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AWARENESS OF GIS SERVICES AMONG LIBRARIANS IN NIGERIAN FEDERAL UNIVERSITIES OF TECHNOLOGY

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Abstract

This study investigated awareness of geographical information systems services amongst academic librarians in Nigerian Federal Universities of Technology. The survey technique was adopted for this study since a large number of populations were involved in the study. Descriptive statistical tools were used to analyse the data collected from the respondents. Result showed that librarian are aware of the traditional map library and have prior knowledge of GIS services in the library. They indicated that lack of administrative support is one of the reasons for lack of Geographic Information Systems services in the Nigeria federal universities of technology libraries. Stability in electricity supply was identified as the main strategies for the provision of GIS service. Recommendation for the increase of GIS services awareness among librarians was made so that there should be close collaboration between those departments dealing with GIS facilities in the university and the library, to enhance the integration of GIS services into the library.

Key Words: GIS, Awareness, Librarian, Library, Information, Technology, University, Nigeria

Introduction

The proliferation of digital geo-references data from both the public and private sectors and its importance as information resources for processing geo-spatial data such as mapping, maintaining, monitoring and planning of environmental resources, has brought changes considerably from the traditional techniques of handling geographic information to modern techniques of remote sensing and geographical information systems. The changes make some departments in federal universities of technology, such as survey and geo-informatics, geography, geology, urban and regional planning, etc, to acquire GIS, which is used in teaching and research activities, provision of systems that allow users to be able to display, manipulate, and analyze information in both digital and printed format.

As the nation's apex science and technology universities, one would expect that every innovation of modern technology or facilities such as the GIS would be available in the university libraries and the

librarians are able to adapt to the changes occurring in the spatial data industry, to effectively provide GIS services in the library. The researcher observed that automated GIS are not available in federal university of technology libraries regardless of the availability of computer hardware/materials which facilitate access to GIS services.

A Geographic Information System (GIS) is a computer system that records, stores, and analyzes information about the features that make up the Earth's surface. A GIS can generate 2- or 3-dimensional images of an area, showing such natural features as hills and rivers along with artificial features such as roads and power lines. Fabiyi (2004) defined GIS as a unique integration of computer hardware, software, peripherals, procedural techniques, organizational structure, people and institution for capturing, manipulating, storing, analyzing, modulating, modeling and displaying geographically referenced data for solving complex human related problems. This definition suggests that GIS is neither the software nor hardware, it is neither the procedure to solve problem, but a good integration of all these components of GIS.

The development of GIS education and training was pioneered in Nigeria at the University of Ibadan in 1996 with the establishment of the first GIS Laboratory and the introduction of a graduate programme at the Professional Master's level in the country (Rasheed, 2005). This development was in response to the University Development Linkages Programme (UDLP) sponsored by the United States Agency for International Development (USAID) to help universities in the United States develop and implement a variety of long term sustainable relationships with institutions in developing countries (Rasheed, 20005). The Programme was designed to produce professionals in the field of remote sensing and GIS. The products of the course were therefore intended to fill a critical and growing need for skilled manpower in the area of GIS applications in Nigeria.

Literature Review

Literature will be look into under the following perspectives; awareness of Geographic Information Systems among Librarians, Strategies for the Implementation of Geographic Information Systems, Problems and Challenges of Geographic Information Systems in the Libraries.

Awareness of GIS among Librarians

Under this heading it is proposed to examine means which GIS skills are often gained. Green (1992) observed that one of the problems in obtaining guidance and education in GIS is that the subject requires some knowledge from a wide subject range of computing skills and of gaining familiarity with number of software programs. Invariably anyone who embarks on GIS course which is of limited duration needs to do a range of extra reading or research in order to get sufficient scope of experience. Hence a very little practical knowledge may be gained from most short GIS courses.

Strategies for the Implementation of Geographic Information Systems

There are a few librarians that have been using GIS or collecting digital geospatial data for several years, which many other librarians aspire to emulate. Once it is understood who is using GIS and what they are trying to accomplish, it will be clearer to ascertain where to develop the collection. Lamont (1997) listed several sources for GIS data including the United States government, state and local governments, researchers on campus, local GIS firms, utility companies, real estate firms, and the Internet. For those in the academic environment, it is possible that various campus departments have been using geographic information systems for years. These departments and researchers are likely to have a wealth of information, much of which can be shared, because they are people who are well connected in the local GIS

community; talking with them frequently which will help to keep the GIS staff abreast of local GIS activity.

Being involved in the local community is a good way to start on these partnerships. A library's hardware and software issues will depend on the institution. The focus of a library, however, is not on hardware and software, but data provision. "These infrastructure issues are secondary, however, to the even larger and more important responsibilities of collection, organization, and dissemination of geospatial data. ... Beyond hardware and software issues, any management discussion must address collection, describing, and accessing spatial data" (Lamont 1997).

Problems and Challenges of GIS in the University

With particular reference to geographical information systems (GIS), a major problem facing its development and use generally and specifically in higher education in the developing countries of tropical Africa is the lack of foreign exchange to purchase the necessary hardware and software. Abumere (1997) identified the major problems with information technology development in Nigeria to be poor telecommunication facilities, erratic electricity supply and the generally poor maintenance and Njoku, (2008) observed lack of recognition of the profession--until recently, the profession was seen as reserved for people with little or no ambition and for those who were not intelligent enough to gain admission to another course of study, and so on

Methodology

A descriptive survey method is used in the conduct of this study. Suleiman (2007) indicated that the aim of survey research is to obtain information from sample of respondents that relate to the present status of the problem being investigated. Aina (2002) corroborated this position stressing that a research is said to be survey when it focuses on a given population parameter where data is collected and analysed and the information gathered can be generalized. Thus, survey design was considered suitable in order to investigate the awareness of GIS services among librarians in Nigeria federal university of technology

Research Questions

This study sought to provide answers to the following questions:

1. What is the level of awareness of GIS among the librarians in the Federal Universities of Technology in Nigeria?
2. What are the efforts made by the Federal Universities of Technology to integrate GIS service in the library?
3. What challenges did Federal Universities of Technology in Nigeria face in providing GIS service in the library?

Research Hypotheses

The following research hypotheses were formulated for the study:

1. There is no significant difference in level of awareness of GIS among librarians in the FUT libraries in Nigeria
2. There is no significant difference in difficulties faced by FUT libraries in acquiring GIS from the originating departments for integration into their services.

Significance of the Study

The significance of this study lies in the fact that for years the Federal Universities of Technology libraries have been active in books, atlases and paper map collection as GIS to handle georeference questions. The adoption of modern GIS in the library will offer series of technological developments to better their services

The findings of this work will be of great importance to the universities under study

and other academic institutions in Nigeria by way of integrating GIS into the institutions' libraries and provision of service to their entire users without any discrimination among users of other departments as in the case with decentralized GIS services in the universities.

The study will equally be useful to Heads of departments, university administrators and librarians to be acquainted with the strategies that will be put in place to enhance implementation of GIS service in the university libraries.

Lastly, the study will contribute to knowledge and add to literature in the area of research and digital information resources management.

Scope of the Study

This study covers the seven Federal Universities of Technology which were established at the same time in 1981. Its delimitation is on the awareness geographical information systems services among librarians in federal universities of technology in Nigeria. The target subjects are the librarians, unit/sectional heads, system analysts and other cadres of staff who deal with GIS activities in the libraries.

Population of the Study

The population of this study comprises the federal universities of technology libraries in Nigeria. The subjects of the study are made up of all the librarians, library divisional and unit heads, as well as other academic librarians. A survey of the population of the study indicated that there are 89 librarians.

Table 1: Population of the Study

S/No.	Federal Universities of Technology in Nigeria, Created in 1980s	No. of Librarians
1	University of Agriculture,, Abeokuta.	15
2	F.U.T, Akure	13
3	Abubakar Tafawa Balewa University, Bauchi.	10
4	University of Agriculture,, Makurdi.	9
5	F.U.T, Minna.	16
6	F.U.T, Owerri.	12
7	F.U.T, Yola.	14
	Total	89

Source; Offices of the Academic Secretaries of the various institutions as at February, 2010

Sampling Techniques and Sample Size

The study adopts non-probabilistic sampling method, otherwise known as judgmental or purposive sampling to draw samples from four out of the seven federal universities of technology in Nigeria. They include: the Federal University of Technology, Akure; Abubakar Tafawa Balewa University, Bauchi,: Federal University of Technology, Minna; and Federal University of Technology, Owerri.

The respondents include the entire set of Librarians from the four selected Federal Universities of Technology.

Table 2: Sample Size Distributions

S/NO.	Sample Federal Universities of Technology	No. of Librarians
1	F.U.T, Akure	13
2	The Abubakar Tafawa Balewa University	10
3	F.U.T, Minna.	16
4	F.U.T, Owerri.	12
	Total	51

Instruments for Data Collection

The instruments that will be used in gathering data for this study are questionnaire, oral interview and personal observation. Aina (2002) observed that using two or more instruments to collect data in a single study is known as triangulation.

Procedure for Data Collection

The researcher shall proceed to the various selected universities to personally administer

questionnaires. The distribution of questionnaire will take the period of at least one week for each of the universities. More so, there will be contact through the use of mobile phone to solicit support and cooperation from the respondents where it has become necessary.

Procedure for Data Analysis

Descriptive statistical tools will be used to analyze the data collected from the various respondents. The data will be assembled, coded, tabulated and analyzed item by item using percentage and means to answer the research questions. On the other hand, inferential statistics was used to test the formulated hypotheses. Hence, ANOVA is used to test the entire hypothesis set at 0.05 level of significance using the Statistical Package for the Social Science (SPSS). This is used in line with Ajiferuke's (2002) observation that ANOVA test is often used to test the effects of qualitative independent variables on a quantitative dependent variable.

Data Presentation, Analysis and Discussion

This deal, with the analysis of the data collected, result and discussion of the findings of the study

Response Rate of Respondents

Table 3: Response Rate By University

Universities	Librarians	
	F	%
Federal University of Technology Minna	11	24.4
Federal University of Technology Owerri	9	20
Abubakar Tafawa Balewa Universty Bauchi	14	31.1
Federal University of Technology Akure	11	24.4
Total.	45	100

Table 3 shows the selected total population of librarians, in general there is total 45 questionnaires returned by the respondents (librarians) in all selected FUT libraries this were the population used to for the second questionnaire and as well as answer, the breakdown from various libraries shows that Akure 11 respondents, Bauchi 9, Minna 14 and Owerri returned 11 respondent of librarians

Descriptive Analysis of the Research Questions

This section analyses and discusses data collected in respect of the research questions raised in the study

Awareness of GIS Services among Librarians in the Selected Federal Universities of Technology in Nigeria

In order to achieve this some questions were asked and Table 4 captures the respondents' responses to the questions.

Table 4: Respondents' Awareness of GIS Services in the Library

S/no	GIS services among librarian	FUT Akure		ATBU Bauchi		FUT Minna		FUT Owerri		Total	
		YES	NO	YES	NO	YES	NO	YES	NO	Yes	No
a.	Have prior knowledge of GIS before now	9 (81.8)	2 (18.2)	5 (53.6)	4 (44.4)	11 (78.6)	3 (21.4)	7 (63.6)	4 (36.4)	32 (71.1)	13 (28.9)
b.	I'm aware about traditional paper map library	11 (100)	0	9 (100)	0	14 (100)	0	11 (100)	0	45 (100)	0
c.	Through Websites/ social networking	2 (18.2)	9 (81.2)	2 (22.2)	7 (77.8)	7 (50)	7 (50)	3 (27.2)	8 (72.2)	14 (31.1)	31 (68.9)
d.	Library patron request	3 (27.3)	8 (72.7)	5 (55.6)	4 (44.4)	4 (28.6)	10 (71.4)	5 (45.5)	6 (54.5)	17 (37.8)	28 (62.2)
e.	Reading recent literature in GIS and related field	4 (36.4)	7 (63.6)	7 (77.8)	2 (22.2)	6 (48.9)	8 (57.1)	4 (36.4)	7 (63.6)	21 (46.7)	24 (53.3)
f.	Attending courses in tertiary institutions for higher degrees	11 (100)	0	6 (66.7)	3 (33.3)	4 (28.6)	10 (71.4)	10 (90.9)	1 (9.1)	31 (68.9)	14 (31.1)

Table 4 contains the responses of awareness of GIS services in the library. The findings shows that the traditional paper map library have the frequency of 45 (100%), and prior knowledge of GIS services in the library before now recorded 32 (71. 1%) responses. James (2008) observed that in the past the map library was where students and other researchers would call for maps but now their first place of stop will be the Internet. This may have given the librarians the idea of the GIS as paper maps are also part of paradigm shift of the library resources to digital maps which will culminate into GIS services. The awareness created by GIS services in the library for attending courses in higher institutions of learning scored 31 (68.9%) which was the same for librarians who learn about GIS through Websites/ social networking recorded 31 (68.9%). The low utilization of social network among librarians could be as a result of low internet connectivity in the libraries. Murphy and Moulaison (2009) observed that the social networking librarian possesses the skills necessary for providing services in and within the online social network site. Library patrons' request 28 (62.2%) and Reading recent literature in GIS and related field scored 24 (53.3%) responses. Librarian low level of awareness of GIS will not be good for the integration of GIS services into the library.

Challenges Faced by the Federal Universities of Technologies in Provision of GIS Services in the Library

Table 5 shows the responses to reasons why GIS services were not provided in the selected libraries of Federal universities of Technology

Table 5: Respondents' Constraint for lack of GIS in the Library

Constraints to your lack of GIS Services in the library	FUT Akure		ATBU Bauchi		FUT Minna		FUT Owerri		Total	
	F	%	F	%	F	%	F	%	F	%
Insufficient financial support	11	100	8	88.9	14	100	10	90.9	43	95.6
Inadequate conferences, workshops and seminars on GIS by librarians	5	45.5	3	33.2	8	57.1	5	45.5	21	46.7
Lack of time due to heavy workload in the library	4	36.4	2	22.2	3	21.4	3	27	12	26.7
Lack of collaboration among departments in the university	5	45.5	7	77.8	9	64.3	8	72.7	29	64.4
Poor GIS/ICT infrastructures	3	27.2	4	44.4	5	35.7	1	9.9	13	28.9
Lack of administrative support	11	100	9	100	14	100	11	100	45	100
General lack of skills and interest among librarians	4	36.4	2	22.2	1	7.1	3	27.2	10	22.2
Energy crises in form of frequent power interruption	6	54.5	5	55.6	7	5.0	8	72.7	26	57.8

Table 5 shows that Lack of administrative support with 45 (100%) responses, was the main reason that the respondents unanimously indicated for lack of GIS services in the library. This finding is in conformity with Lakos (2002) who states that the presence of visible leadership cannot be over-emphasized in managing library operational services, adding that leadership is paramount for any organizational cultural change. This is followed by insufficient financial support with 43 (95.7%) responses. This agreed with the finding of Lamont (1997) who stated that Investing in staff training and purchasing resources for GIS services puts a heavy financial burden on library budgets. Another piece of the puzzle, data, does not come cheaply either. The expensive process of collecting and formatting spatial data often means access is not free or publicly accessible. Lack of collaboration among departments in the universities scored 29 (64.4%) responses and energy crises in form of frequent power interruption scored 26 (57.8%) responses respectively.

However, inadequate conferences, workshops and seminars on GIS by librarians scored 21 (46.7%), poor GIS/ICT infrastructure, 13 (28.9%), lack of time due to heavy work load in the library, 12 (26%), and general lack of skills and interest among librarians, 10 (22.2%) responses accounted for the least scores as reasons for lack of GIS services among the selected FUT libraries in Nigeria.

Administrative support for GIS services encompasses all the amount of administrative support provided for personnel training on GIS software and support for GIS software and hardware purchase needed. For GIS service to be effectively implemented in the library the cooperation of the administrator is required and lack of skills scored the least response as a factor to hinder GIS service because most of them feel if the administrative support is available all other staff will respond to the schedule assigned to them in respect of the GIS services.

Efforts of the Libraries in Integrating GIS Services into the Library

Table 6 shows the responses of the strategies employed by the respondents in order to adopt GIS services into the library of the selected FUTs in Nigeria.

Table 6: Efforts being made in Implementing GIS in the Library

Effort being made in implementing GIS in the library	FUT Akure		ATBU Bauchi		FUT Minna		FUT Owerri		Total	
	F	%	F	%	F	%	F	%	F	%
Organization of workshop, conferences and seminars to create awareness	6	54	9	100	11	78.6	7	63.6	33	73.3
Provide GIS/ICT facilities in the library	9	81.1	3	33.3	8	57.1	10	90.9	30	66.7
Collaboration among departments and organization for GIS services in the library	4	36.3	3	33.3	9	64.3	4	36.3	20	44.4
Constant power supply in the library	11	100	8	88.9	14	100	10	90.9	43	95.6
Awareness of GIS presence in the library	2	18.1	7	77.8	6	42.9	7	63.6	22	48.9
Administrative support	6	54.5	8	88.9	6	42.9	5	45.5	25	56
GIS use policy in the library	8	72.7	6	54.6	14	100	8	77.7	36	80
Technical assistance to GIS users	10	90.9	9	100	12	85.7	10	90.9	41	91.1

Table 6 Indicates that the highest response rate for the strategies to integrate GIS service in FUT Akure includes provision of constant power supply in the library with 11 (100%) responses; constant technical assistance for GIS users, 10 (90.9%); provision of adequate GIS/ICT facilities in the library, 9 (81.1%); provision of GIS services policy in the library 8, (72.1%); and organization of workshop, conferences and seminar to create awareness, 6 (54%) responses. While, creation of awareness of

GIS presence 8 (72.7%), solicits for administrative supports 5 (45.6%) recorded the highest score of the respondents disagree to the strategies for GIS integration into the library.

In ATBU, Bauchi Table 6 reveals that organization of workshop, conferences and seminars to create awareness with 9 (100%) responses; constant technical assistance to GIS users 9, (100%) responses; solicitation for administrative support 8, (88.9%); provision of constant power supply in the library, 8 (88.9%); creation of awareness of GIS services in the library 7, (77.8%); and provision of constant power supply with 5 (55.6%) were found to be the respondents favorable strategies for the integration of GIS service into the library. On the other hand, collaboration among departments and organizations to support GIS services in the library with a sore of 6 (54.6%) disagreed by the respondents as the right strategy for integrating GIS services into the library.

More so, at the FUT Minna, the provision of GIS service policy in the library scored 14 (100%); constant technical assistance to the GIS users, 12 (85.7%); provision of constant power supply in the library, 14 (100%); Organization of workshop, conferences and seminars to create awareness, 11 (78%); collaboration among departments and organizations to support GIS service in the library 9, (64.3%) and provision of constant power supply in the library, 7 (50%) were agreed by the respondents as the main strategies to be adopted

Similarly, in FUT Owerri, the provision of adequate GIS/ICTs facilities in the library with 10 (90.9%) responses, constant technical assistance to GIS user, 10 (90.9%); provision of constant power supply in the library, 10 (90.9%); provision of GIS services users' policy in the library, 8 (77.7%); adequate Organization of workshop, conferences and seminars to create awareness, 7 (63.6%); creation of awareness of GIS presence in the library, 7 (63.6%) responses respectively were what the respondents agreed to as the main strategies for the integration of GIS services into FUT, Owerri library, whereas, collaboration among departments and organizations to support GIS services with 6 (54.5%) responses was disagreed among the respondents as commensurable strategy for GIS integration into the library.

Generally, looking at the facial value for the Federal Universities of technology Libraries, the findings show that constant electrification or power supply topped with 43 (95.6%) as shown in Table 6. This finding is in line with Abumere and et al (1997), who affirmed that the major problem with technology development in Nigeria is erratic power supply. The fear of erratic power supply due to shortage is the major strategy that every library that wants to succeed in the ICT era will have settle before embarking on any digital services in the library, because nothing will function if the power to supply energy to the entire GIS gadget is not available. Through the installation of generator with a capacity high enough to carry all the systems in the library, such additional equipment makes setting up and operating a GIS much more expensive than would otherwise have been the case, this goes to show that in our parts of the world where power supply is always the problem we shall always have difficulties in providing this services in our libraries.

Constant technical assistance to GIS users is also agreed strategy for GIS integration into the library, this is because it has the second highest number of respondents of 41 (91.1%) responses, being the second highest number of respondents. The reason for this is that when users are assisted it tends to attract them to use the library resources.

Among the unpopular strategies is the collaboration among departments and organization to provide GIS service in the library with 21 (44.4%) responses. This contradicts the position of Shuler & Obermeyer (2001), who discovered that Libraries are centres for collaboration and have links across campus and into the community beyond. The implication of this is that the library being an autonomous organ

can on its own provide GIS services without collaboration with the Departments in the University.

Statistical Analysis

This section analyses and discusses the data based on the outcome of the statistical techniques used to test the hypotheses generated for the study. To test the hypotheses, one way Analysis of Variance (ANOVA) was used. ANOVA was used to test all the hypotheses because they are all trying to find out the differences among the four selected FUTs in Nigeria. Also, in order to further test for where differences existed or where differences were attributable to in the ANOVA result, post-hoc tests using scheffe's difference test were carried out.

Testing the Hypotheses

Null Hypothesis 1: There is no significant difference in the level of awareness of GIS among librarians in the FUT librarians in Nigeria.

Table 7(a): Analysis of Variance on the Level of Awareness of GIS among Librarians in the Selected FUT Librarians in Nigeria

Descriptive

Universities	N	Mean	Std. Dev	Std. Error
FUT Akure	11	3.8182	1.77866	.53629
ATBU Bauchi	9	4.2222	2.487886	.82962
FUT Minna	14	3.5000	2.34521	.62678
FUT Owerri	11	4.0000	2.32379	.70065
Total	45	3.8444	2.18419	.32560

ANOVA

AWARENESS_OF_GIS_SERVICES_AMONG_LIBRARIANS

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.219	3	1.073	.213	.887
Within Groups	206.692	41	5.041		
Total	209.911	44			

The result of the Analysis of Variance (ANOVA) statistics shows that there is no significant difference in the awareness level among the librarians in the Federal universities of technology. This is because the ANOVA calculated F ratio value of 0.213 is smaller than the F critical value of 2.60 and the calculated significant value of 0.887 is higher than the 0.05 level of tolerance.

Table 7(b): Post Hoc Tests on the Level of Awareness of GIS among Librarians in the Selected FUT Librarians in Nigeria

Multiple Comparisons

Dependent Variable: AWARENESS_OF_GIS_SERVICES_AMONG_LIBRARIANS

LSD

(I) fed university name	(J) fed university name	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
FUT AKURE	ATBU BAUCHI	-.40404	1.00918	.691	-2.4421	1.6340
	FUT MINNA	.31818	.90465	.727	-1.5088	2.1452
	FUT OWERRI	-.18182	.95739	.850	-2.1153	1.7517
ATBU BAUCHI	FUT AKURE	.40404	1.00918	.691	-1.6340	2.4421
	FUT MINNA	.72222	.95929	.456	-1.2151	2.6595
	FUT OWERRI	.22222	1.00918	.827	-1.8159	2.2603
FUT MINNA	FUT AKURE	-.31818	.90465	.727	-2.1452	1.5088
	ATBU BAUCHI	-.72222	.95929	.456	-2.6595	1.2151
	FUT OWERRI	-.50000	.90465	.583	-2.3270	1.3270
FUT OWERRI	FUT AKURE	.18182	.95739	.850	-1.7517	2.1153
	ATBU BAUCHI	-.22222	1.00918	.827	-2.2603	1.8159
	FUT MINNA	.50000	.90465	.583	-1.3270	2.3270

Moreover, the Post Hoc Multiple comparison test showed no significant difference in the librarians views of each university compared to another one in their view on awareness of GIS. The descriptive statistics also showed the mean responses of 3.8182, 4.2222, 3.5000 and 4.0000 for librarians of FUT Minna, ATBU Bauchi, FUT Minna and FUT Owerri respectively further showed that they had almost similar views in the awareness level of GIS in their universities. Therefore, the null hypothesis state that there is no significant difference in the awareness level of GIS services among the librarians in the federal universities of technology is hereby accepted and retained.

Null Hypothesis 2: The null hypothesis states that there is no significant difference in the level of difficulties faced by FUT libraries in their GIS services.

Table 8(a): Analysis of Variance on Difficulties Faced by Selected FUT Libraries in Integrating GIS Services.

Descriptive

Universities	N	Mean	Std.Dev	Std. Error
FUT Akure	11	4.4545	2.76997	.83518
ATBU Bauchi	9	4.4444	2.50555	.83518
FUT Minna	14	4.3571	2.20514	.58935
FUT Owerri	11	4.4545	2.25227	.67909
Total	45	4.4222	2.34025	.34886

ANOVA

CONSTRAINT_OR_DIFFICULTIES_FOR_LACK_OF_GIS_IN_LINBRARY

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	.087	3	.029	.005	1.000
Within Groups	240.891	41	5.875		
Total	240.978	44			

The results of the Analysis of Variance (ANOVA) statistics it have shown that there is no significant difference in the difficulties faced by the librarians in the Federal universities of technology. This is because the ANOVA calculated significant value of 1.000 is higher than the 0.05 level of tolerance.

Table 8(b) Post Hoc Tests on Difficulties Faced by Selected FUT Libraries in Integrating GIS Services.

Multiple Comparisons

Dependent Variable: CONSTRAINT_OR_DIFFICULTIES_FOR_LACK_OF_GIS_IN_LINBRARY

LSD

(I) fed university librarians	(J) fed university librarians	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
FUT AKURE	ATBU BAUCHI	.01010	1.08947	.993	-2.1901	2.2103
	FUT MINNA	.09740	.97663	.921	-1.8749	2.0697
	FUTR OWERRI	.00000	1.03356	1.000	-2.0673	2.0673
ATBU BAUCHI	FUT AKURE	-.01010	1.08947	.993	-2.2103	2.1901
	FUT MINNA	.08730	1.03561	.933	-2.0042	2.1788
	FUTR OWERRI	-.01010	1.08947	.993	-2.2103	2.1901
FUT MINNA	FUT AKURE	-.09740	.97663	.921	-2.0697	1.8749
	ATBU BAUCHI	-.08730	1.03561	.933	-2.1788	2.0042
	FUTR OWERRI	-.09740	.97663	.921	-2.0697	1.8749
FUTR OWERRI	FUT AKURE	.00000	1.03356	1.000	-2.0673	2.0673
	ATBU BAUCHI	.01010	1.08947	.993	-2.1901	2.2103
	FUT MINNA	.09740	.97663	.921	-1.8749	2.0697

Moreover, the Post Hoc Multiple comparison test showed no significant difference in the librarians views of each university compared to another one in their view on awareness of GIS The descriptive statistics also showed the mean responses of4.4545, 4.4444, 4.3571 and 4.4545 for librarians of FUT Minna, ATBU Bauchi, FUT Minna and FUT Owerri respectively further showed that they had almost similar views in the difficulties faced by the librarians in their universities. Therefore, the null hypothesis state that there is no significant difference in the difficulties faced by librarians in GIS services among the librarians in the federal universities of technology is hereby accepted and retained.

Conclusion

The librarians in the selected FUTs are aware of the traditional map library and as well, are aware of GIS service in the library.

Insufficient financial support, lack of collaboration among departments and organizational support, and energy crises in form of epileptic power supply were the major obstacles for the lack of GIS services in the selected FUT libraries.

Provision of constant power, adequate GIS/ICT facilities, needed technical

assistance for GIS user and collaboration among organizations, departments and various units in the school to support GIS services in the library were the main strategies for the integration of GIS services into the library.

There is no significant difference in the level of awareness of GIS service in the libraries and among the librarians in the selected federal universities of technology in Nigeria.

There is no significance difference in the problem faced by the selected universities integrating GIS services into the library.

Given the level of GIS awareness among the librarian and the neutrality of library functionality as information hub on the campus, it is natural that the authorities give the necessary support to bring in this service into the library, where a librarian with GIS skill (GIS librarian) will be dedicated to the provision of the needed assistance to the library patron to maximized access and utilization of GIS services.

Recommendations

The following recommendations are offered so as to improve GIS services in the Federal Universities of Technology in Nigeria:

1. The university library should collaborate with organizations that deal with spatial information or GIS related departments in the university to facilitate GIS services integration into the library, to acquire and, store data from various agencies in a centralized location for maximum accessibility and utilization.
2. The parent organization should allocate more funds to the library to enable them respond to the state of GIS facility and train manpower
3. Librarians and other stakeholders in GIS industry should organize seminars, conferences, workshops, orientation and, refreshers training programmes in the library to keep GIS users informed about developments in the GIS world. Sponsored campus-wide events, such as research symposia and seminars, to inform faculty, staff, and students better about current developments in spatial information and analysis are recommended.
4. Educate a new generation of researchers and students on principles and uses of GIS methods and tools of spatial analysis

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