

3d Mapping of Federal Polytechnic Nekede Using Arcgis Online: Enhancing Smart Campus Visualization and Planning in Nigeria

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Key words: Cartography; Education; Geoinformation/GI; Remote sensing; Spatial planning; 3D Mapping; ArcGIS Online; Smart Campus; Spatial Visualization; Web Scene; Nigeria

SUMMARY

3D MAPPING OF FEDERAL POLYTECHNIC NEKEDE USING ARCGIS ONLINE: ENHANCING SMART CAMPUS VISUALIZATION AND PLANNING IN NIGERIA

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Abstract:

This paper presents a practical case study of using cloud-based Geographic Information Systems (GIS) to create a 3D digital map of Federal Polytechnic Nekede, Owerri, Nigeria. The project, executed as a final-year Higher National Diploma (HND) research by the first author, applies Esri's ArcGIS Online platform to enhance spatial visualization, infrastructure planning, and campus navigation. The methodology involved multiple data acquisition strategies, including ground-based GPS surveys, aerial drone imagery, and satellite data. These datasets were integrated into ArcGIS Pro for georeferencing, digitizing, and 3D modeling via extrusion based on building heights. The final model was published as an interactive web scene using ArcGIS Online, enabling users to explore, rotate, and query 3D features such as buildings and landmarks. The resulting digital environment offers stakeholders, including administrators, planners, and students, a functional tool for decision-making, facility management, emergency response, and academic orientation. In addition, the project provides a replicable model for other educational institutions in developing countries aiming to build smart campuses using accessible geospatial technologies. While the

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platform used is proprietary, the study lays the groundwork for future adaptation to open-source tools such as CesiumJS and QGIS plugins for wider adoption. Limitations encountered include restricted site access, weather-related drone interference, and hardware constraints. Nonetheless, the project demonstrates that 3D GIS technologies are both achievable and impactful at the technical tertiary education level. This presentation is intended for FIG's Commission 2 (Professional Education), Commission 3 (Spatial Information Management), and the FIG Young Surveyors Network. It highlights the role of practical geospatial education, youth innovation, and institutional collaboration in advancing geospatial literacy and smart planning.

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