Establishment of an Interactive Dashboard Showing the Accreditation Status of Institutions Offering Surveying in Nigeria as at June 2025

(IZUEGBU Ogochukwu Uju and MBEREDE Benedict Obinna, Nigeria)

Key words: Data Management, ArcGIS Dashboard, Geographic Information System, Surveyors Council of Nigeria, Location Intelligence.

1. SUMMARY

Data management is the practice of collecting, organizing, managing, and accessing data to support productivity, visualization, efficiency, and decision-making. Given the pivotal role data plays in an organizational setting, an effective enterprise strategy, and a modern data management platform are essential for data-driven use cases including regulatory compliance, accurate analytics, locational intelligence, proper planning and visualization at a glance. The modern data management and visualization platform showing the accreditation status of Institutions offering Surveying in Nigeria as at June 2025 in a glance is achieved through the establishment of an interactive ArcGIS Dashboard. ArcGIS Dashboard is a multifaceted web application where users can visually analyze and interpret complex data. Leveraging Geographic Information Systems and location intelligence, this study provided a real-time platform to monitor institutional performance, accreditation statuses, and key performance indicators. The interactive Dashboard serves as a central resource for data collection, management, analysis, and community engagement, fostering transparency and professional development within the Surveying field. The project was executed in well-defined phases, beginning with comprehensive data collection from Surveyors Council of Nigeria (SURCON) and compilation of detailed attribute data of Surveying institutions, which was followed by accurate mapping of institutional locations and the integration of attribute data to create comprehensive visualization. The final phase culminated in the successful development and deployment of an Executive Interactive ArcGIS Dashboard, offering stakeholders the ability to monitor trends, evaluate accreditation statuses, and make informed decisions effectively. The result of this study showed 74 Universities, in which 15 Universities were not recognized due to the fact that they have not accredited. 11 Universities are due for an accreditation, 8 Universities have an interim accreditation, 2 universities failed accreditation, and 38 Universities have full accreditation. This milestone is highly recommended to the Stakeholders in the Surveying industry by leveraging technology for improved regulation and development in the profession through delivering a centralized, interactive platform. This project promotes operational efficiency, enhances e-governance, provides effective decision-making, improves policy formulation, and stakeholder engagement.

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1. INTRODUCTION

A dashboard is used to view, analyze and manage the key performance indicators of a process or business. It is a kind of information management system. The information on the dashboards can be enhanced by integrating Geographic information systems (GIS) with it. ArcGIS Dashboards is a multifaceted web application where users can visually analyze and interpret complex data. Dashboards were created by the Environmental Services Research Institute (ESRI), a geospatial software corporation that specializes in geospatial data storage, management, and visualization strategies (GISGeography, 2021). ArcGIS Dashboards is a multifaceted ESRI application that is used to manage and visually represent data for users ranging from individual researchers to large organizations (White, 2021). The establishment of an interactive map and executive dashboard to monitor and evaluate the accreditation status of institutions offering Surveying programs in Nigeria is very pertinent to uphold professional ethics and adopt global best practices by integrating location intelligence and advanced visualization tools. The initiative has significantly enhanced decision-making, policy formulation, and stakeholder engagement. This research would contribute to the advancement of data management, visualization, analysis, presentation, and community engagement by using maps to create an executive dashboard to monitor all surveying institution in Nigeria for proper policy and decision making by relevant stakeholders.

Surveyors Council of Nigeria (SURCON) whose mission is to regulate, control and uphold professional ethics and continuously develop professionals in line with world-class standards. The Office plays a vital role in maintaining the quality and integrity of the surveying profession in Nigeria. The SURCON accreditation of schools is crucial for ensuring that surveying programs meet the required standards, producing competent professionals who can deliver quality services. The accreditation process involves evaluating educational institutions' surveying programs against established standards, ensuring they meet the required criteria. The following are the key reasons why SURCON accreditation is important:

- Ensures Quality Education: SURCON accreditation guarantees that educational institutions provide a high-quality surveying program, equipping students with the necessary skills and knowledge.
- Maintains Professional Standards: Accreditation ensures that surveying programs align with professional standards, maintaining the integrity and reputation of the surveying profession.
- Enhances Employability: Graduates from accredited programs have better job prospects, as employers recognize the value of a SURCON-accredited education.

- Protects Public Interest: By ensuring that surveyors are competent and qualified, SURCON accreditation protects the public from potential risks associated with substandard surveying practices.
- Promotes Continuous Improvement: The accreditation process encourages educational institutions to continuously evaluate and improve their surveying programs, ensuring they remain relevant and effective.
- Accreditation and Monitoring of Institutions: During accreditation, evaluation of factors such as: Curriculum relevance, Quality of teaching staff, Adequacy of facilities (e.g., laboratories, survey equipment), Research and practical training components and conduction of periodic assessments to ensure compliance with the approved standards.

ArcGIS Dashboard is essential for efficient, transparent, and data-driven monitoring of accredited surveying institutions in Nigeria. It enhances decision-making, accountability, and real-time oversight, ensuring that surveying education meets national and global standards. ArcGIS Dashboard is a powerful Geographic Information System (GIS) tool that can help the Surveyors Council of Nigeria (SURCON) and other stakeholders effectively monitor, analyze, and manage accredited institutions offering Surveying and Geoinformatics in Nigeria. Its importance includes:

- Real-time Monitoring of Institutions: ArcGIS Dashboard provides a real-time, interactive display of all accredited institutions. It can show: locations of accredited universities and polytechnics, status of accreditation (e.g., full, provisional, or expired), quality indicators such as staff strength, facilities, and research output. This enables efficient oversight and quick response to changes or non-compliance.
- Data Visualization and Analysis: ArcGIS Dashboard allows stakeholders to visualize accreditation data through: maps showing the geographical spread of accredited institutions, charts and graphs for data comparison (e.g., number of accredited institutions by state), tables and statistics for performance assessment. This helps in identifying gaps and trends in surveying education across the country.
- Decision-making and Policy Formulation: With comprehensive data and analytics, decision-makers can: improve resource allocation (e.g., establishing more institutions in underserved regions), ensure balanced development of surveying education nationwide, make informed policy decisions on accreditation and professional training.
- Enhancing Transparency and Accountability: The dashboard can be made accessible to the public, allowing students, researchers, and the government to: verify which institutions are accredited, track the accreditation process and ensure institutions meet standards, prevent fraudulent claims of accreditation
- Integration with Other Systems: ArcGIS Dashboard can be linked with: SURCON's accreditation database for automated updates, Surveying professional bodies for certification tracking, Government Agencies (e.g., National University Commission (NUC), National Board for technical Education (NBTE)) for regulatory collaboration.
- Improving Efficiency in Accreditation Processes: Instead of relying on manual data collection and reporting, ArcGIS Dashboard streamlines the process by: allowing

instant updates on accreditation status, reducing paperwork and administrative delays, providing automated alerts for institutions nearing re-accreditation.

2. OBJECTIVES OF THE RESEARCH

To achieve this goal this project has specific aims, which are planned to be accomplished within successive phases:

- Conducting data collection and research for Collating all necessary attribute data of all institutions offering surveying.
- Accurate Mapping of locations of these institutions and linking all necessary attribute data.
- Development and configuration of map showing locations of the relevant institutions
- Creating and configuring an executive interactive Dashboard showing the accreditation status of all relevant institution.

3. METHODOLOGY

This study involved the cleaning, structuring, visualization, and dissemination of data from the Surveyors Council of Nigeria on institutions offering surveying programs and their accreditation status. The process was conducted in five stages: data cleaning, schema creation, visualization, publication, and dashboard development. The project was executed in well-defined phases, beginning with comprehensive data collection and research to compile detailed attribute data of surveying institutions. This was followed by accurate mapping of institutional locations and the integration of attribute data to create comprehensive visualization. The final phase culminated in the successful development and deployment of a dashboard, offering stakeholders the ability to monitor trends, evaluate accreditation statuses, and make informed decisions effectively. Each stage is detailed in figure 1.

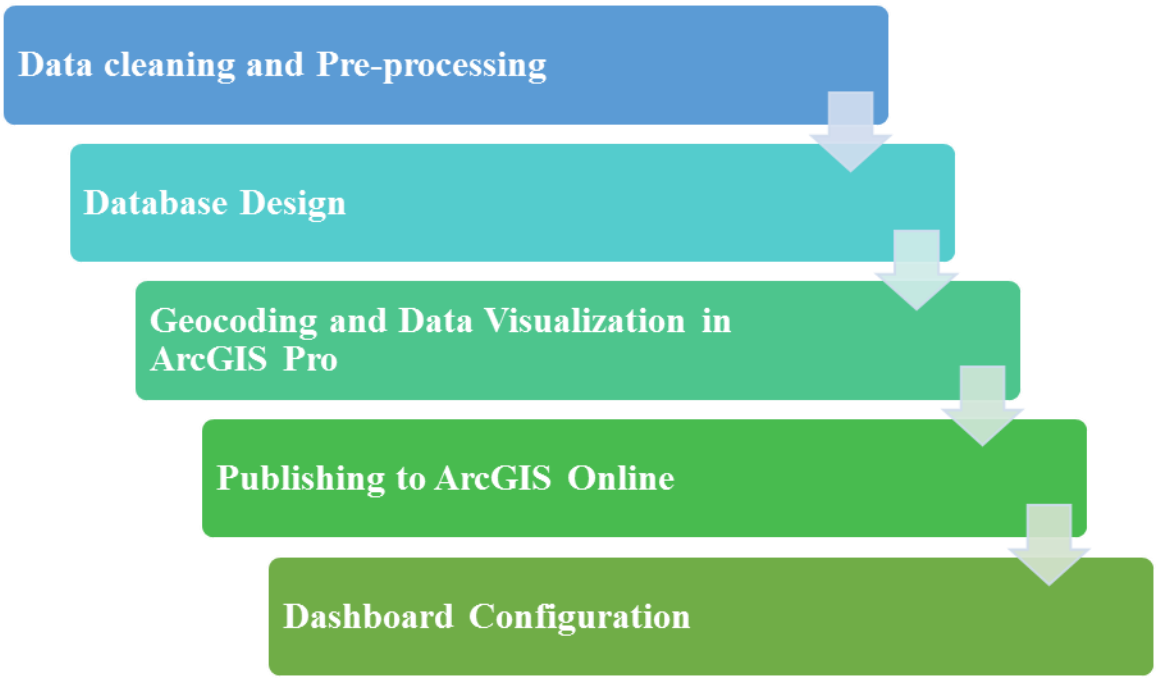

Figure 1: Methodology Workflow.
Source: Author, 2025.

3.1 Data Cleaning and Processing

The raw data, obtained from the Surveyors Council of Nigeria in csv. file format, contained records of institutions offering surveying programs, their accreditation statuses, and associated metadata. The dataset was saved in tabular format (Microsoft Excel). The following steps were implemented to ensure data quality:

3.1.1 Validation and Standardization:

- Column headers were standardized to align with geospatial database conventions (e.g., Institution_Name, Accreditation_Status, Address).

- Categorical data such as accreditation status were standardized into consistent categories: Full Accreditation, Interim Accreditation, and Failed.

3.1.2 Error Handling:

- The missing coordinate values, particularly in geographic coordinates system, were resolved using geocoding tools integrated into ArcGIS Pro software environment.

- Duplicates on the feature names were identified and removed based on unique combinations of institution names and accreditation dates.

3.1.3 Formatting:

- Date fields were converted into a uniform Date format, displaying MM/DD/YYYY
- Text fields were stripped of inconsistencies such as extra spaces or case variations.

At the completion of this phase, the cleaned dataset was free from redundancies and inconsistencies and was ready for integration into a geospatial environment.

3.2 Development of Data Schema

A geodatabase schema was designed to ensure that the data structure supported geospatial visualization and analysis. The schema was developed in ArcGIS Pro software environment and included the following fields:

- Institution_Name: Text field for the name of the institution.
- Accreditation_Status: Text field with a coded domain to represent statuses as Accredited, Pending, or Revoked.
- Type_of_Institution: Text field indicating the type (e.g., University, Polytechnic).
- Location: Geometry field to store point features based on geographic coordinates.
- Date_of_Accreditation: Date field indicating when accreditation was granted.
- Comments: Optional text field for additional remarks.

Domains and subtypes were configured for fields like Accreditation_Status to minimize input errors and enforce data consistency during future updates.

3.3 Development of Data Schema

The cleaned dataset was imported into ArcGIS Pro for visualization. A map was designed to depict the spatial distribution of institutions and their accreditation statuses. The key activities that was performed included:

3.3.1 Symbology Configuration:

- Unique symbols were assigned to represent type of Institutions.
- Graduated symbol sizes were used to emphasize significant Institutions.

3.3.2 Labelling and Base Map Integration:

- Institution names and their statuses were labelled for easy interpretation.
- A suitable base map (Street map) was added to provide geographic context.

3.3.3 Analysis:

- Preliminary spatial analysis revealed clustering patterns of accredited institutions in urban centres, which were later highlighted in the dashboard.

3.4 Publishing to ArcGIS Online

The geospatial dataset was published as a web layer to ArcGIS Online for accessibility and integration into interactive tools. The following steps were taken:

- The dataset was prepared in WGS 1984 spatial reference to ensure compatibility with web mapping applications.

- Using ArcGIS Pro, the dataset was shared as a hosted feature layer, with detailed metadata including title, description, tags, and credits added to enhance discoverability.

- Permissions were configured to allow access to authorized users while ensuring data integrity.

3.5 Dashboard Configuration

An interactive dashboard was developed using ArcGIS Dashboards to facilitate user-friendly exploration and visualization of the data. The dashboard incorporated the following elements:

3.5.1 Map Widget:

- The published web layer was added to provide an interactive map interface.

3.5.2 Indicators:

- Key performance metrics such as the total number of accredited institutions and the proportion of pending and revoked accreditations were displayed.

3.5.3 Charts and Filters:

- A bar chart illustrated the distribution of accreditation statuses by type of institution.
- Filters allowed users to explore data based on accreditation status, institution type, or geographic region.

3.5.4 Interactivity:

- Users could click on individual institutions on the map to view detailed information, including their accreditation status and date.

3.6 Publishing to ArcGIS Online

To ensure the continuous accuracy and relevance of the interactive accreditation map of surveying institutions in Nigeria, Survey123 has been successfully configured and integrated as a data collection and update tool. The survey123 connect was used to configure this update. This configuration will allow for addition of new records and update of existing records.

Field officers and designated stakeholders were granted secure access to the Survey123 platform, enabling them to submit new data or update existing records directly from mobile devices or web browsers. The tool was linked to an ArcGIS Online database, ensuring real-time synchronization with the interactive dashboard. The Survey123 form was integrated on the dashboard by adding element and Selecting “Embedded Content”. In the configuration panel,

the URL for the Survey123 form was pasted. This integration allows updates to be instantly reflected, providing decision-makers with the most current information.

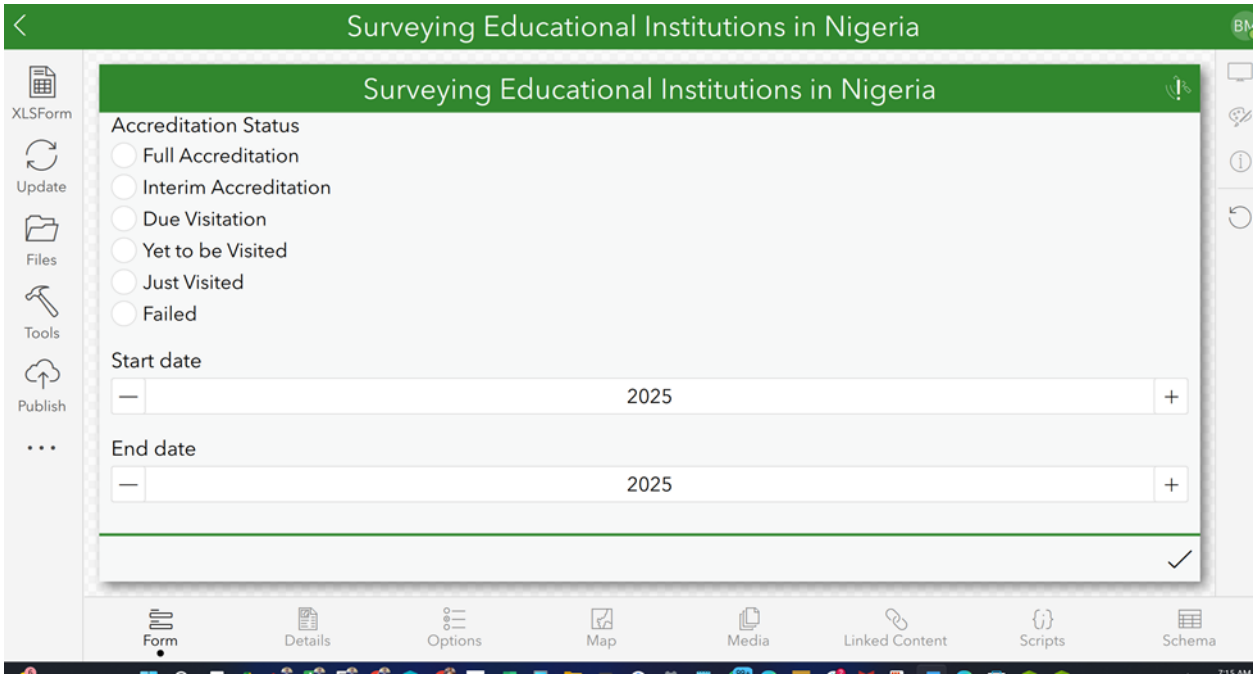

Figure 2: Survey123 Update workflow
Source: Author, 2025.

3.6.1 Operational Workflow:

- Data Collection & Updates: Field officers use Survey123 to submit accreditation updates, including new approvals, renewals, or revoked statuses.
- Automatic Synchronization: Once data is submitted, it is automatically uploaded to the cloud-based ArcGIS database and reflected in the interactive map.
- Quality Control & Verification: Submitted entries undergo a verification process before final confirmation, ensuring data accuracy and compliance with SURCON regulations.
- Dashboard Visualization: The interactive dashboard dynamically updates, providing stakeholders with real-time insights into the accreditation status of institutions.

4 PUBLISHING TO ARCGIS ONLINE

This section displayed the results obtained in accordance with the specified objectives of the research. It encapsulated the necessary attribute data of all institutions offering

surveying obtained from the Surveyors Council of Nigeria and the interactive ARCGIS dashboard Showing the Accreditation Status of Institutions Offering Surveying in Nigeria.

4.1 The Cleaned Data from Surveyors Council of Nigeria

- Data cleaning process was performed in the raw data from SURCON. The cleaned data were categorized into columns for Institution, addresses of the Institutions, the type of Institution (State or Federal), the Institution types (university, polytechnic, monotechnic, college), the accreditation statuses (full accreditation, interim accreditation, due visitation, yet to be visited, just visited, failed), the Institution websites, and the Global Identification of the Institutions which is an automatically generated number by the GIS system for identification of entities to help indexing and Query.

	C	D	E	F
1	**Institution**	**Address**	**Type**	**Institution Type**
2	FEDERAL POLYTECHNIC OFFA, KWARA STATE	FEDERAL POLYTECHNIC OFFA, KWARA STATE	Federal	Polytechnics
3	FEDERAL POLYTECHNIC, BIDA, NIGER STATE.	FEDERAL POLYTECHNIC, BIDA, NIGER STATE.	Federal	Polytechnics
4	FEDERAL POLYTECHNIC, ADO-EKITI, EKITI STATE.	FEDERAL POLYTECHNIC, ADO-EKITI, EKITI STATE.	Federal	Polytechnics
5	FEDERAL POLYTECHNIC, BAUCHI, BAUCHI STATE.	FEDERAL POLYTECHNIC, BAUCHI, BAUCHI STATE.	Federal	Polytechnics
6	FEDERAL POLYTECHNIC, ILARO, OGUN STATE.	FEDERAL POLYTECHNIC, ILARO, OGUN STATE.	Federal	Polytechnics
7	FEDERAL POLYTECHNIC, EDE, OSUN STATE	FEDERAL POLYTECHNIC, EDE, OSUN STATE	Federal	Polytechnics
8	THE POLYTECHNIC, IBADAN, IBADAN, OYO STATE.	THE POLYTECHNIC, IBADAN, IBADAN, OYO STATE.	Federal	Polytechnics
9	FEDERAL POLYTECHNIC, IDAH, KOGI STATE.	FEDERAL POLYTECHNIC, IDAH, KOGI STATE.	Federal	Polytechnics
10	KADUNA POLYTECHNIC, KADUNA, KADUNA STATE.	KADUNA POLYTECHNIC, KADUNA, KADUNA STATE.	Federal	Polytechnics
11	FEDERAL POLYTECHNIC, DAMATURU, YOBE STATE.	FEDERAL POLYTECHNIC, DAMATURU, YOBE STATE.	Federal	Polytechnics
12	FEDERAL POLYTECHNIC, NASARAWA, NASARAWA STATE	FEDERAL POLYTECHNIC, NASARAWA, NASARAWA STATE	Federal	Polytechnics
13	WAZIRI UMARU FEDERAL POLYTECHNIC, BIRNIN KEBBI, KEBBI STATE.	WAZIRI UMARU FEDERAL POLYTECHNIC, BIRNIN KEBBI, KEBBI STATE.	Federal	Polytechnics
14	AUCHI POLYTECHNIC, AUCHI, EDO STATE.	AUCHI POLYTECHNIC, AUCHI, EDO STATE.	Federal	Polytechnics
15	FEDERAL POLYTECHNIC, MUBI, ADAMAWA STATE.	FEDERAL POLYTECHNIC, MUBI, ADAMAWA STATE.	Federal	Polytechnics
16	FEDERAL POLYTECHNIC, NEKEDE, OWERRI, IMO STATE.	FEDERAL POLYTECHNIC, NEKEDE, OWERRI, IMO STATE.	Federal	Polytechnics
17	FEDERAL POLYTECHNIC, OKO, ANAMBRA STATE.	FEDERAL POLYTECHNIC, OKO, ANAMBRA STATE.	Federal	Polytechnics
18	YABA COLLEGE OF TECHNOLOGY, YABA, LAGOS.	YABA COLLEGE OF TECHNOLOGY, YABA, LAGOS.	Federal	College
19	ABIA STATE POLYTECHNIC, ABA, ABIA STATE	ABIA STATE POLYTECHNIC, ABA, ABIA STATE	State	Polytechnics
20	KWARA STATE POLYTECHNIC, ILORIN, KWARA STATE.	KWARA STATE POLYTECHNIC, ILORIN, KWARA STATE.	State	Polytechnics
21	ADAMAWA STATE POLYTECHNIC, YOLA, ADAMAWA STATE	ADAMAWA STATE POLYTECHNIC, YOLA, ADAMAWA STATE	State	Polytechnics
22	KANO STATE POLYTECHNIC, KANO, KANO STATE	KANO STATE POLYTECHNIC, KANO, KANO STATE	State	Polytechnics
23	KENULE BEESON POLYTECHNIC BORI, RIVERS STATE	KENULE BEESON POLYTECHNIC BORI, RIVERS STATE	State	Polytechnics
24	RUFUS GIWA POLYTECHNIC, OWO, ONDO STATE.	RUFUS GIWA POLYTECHNIC, OWO, ONDO STATE.	State	Polytechnics
25	AKANU IBIAM POLYTECHNIC UWANA, AFIKPO, EBONYI STATE	AKANU IBIAM POLYTECHNIC UWANA, AFIKPO, EBONYI STATE	State	Polytechnics
26	PORT HARCOURT POLYTECHNIC, RUMUOLA, RIVERS STATE	PORT HARCOURT POLYTECHNIC, RUMUOLA, RIVERS STATE	State	Polytechnics
27	AKWA IBOM STATE POLYTECHNIC, IKOT OSURUA.	AKWA IBOM STATE POLYTECHNIC, IKOT OSURUA.	State	Polytechnics

Institutions

Figure 3: The cleaned data used for the interactive map generation.
Source: SURCON

- Automatic Synchronization: Once data is submitted, it is automatically uploaded to the cloud-based ArcGIS database and reflected in the interactive map.
- Quality Control & Verification: Submitted entries undergo a verification process before final confirmation, ensuring data accuracy and compliance with SURCON regulations.
- Dashboard Visualization: The interactive dashboard dynamically updates, providing stakeholders with real-time insights into the accreditation status of institutions.

4.2 Accurate Mapping of locations of these institutions and linking all necessary attribute data.

- The geographic locations of the Institutions were linked with their attribute data using geocoding tools integrated into ArcGIS Pro software environment, in geographic coordinate system (Latitude and Longitude).

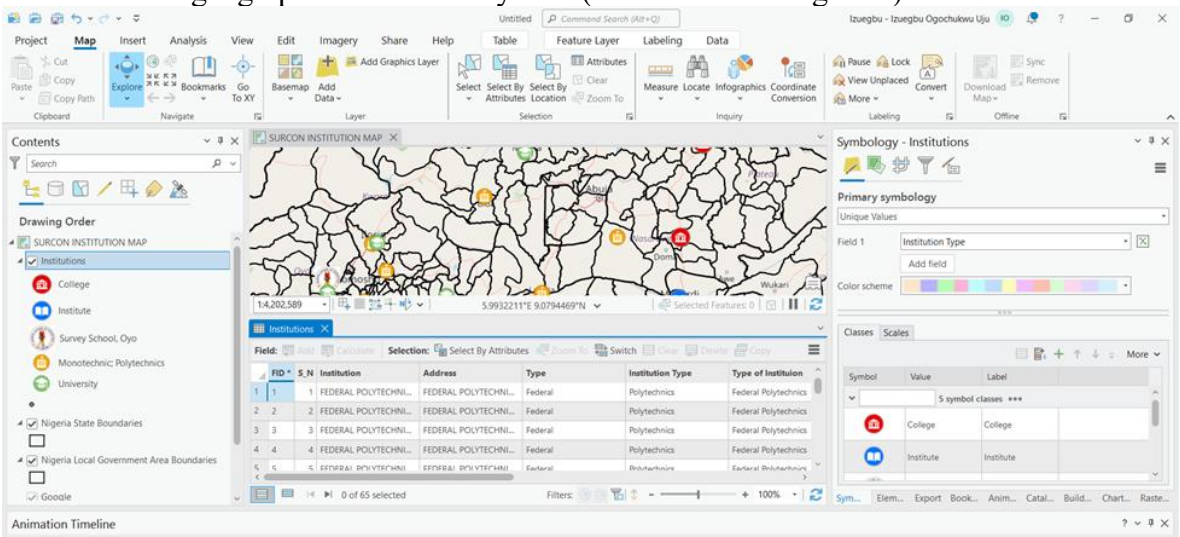

Figure 4: Attribute data and the geographic locations of the Institutions linked in ArcGIS Pro software environment.

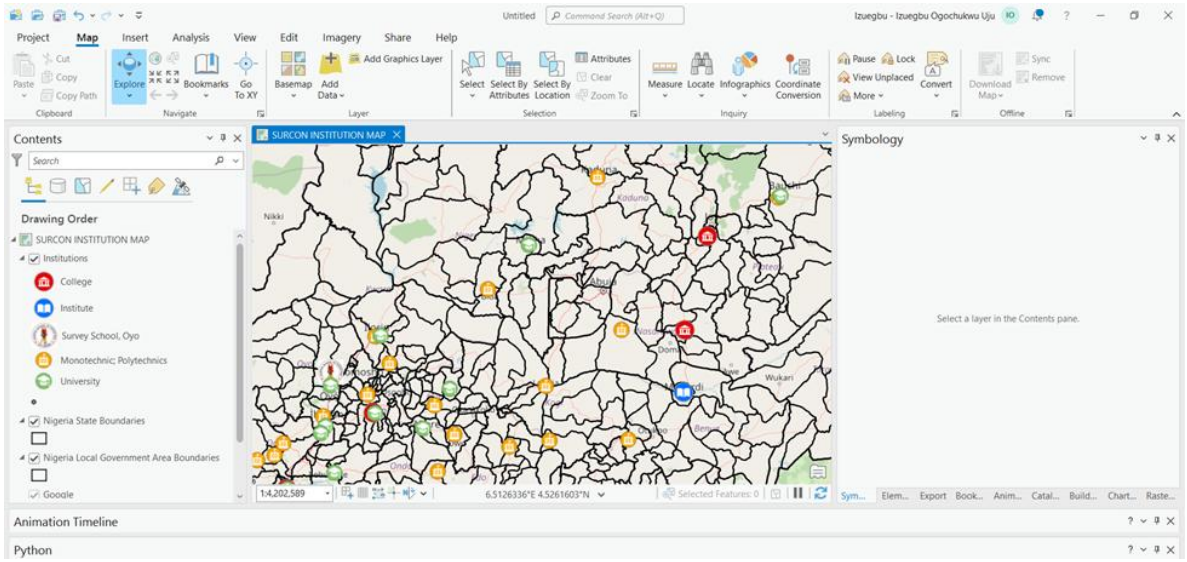

Figure 5: Spatial distribution of Institutions and their accreditation statuses in ArcGIS Pro software environment.
Source: Author, 2025.

4.3 The interactive ARCGIS dashboard Showing the Accreditation Status of Institutions Offering Surveying in Nigeria

- The interactive dashboard shows at a glance, a total of 74 Universities, in which 15 Universities where not recognized due to the fact that they have not accredited. 11 Universities are due for an accreditation, 8 Universities have an interim accreditation, 2 universities failed accreditation, and 38 Universities have full accreditation.
  The details of the accreditation findings are attached via this link: https://docs.google.com/spreadsheets/d/1W5dkrXrAYpJFXyHY4deVSZJzLsqZV9PaQ1Uk2RlwwiM/edit?gid=0#gid=0
  The web link to the interactive dashboard: https://africageoportal.maps.arcgis.com/apps/dashboards/3d02f73a461c449084fab12bbb93706b

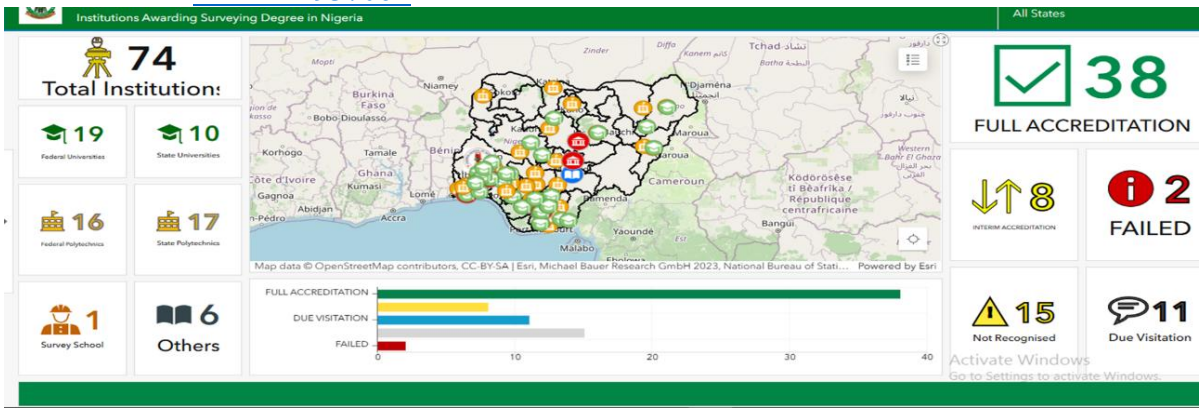

Figure 6: Full Extent view of Interactive ARCGIS dashboard Showing the Accreditation Status of Institutions Offering Surveying in Nigeria.
Source: Author, 2025.

5. CONCLUSION

This study was able to establish an Interactive ARCGIS dashboard Showing the Accreditation Status of Institutions Offering Surveying in Nigeria. The research Leveraged Geographic Information Systems (GIS) and location intelligence, to provide a real-time platform to monitor institutional performance, accreditation statuses, and key performance indicators. The interactive dashboard serves as a central resource for data collection, management, analysis, and community engagement, fostering transparency and professional development within the surveying field.

6. RECCOMMENDATIONS

- This milestone reinforces SURCON's commitment to leveraging technology for improved regulation and development in the surveying profession. By delivering a centralized, interactive platform, the project has elevated operational efficiency, enhanced governance, and strengthened SURCON's position as a global leader in surveying and geoinformatics regulation.
- As the council continue to regulate, control, and uphold professional ethics and continuously develop professionals in line with world-class standards there is need to adopt integrate locational intelligence, visualization and analysis for better monitoring and evaluation to make better decisions and formulate better policy in accordance with its vision to be global leading regulatory agency in the field of Surveying and Geoinformatics in line with best practices. This implementation will support data collection, data management, community engagement and monitoring and evaluation.
- Beyond monitoring the accreditation status of institutions, this project can be expanded to digitize other critical functions, such as the registration of surveyors, tracking of professional development programs, and automation of compliance monitoring. A centralized digital platform can facilitate seamless interactions between surveyors, regulatory bodies, academic institutions, and other stakeholders, reducing manual processes and improving service delivery.
- Overall, this initiative represents a significant step toward modernizing SURCON's operations in alignment with global best practices. By continuing to invest in digital transformation, SURCON can establish itself as a leading regulatory authority in surveying and geoinformatics, fostering innovation, improving governance, and strengthening the profession's impact in Nigeria and beyond.

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BIOGRAPHICAL NOTES

Surv. Dr. IZUEGBU, Ogochukwu Uju, holds a Ph.D. in Land Administration (Nasarawa, Nigeria). M.Sc. in Geographic Information System (Nasarawa, Nigeria), B.Sc. in Surveying and Geoinformatics (Enugu, Nigeria), and She is currently a Surveyor at the Office of the Surveyor General of the Federation (OSGoF) Headquarters, Abuja-FCT, Nigeria. She is also a Leadership Enhancement and Development Program (LEAD-P) Officer with Office of the Federal Civil Service of the Federation (OHCSF), Nigeria. She is a Registered Surveyor with Surveyors Council of Nigeria (SURCON). She is a Full Member of the Nigerian Institution of Surveyors (NIS), a Member of Geoinformation Society of Nigeria (GEOSON), a Member of Building Collapse Prevention Guild (BCPG), a Member of Women-In-Surveying (WIS), a Member of Northern Surveyors Forum (NSF), a Member of FIG Commissions 5 and 7, a Member of the FIG Commission 7.5 Women's Land Rights Working Group and Member of the Young Surveyors Network (YSN) Nigeria, and also involved in the FIG Mentornity for Africa. I have presented papers at both international and local conferences and published papers.

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