UNIVERSITI TEKNOLOGI MARA

GEOSPATIAL ANALYSIS AND VISUALISATION ENHANCEMENT OF SCIENCE AND MATHEMATICS STUDENTS' EXAMINATION PERFORMANCE

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ABSTRACT

Science and mathematics have received considerable attention from the government as well as from the Malaysian Ministry of Education. This is to raise the level of students' performance as indicated by the performance analysis during the yearly examination results' announcement by the related ministry. From the GIS perspective, this method of analysis has not been comprehensively carried out although the Malaysian Ministry of Education has developed the Geographical Information System (GIS) school database in 2013. However, to date, no spatial analysis is integrated for any examinations performance analysis and no discussions held as announced every year. Therefore, the first objective of this study was to analyse temporal SPM science and mathematics students' performance for the Kelantan State schools using geospatial techniques for 2010 to 2014. The students' performance according to student grade point average (GPA) from Grade A+ (super distinction) to Grade G (fail) were mapped and query analysis was successfully done using geospatial tools. The results highlighted that the trend during the 5-year period i.e. from 2010 to 2014, of the students' mathematics and science performance was successfully generated in a map format instead of by the conventional method as currently practised by the education sector through the IDW interpolation method. The results have proven that the schools' density and the size of the area are the factors of the changes that generated a pattern with a density of approximately 1335km^2 to generate good GPA as indicated by Jeli district. The Select by Attribute function and the Buffer analysis tool also supported in answering the students' performance study. This study was further conducted with the use of GIS interpolation in assisting the education sector to illustrate the teacher-student ratio data in a mapping presentation. The second objective was to determine the potential of using GIS in the SPM examination students' performance in relation to the schools' location. The predetermined distance of 1 to 5 kilometres of the school to the nearest town centre used in this study, has proven to be insignificant to relate with the students' performance in the SPM Examination for Kelantan state for the 2014 analysis. Mapping has emerged as a communication tool and has become the effective way to publish the georeferencing digital document and statistical data information through the use of MAPublisher Avenza Software. In the third objective, the Geospatial PDF which highlighted the SPM students' performance achievement through map publishing method was developed in this study. In addition, five advantages of using Geospatial PDF were identified and recommended to be used by the education sector as an improvement on the current school or students' performance analysis. Overall, this study was able to provide an alternative representation in spatial viewer manner of students' examination performance specifically to the Malaysian education management and potentially later for public use.

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