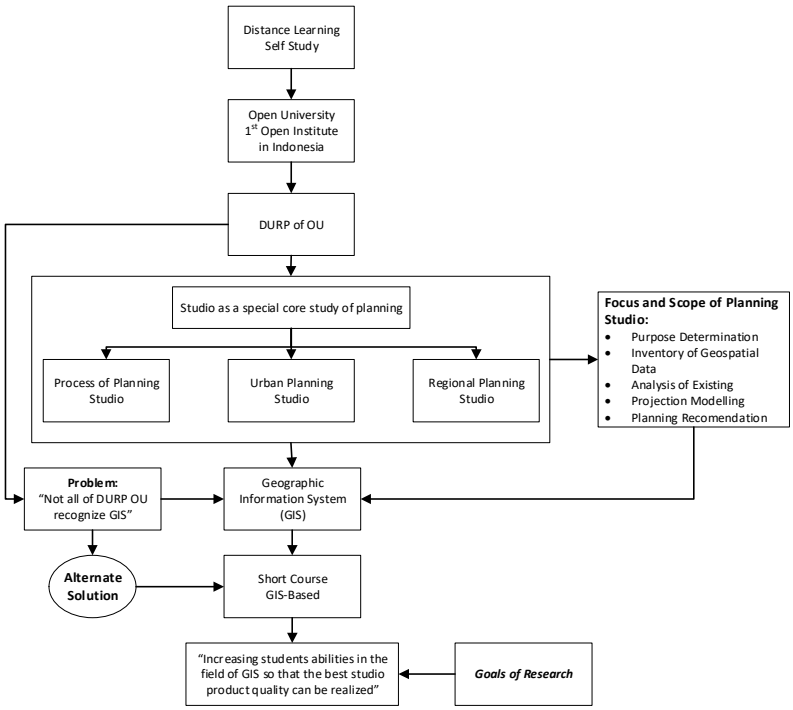

Figure 2. Goals of Research Process.

Figure 2. In the era of advancing globally, education has been integrated by technology as a support. The concept that is increasingly in the spotlight today is Distance Learning (Traxler, 2018). This can be used as a goal for students to have an attitude of independence in the learning process. The Open University (OU) in Indonesia, became a pioneer as an institute that has a distance learning program (Suprapto & Mursid, 2017). Because OU, which was founded in 1984,

has the vision of becoming a world-quality of ODL (Open and Distance Learning) university and its mission is to provide access to higher education for all corners of Indonesia and continue to develop distance learning systems by utilizing the latest technology.

In 2010, OU established a study program, namely DURP. This Department has practical courses that are divided into three, namely the process of planning, urban planning and regional planning studios. Focus and scope in the all of planning studio, namely purpose determination, inventory of Geospatial Data, Analysis of Existing, Projection modelling, and planning recommendation (Yeh, 2005). It is desirable that students who take this course can operate software such as ArcGIS, QGIS or the like.

However, the problem is that not all DURP OU students know and study GIS, therefore this Department initiated to organize a GIS-based short course. The purpose of this study is to connect the correlation of the results of the shortcourse, namely post-test and map products, so as to improve student competence in producing the best and quality planning products.

2 METHODOLOGY

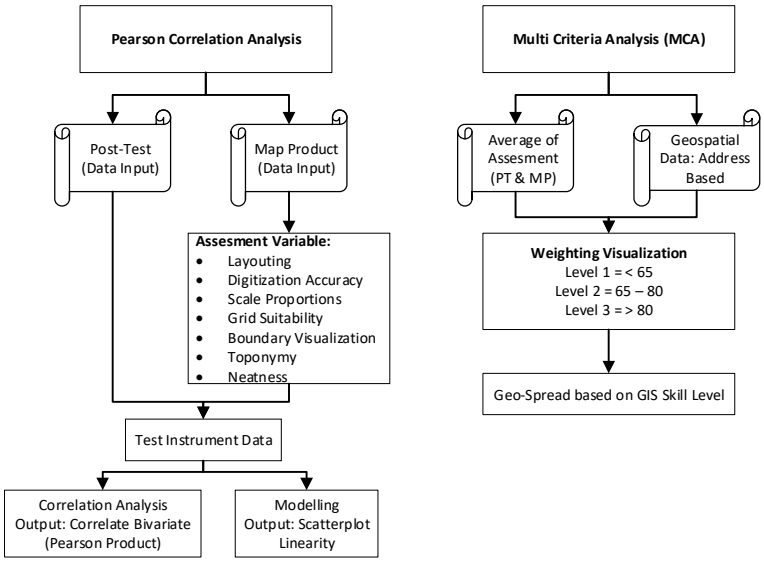

Figure 3. Method of Reaserch.

In Figure 3. describes related diagrams of the analysis method. This research refers to a descriptive quantitative design that seeks various types of data, namely using secondary data from the web that presents data openly and primary data taken based on the results of questionnaires from google forms. The following analysis was used in this study.

2.1 Pearson Correlation

At this stage, researchers use statistics-based software, namely "IBM SPSS Statistics 22" (Purwanto et al., 2020). Which serves to determine the correlation between two different variables. In this study, the Post-Test Value was used as a theoretical variable and the map product as a practice variable. It is worth underlining, for this method using correlate bivariate (Pearson Product) (Zamariola et al., 2018). Thus resulting in linearity between these variables.

The data used in determining pearson correlation is a sample of respondents who have tried to fill out the questionnaire provided by utilizing the google form (Iqbal et al., 2018). Because the application developed by Google is considered quite flexible, especially in terms of providing products uploaded by respondents both in pdf, jpeg/jpg, ppt, doc, or other formats.

2.2 Multi Criteria Analysis (MCA)

Multi Criteria Analysis (MCA) is the concept of a decision-making method that can be visualized both spatially and A-spatially with weighting of the criteria determined by the researcher (Velasquez & Hester, 2013). The criteria referred to in this study are the level of student expertise which is calculated based on the average obtained from the product map with variables such as Layouting, Digitization Accuracy, Scale Proportions, Grid Suitability, Boundary Visualization, Toponymy and Neatness (Okada et al., 2008). It is adapted to modern cartographic elements with the latest technology. Then it is overlayed with geospatial data from the domicile of address-based respondents into a map layout containing visualizations of sample distribution throughout Indonesia and categorized based on the average of the product and post-test maps.

3 FINDINGS AND DISCUSSION

Several findings have been identified in this study. Analyses on the method have been carried out to answer the stated objectives. Therefore, the following are the findings obtained by researchers.

3.1 Linearity

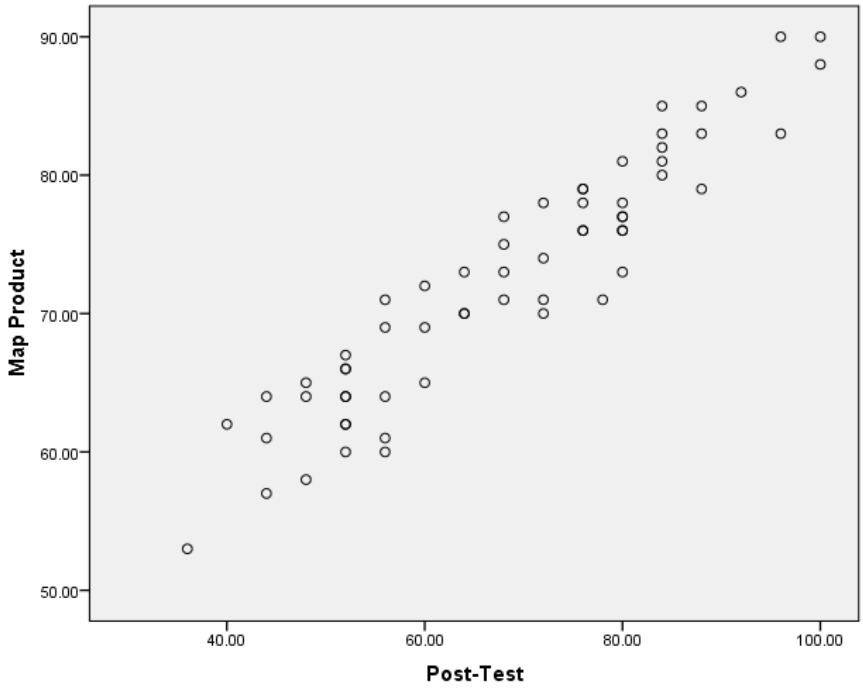

Figure 4. Scatter Plot of Linearity.

Figure 4. shows a scatter plot that aims to visualize the results of both variables, namely Post-Test as a dependent variable where the data has an influence while the product map as an independent variable where the data is the result in a correlation (Statistics, 2018). According to (Schober et al., 2018) the data shown in scatter plot. It literally forms a pattern of straight lines that means that between the two variables can be fulfilled linearity.

Table 1. Pearson Correlation Coefficients Interpretation (Schober et al., 2018).

Type	Range	Class
A. Pearson Correlation	0.00 – 0.10	No Correlation
B. Pearson Correlation	0.11 – 0.40	Weak
C. Pearson Correlation	0.41 – 0.70	Moderate
D. Pearson Correlation	0.71 – 0.90	Strong
E. Pearson Correlation	0.91 – 1.00	Perfect

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Table 1. shows the interpretation of conformity to pearson correlation. In this case, the researcher tested the attachment of the post-test and product map, which was 0,943. From Table 1. It can be categorized into class perfect so that this correlation is very strong and mutually influential.

3.2 Weighting Visualization

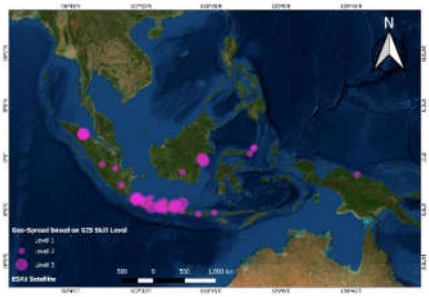

Figure 5. Geo-Spread based on GIS Skill Level.

Figure 5. visualize the distribution of respondents who are willing to fill out the questionnaire from the location-based google form application at each respondent's domicile. Then it is processed with average data from the post-test and map product variables. From these average results, it can give rise to a weighting (Odu, 2019). In the weighting, researchers gave categories based on average values, namely <65 as level 1, 65-80 as level 2, and ≥80 as level 3. Then it is overlaid with the ESRI Satellite product basemap by utilizing QGIS software version 3.22.4.

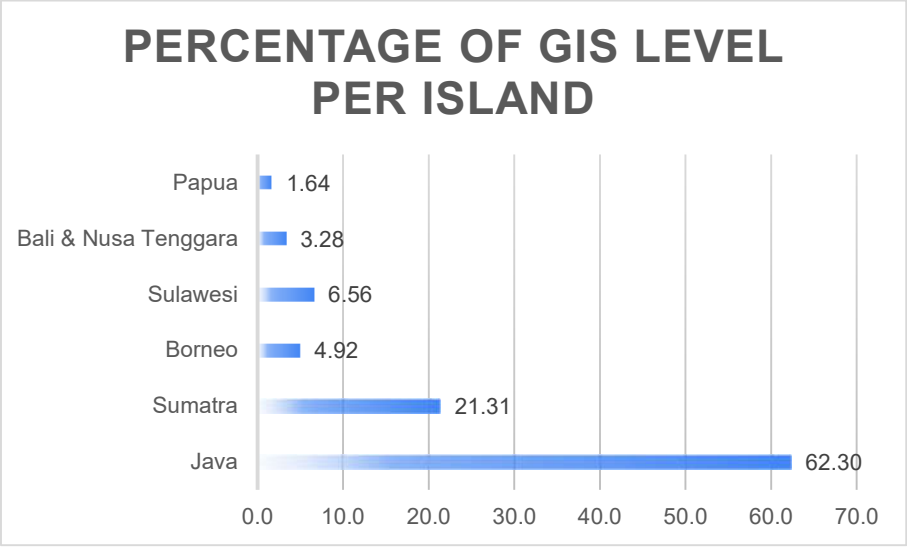

Figure 6. Percentage of Level per Island.

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From the visualization of "Geo-Spread based on GIS Skill Level" there is a result of Figure 6. What is astonishing is that it is located on the island of Java, which is with a value of 62.30%. The island of Java is already known on a national and even international scale as the most populous island in Indonesia (Firman, 2017). This represents that the island has many advantages, especially in terms of intellectuals embedded by its people. While on the island of Papua although it has been named the second largest island in the world which has an area of 785,753 km2 (Putu Eka Widiastuti & Kamaluddin, 2020), in this study only had one respondent or 1.64% worth only.

Table 2. Percentage of Students GIS Level.

Category	Range	n	%
A. Level 1	< 65	15	24.59
B. Level 2	65 - 80	33	54.10
C. Level 3	≥ 80	13	21.31

For Table 2. Is the result of an analysis presented on a macro scale. In essence, it has been divided into 3 levels. The first level has a value of 24.59% consisting of 15 respondents, the second level is worth 54.10% consisting of 33 respondents, and level 3 is worth 21.31% consisting of a sample of 13 respondents. In Table 2. Shows that level 2 as the majority in the study.

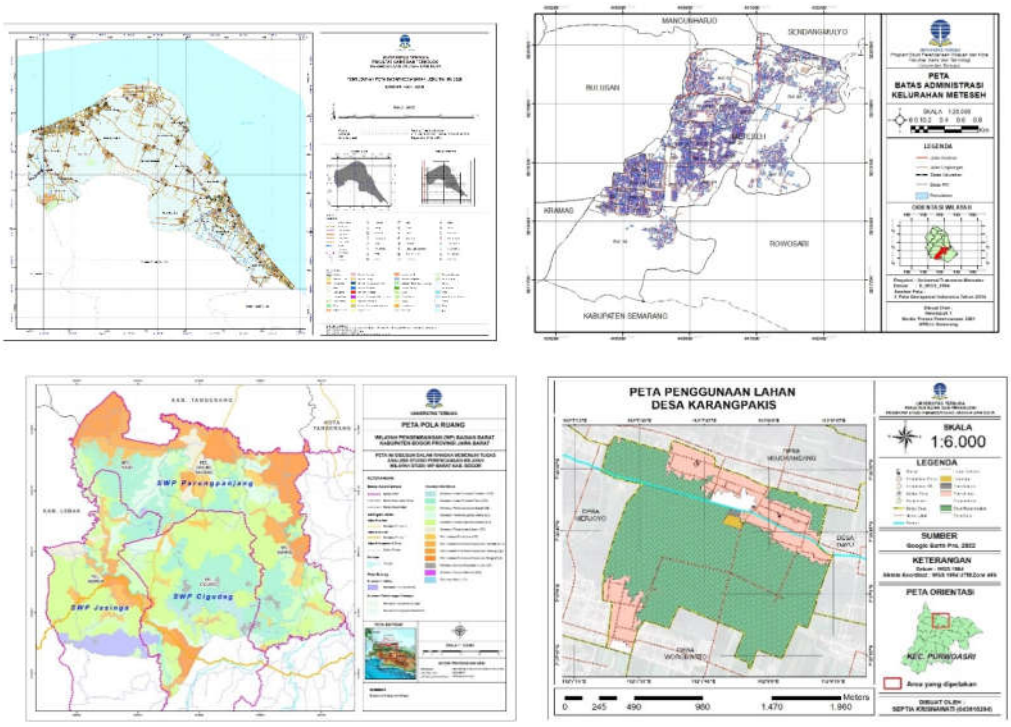

Figure 7. Best Student Map Products.

Based on Figure 7. DURP OU students who are willing to send their best product folders, have complete modern cartographic components. In theory, cartography is the science of mapping where a map is required to be visualized informatively and communicatively by utilizing the latest technology (Reddy et al., 2022). Neatness and art are also contained in the product. So that the map can be used in all aspects of the global (De Feudis et al., 2021). For example, the Land Use Map can be used for monitoring and evaluating the ability and suitability of agricultural land. This is an example of the physical and environmental aspects which are one of the aspects that students must master, especially in the planning studio practice course.

4 CONCLUSION

A series of results from several analyses can be concluded that DURP OU students have diverse competitiveness in terms of GIS operations. In this study, perfect linearity has been visualized against influencing factors, namely theory and practice, and the mappedness of GIS-based skills by students located in the middle category, namely with an average score of 72.46. So that students also have competence in continuing to increase their potential in the field of geospatial analysis which is implemented both in planning studio practice courses and in professional competition in the global world. A series of results from several analyses can be concluded that DURP OU students have diverse competitiveness in terms of GIS operations. In this study, perfect linearity has been visualized against influencing factors, namely theory and practice, and the mappedness of GIS-based skills by students located in the middle category, namely with an average score of 72.46. So that students also have competence in continuing to increase their potential in the field of geospatial analysis which is implemented both in planning studio practice courses and in professional competition in the global world.

In the future, lecturer of the department of urban and regional planning at an open university will continue to develop material not only gis for basic but also advanced GIS and for other planning analysis methods. Such as the creation of contour maps/3D map products, mapping using product results by UAVs (Unmaned Aerial Vehicles) either photogrammetric fields or hydrographic surveys, Remote Sensing Surveys (Eg: Analysis of Normalized Difference Vegetation Index/NDVI, Analysis of Normalized Difference Water Index/NDWI, Analysis of Normalized Difference Built-up Index/NDBI, Analysis of Remote Sensing using Google Earth Engine or Other Software GIS Based, Function Change Analysis using Scoring Method), etc.he conclusion needs to be concise and coherent.

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