

Impacts of The Use of Data Analysis Software by Academic Staff of David Umahi Federal University of Health Sciences Uburu, Nigeria for Capacity Building Programme

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Abstract

Background

This study focused on the impact of utilizing data analysis software by lecturers at David Umahi Federal University of Health Sciences (DUFUHS) Uburu, Nigeria for capacity building of research and administrative outputs of the university. The following areas were investigated: Perceived level of Proficiency on the part of lecturers, Readiness to be trained, Establishment need for the support centre for data analysis, and Capacity Building Programmes preferred type

Methodology

In collecting data for the study, we considered descriptive census design, and a structured questionnaire. A total of 319 lecturers at DUFUHS gave their response to questionnaire. Data analysis involved the use of descriptive and inferential statistics.

Results

Results of analysis showed that lecturers used quantitative data analysis software more often than qualitative data analysis software as a way of boosting the research and administrative capacity of the university. This has impacted a lot on the growth of academics among global university ranking in research and collaborations. The quantitative data analysis software that are used frequently were Excel, SPSS, and STATA. Lecturers were therefore rated moderately proficient in their use of preferred data analysis software which has also assisted the university administratively in examination preparations and results computations. They also preferred the establishment of a center for data analysis support in other to facilitate the analysis of their research work and enhance the administrative output of the university.

Conclusions

This study considered the impact of data analysis software use by lecturers at David Umahi Federal University of Health Sciences (DUFUHS) Uburu, Nigeria in the overall output capacity building programme of research and administration of the university. By using some descriptive statistics and ANOVA, we concluded that the preferred training approaches for the capacity building programmes included live demonstration of lecture, discussions in small group, one-on-one instruction or a combination of all the methods. The recommendation about capacity building programmes use of data analysis software is that it must tend to the direction of training methods preferred by lecturers. By our preferred hypothetical ANOVA method, we also conclude that there is an urgent need to establish a data analysis support centre at DUFUHS for use by lecturers in other to enhance their creative outputs generation.

Keywords: *Data analysis software, Lecturer, Capacity building, DUFUHS, Programmes, Centre*

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I. Introduction

Utilization of Data Analysis Software (DAS) by lecturers in universities has increasingly become necessary for informed decision-making, research, and policy development. This work investigates the impact of DASP on capacity building programs at David Umahi Federal University of Health Sciences (DUFUHS) Uburu Ebonyi State Nigeria, focusing on its impacts on lecturer's research productivity, teaching quality, examination preparations and management policy influence. The ability to engage statistical procedures as well as research, and policy development in today's data-driven world is crucial for informed decision-making. Academic staff as key stakeholders in the higher institutions of learning, play a pivotal role in promoting data

analysis and its applications. The use of data analysis in the institutions of higher learning is vital for informed decision-making, research, and policy development. This work considers the evidence-based knowledge, awareness, attitude, skills, and challenges of data analysis among lecturers of universities. The fact that universities rank among the most generally accepted institutions in the twenty-first century according to UNESCO (2013) is commendable. Because of this, institutions of higher learning, play a critical role in the advancement of nations through reputable and high quality research outputs and teaching jobs. The links established between higher education, earnings of higher income and national growth and development have increased the importance for universities to build their capacity so as to provide leadership in the development plan of nations by way of cutting edge research work and innovation (Harmon, et al 2003; OECD, 2003; Blumdell, et al, 2005). Expectations that are high like that from institutions of higher learning means that universities in Nigeria, particularly David Umahi Federal University of Health Science Uburu Ebonyi State, whose mandate is to maintain excellence in human development at every level of education and be able to compete with international developmental standards so as to improve on their visibility. In other to achieve this objective, it is important for universities to attract and hold to themselves well trained and strong faculty members. Lecturers, all over the world especially those at David Umahi Federal University of Health Sciences are needed to guide their students and staff in carrying out research work. According to Akinnagbe and Baiyeri (2011), in time to come, the duties of lecturers will still yield an improved learning by students, but this will require them also wider capabilities rather than content knowledge and skills since we live in a time lecturers are needed to measure up to international standards and create bigger impact as academics from their institutions. Proficiency in using relevant technological tools, like DASP, or a data analysis support centre to aid the work of lecturers is very necessary. Note that data analysis does not only involve statistical data analysis because research needs both quantitative and qualitative data. Data analysis involves the classification as well as the interpretation of linguistic (or visual) material to make statements about implicit and explicit levels and structures of making meaning in the material and what is represented (Flick, 2013). Many computer software packages exist that takes care of quantitative analysis, such as SPSS, Minitab, STATA, SAS, R., Excel, MATLAB, Latex, Python, Excel, etc. There also exist the ones for qualitative data analysis such as: MAXQDA, QDA Miner, Atlas.ti, NVivo, etc.

The specific objectives of this work include: To know the most frequently utilized DASP by lecturers at DUFUHS Uburu, To determine the perceived level of proficiency of using preferred DASP by lecturers, To assess the readiness of training on the use of DASP by lecturers at DUFUHS, To know the extent which the lecturers' preferred methods of training for developing competence using their preferred DASP, To know DUFUHS lecturers' perception concerning the establishment of a data analysis support centre, To determine the difference between DUFUHS lecturers' age and levels of their perceived proficiency using DASP and finally to know the difference between academic rank and DUFUHS lecturers' perceived level of proficiency using DASP.

Significance Of Study

This study will enhance in knowing the role of data analysis software packages in capacity building programs in universities and identify areas that needs improvement. The findings will inform policy decisions and training programs aimed at enhancing the capacity of academic staff in data analysis and its applications.

Knowledge Gap

There is need for the knowledge, awareness, attitude, skills, and challenges of data analysis among academic staff of universities. The above study objectives will go a long way in addressing this knowledge gap and be able to provide insights into the current level of data analysis in universities.

II. Method

This work adopted a descriptive census study design. This is to obtain the entire number of lecturers based on their biographical details (Welman et al, 2012) and also to be able to describe their perspectives on DASP utilization. The sample population taken was the entire DUFUHS Lecturers. A total of 319 lecturers were sampled out of about seven hundred lecturers present at the time of the study. Lecturers of the professorial rank were excluded for lack of response to the questionnaire. Adequate biographical information was obtained from these 319 sampled lecturers for the study.

We designed a questionnaire for data collection. It was pilot-tested first using 40 randomly selected lecturers from the Ebonyi State University Abakaliki, Nigeria to determine its reliability and validity. We obtained an overall Cronbach's alpha of 0.77 as a reliability measure because it is acceptable (Cortina, 1993). We distributed the questionnaire electronically and followed up in other to obtain responses back. Care was taken to ensure the accuracy of data, completeness, and consistency. Participants were made to know about the purpose of research, risks, and benefits of the research study and were supplied with consent before participating. Also information about participant were kept secret. We analyzed data obtained in terms of

frequencies and percentages; means and standard deviation; and ANOVA. We also analyzed thematically data obtained from open-ended items.

III. Analysis And Results

Study Objective 1: Knowing the most often used DASP among Lecturers in the DUFUHS

We considered finding out the most often used DASP among lecturers in the DUFUHS. We listed both qualitative and quantitative DASP. Figure 1 shows bar chart indicating DASP USE by lecturers.

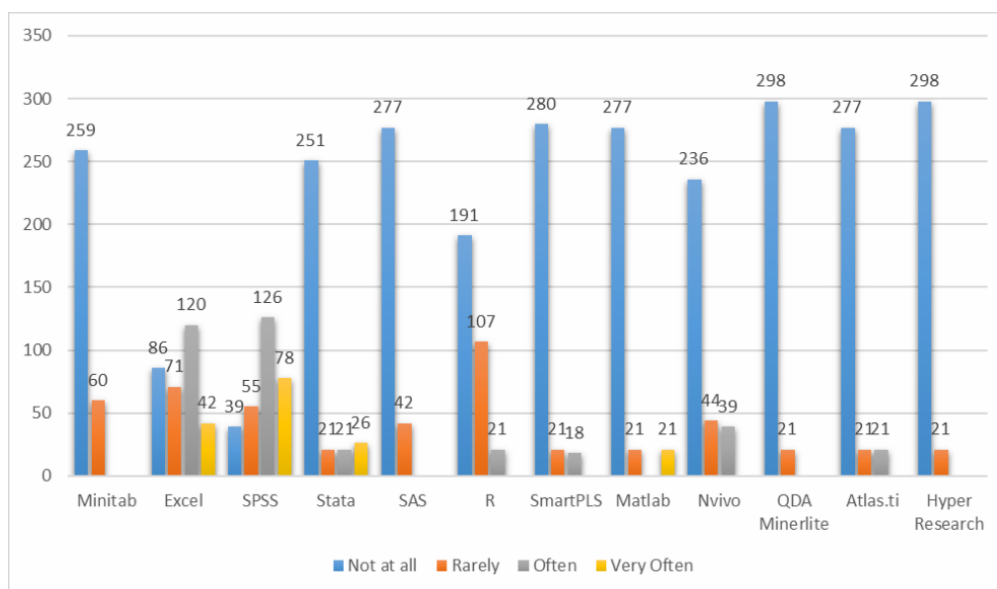


Figure 1: Bar chart for the rate of using DASP:

From the above graph, the most often used DASP was SPSS and seconded by Excel and Stata respectively. These are mainly quantitative DASP. Also note that, QDA Miner Lite and Hyper Research recorded non-usage. This is because there are qualitative DASP. Nvivo and Atlas.ti, are rarely used because there are qualitative data analysis software as well.

Study objective 2: To know DUFUHS lecturers' perceived level of proficiency while using their preferred DASP

The perceived level of proficiency of lecturers is determined here with respect to using their preferred DASP. We measured the level of proficiency on a 5-point likert scale. Table 1 below shows the means and standard deviations of responses from lecturers.

Table 1: Levels of proficiency in using DASP

S/n	Remark	Mean	Standard deviation	Meaning
1	Data coding	2.96	1.67	Average proficient
2	Data entry into DASP	3.59	1.48	Highly proficient
3	Initial Data analysis using qualitative software package	2.53	1.28	Good proficient
4	Initial data analysis using quantitative software package	4.16	1.34	Highly proficient
5	Assumptions checking	4.28	1.26	Highly proficient
6	Choice of appropriate analytical technique	3.13	1.25	Good proficient
7	Capacity to carry out analysis of data	4.04	1.50	Highly proficient
8	Interpretation of data output	3.92	1.38	Highly proficient
9	Info-graphics presentation	2.90	1.48	Good proficient
10	DASP usage proficiency	3.53	1.27	Good proficient

Ranges of Mean: 0–1.5 (Not Proficient); 1.6–2.5 (small proficient); 2.6–3.5 (good proficient); 3.6–4.5 (Very good proficient); 4.6–5 (Excellent proficient)

Average Mean: 3.51 **Average Standard Deviation:** 1.35

From the above Table 1, result revealed that lecturers showed different levels of proficiency in using their preferred DASP. Responses ranged from good to very good proficient. Averagely, the lecturers who joined in the study are seen as good proficient (mean=3.5, standard deviation =1.35) in using their preferred DASP.

Study objective 3: Assessing training readiness of lecturers in DUFUHS in using DASP.

We tried to determine the readiness of training lecturers of DUFUHS in using DASP. This readiness level was measured on a 5-point likert scale with lecturers indicating their positions regarding certain statements about its authenticity or otherwise with respect to their levels of training readiness. The items tried to assess their readiness and knowledge background of using other software packages which offers the needed competencies to them for future training. Table 2 below presents the means and standard deviations of those responses from DUFUHS lecturers.

Table 2: Readiness of training in using DASP by DUFUHS Lecturers

S/n	Remarks	Mean	Standard deviation	Meaning
1	Use of DASP training will increase ones confidence on the job	4.22	1.13	Sincerely of me
2	Creating chance to join in the training on DASP usage	3.79	1.48	Sincerely of me
3	Enough beginners knowledge in the use of other computer software packages	4.07	1.48	Sincerely of me
4	The zeal to join in DASP training	3.16	1.10	A little sincerity from me
5	Participating in the DASP training will help to contribute to professional growth and development	4.12	1.35	Sincerely of me
6	Capacity to pay for the training cost	3.80	1.25	Sincerely of me
7	Zealousness to purchase DASP	4.12	1.21	Sincerely of me

Ranges of mean: 0 – 1.5 (Not sincerely of me); 1.6 – 2.5 (A little sincerity from me); 2.6 – 3.5 (averagely sincerely of me); 3.6 – 4.5 (Sincerely of me); 4.6 – 5.0 (Very Sincerely of me)

Average Mean: 3.90

Average Standard Deviation: 1.28

From Table 2 above, results revealed that DUFUHS lecturers showed different levels of training readiness on DASP. Example, they agreed that DASP training would increase their belief and confidence on the job (mean = 4.22, standard deviation= 1.13) as well as possessing the needed background knowledge in the usage of computer software packages which helps them learn how to utilize new DASP (mean = 4.07, standard deviation= 1.48). Averagely, it means that lecturers who joined in the research study could be seen as very ready (Mean = 3.90, Standard deviation = 1.28) for the training on DASP usage.

Study objective 4: Determining DUFUHS lecturers’ preferred methods of training for competence development in using preferred DASP

Study objective here elicited from lecturers their preferred methods of training for capacity building programme in using their preferred DASP. The results are presented in Figure 2 below.

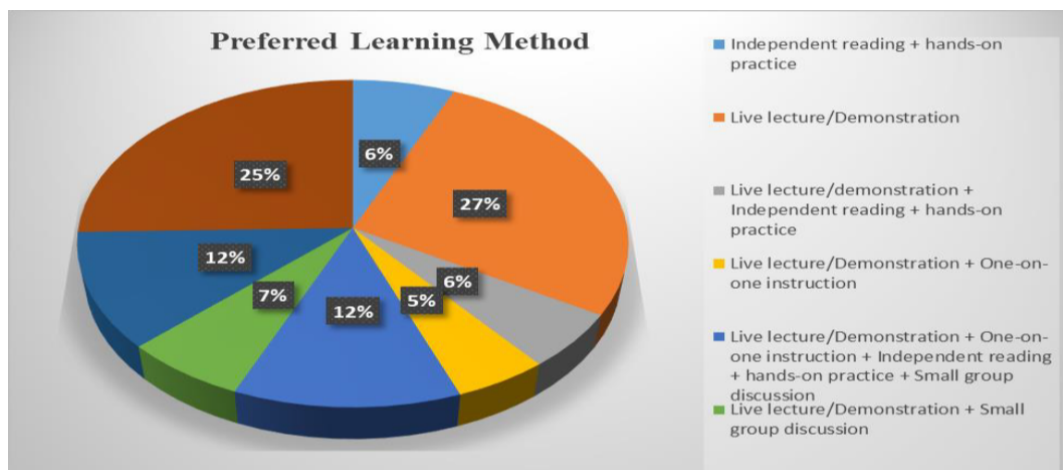


Figure 2: Pie chart for preferred methods of learning by lecturers for data analysis training

From the figure above 27% of the respondents showed their preferred method of training as live lecture/demonstration, followed by 25% who showed interest in having small group chat for any training programme on DASP. While 12% preferred a one-on-one instruction during any training programme on DASP, others preferred choice is combination of live lecture/demonstration, one-on-one instruction, small group discussion, hands-on practice and independent reading,

Study objective 5: Knowing the perception of lecturers in establishing data analysis support centre at DUFUHS

Study objective here is in knowing lecturers’ perception in establishing a support centre for data analysis at DUFUHS. The results are presented in Figure 3.

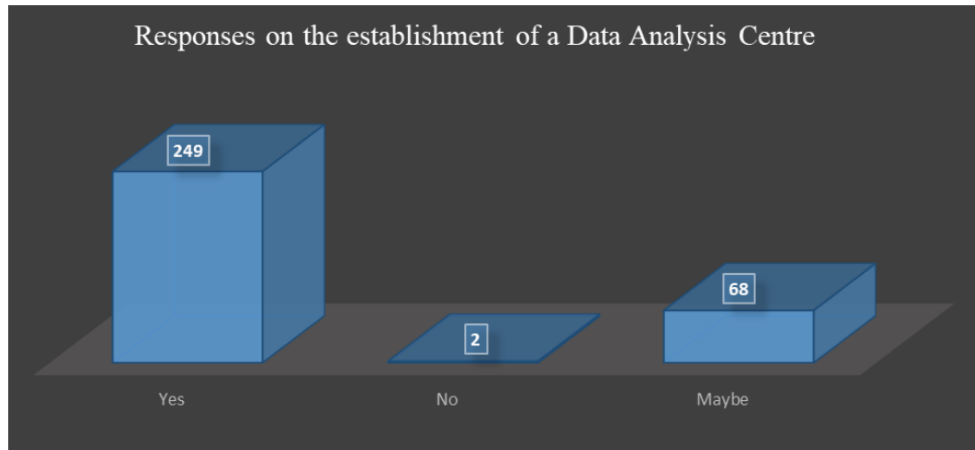


Figure 3: Bar chart graph of responses on establishing a support centre for data analysis

Figure 3 above shows that out of lecturers who joined in the research study, only 2 did not want the establishment of a data analysis support centre. Majority, (249) supported the establishment of the centre to provide help to lecturers in data analysis. Reasons from lecturers’ responses for the support of the centre are summarized below: (a) Increased creative output among lecturers, (b) speed up the rate of research writing, fasten time spent on data analysis and meeting up timelines for research works, (c) there will an opportunity to learn advanced methods of qualitative and quantitative DASP while others believed it would enable them to improve on DASP skills they are used to and (d) the establishment would provide an opportunity for them to receive help data analysis. Some was of the view that such a centre would help them in knowing and selecting the appropriate qualitative and quantitative data analysis method for use in their research, which would help them meet the levels needed by high impact journals and as well make their work more acceptable in the academic world.

Study objective 6: Establishing a distinction between age of DUFUHS lecturers and levels of their perceived proficiency in using DASP

To establish the boundary between lecturers age and levels of their proficiency in DASP utilization, we tested the null hypothesis:

H_0 : There exists no difference between the lecturers age and levels of their proficiency in DASP use.

H_1 : The lecturers age and levels of their proficiency in DASP use are not the same.

Analysis using one-way Analysis of Variance (ANOVA) test produced the results presented in Table 3 below.

Table 3: ANOVA Table for lecturers age and levels of their perceived proficiency in DASP use

Source of variation	Sum of squares (SS)	Degree of freedom	Mean square (MS)	F	Significant probability
Between groups	5.531	3	2.765	6.802	.0000
Within groups	192.305	315	0.406		
Total	197.837	318			

Significant* at P-value < 0.05

Table 3 showed significant relationship difference between lecturers age and perceived level of their proficiency in using their preferred DASP (F (3, 315) = 6.802, P-value = 0.001).

In other to know if the difference lies within the various age groups, we carried out Post-Hoc Analysis of Tukey’s Honestly Significant Difference (HSD) and the results are shown in Table 4 below.

Table 4. Tukey’s honestly significant difference for determining if difference lies within the various age groups

(I) age group	(J) age group	mean difference (I-J)	Standard Error	Significance
24 – 38	39 – 53	.152*	0.049	.005

	54+	.140	.108	.394
39 – 53	24 – 38	.214*	.062	.002
	54+	-.109	.138	.711
54+	24 – 38	.329*	.059	.000
	39 – 53	-.082	.132	.808

Significant at P-value < 0.05

Results from Table 4 showed a significant relationship in the perceived proficiency in the utilization of preferred DASP between age group of lecturers (24–38) and (39–53) at P-value 0.05. Therefore, lecturers aged between 24–38 years appears to be more proficient in their use of preferred DASP when compared to those between 39–53 years. Also, there existed a statistically significant difference between 24–38 age group of lecturers and 54+ age group of lecturers with respect to their proficiency in the use of preferred DASP where the previous doing better than the present.

Study objective 7: Establishing the distinction between rank and DUFUHS lecturers’ perceived level of proficiency in their use of DASP

Based on this we formulate the following hypothesis and test it:

H_0 : There is no difference between lecturers’ rank and levels of proficiency in their DASP usage.

H_1 : There is difference between the rank of lecturer and their levels of proficiency in DASP usage.

We conducted a one-way Analysis of Variance (ANOVA) test while the results were shown in Table 5 below. The results therefore indicate a statistically significant relationship between the lecturers’ rank and perceived level of their proficiency in using their preferred DASP, $F(3, 316) = 9.335$, P-value= 0.000).

Table 5: Analysis of variance table on the Rank of lecturers and levels of their perceived proficiency in DASP use

Source of variation	Sum of squares (SS)	Degree of freedom (DF)	Mean square (MS)	F-ratio	Significant probability
Between Groups	9.831	3	2.765	9.334	0.000
Within Groups	172.098	315	.406		
Total	181.930	318			

Significant* at P-value < 0.05

Applying post-hoc analysis using Tukey’s Honestly Significant Difference (HSD) to identify where the difference lies amongst the various ranks. The results of this analysis are shown in Table 6 below.

Multiple Comparison

Table 6: Tukey’s Honestly Significant Difference (HSD) analysis showing mean differences between lecturers’ age and perceived proficiency in use of data analysis software package

(I) rank	(J) rank	mean difference (I-J)	standard error	Significant probability
assistant lecturer	lecturer	2.595*	.532	.000
	senior lecturer	6.922	2.895	.081
lecturer	assistant. lecturer	2.594*	0.643	.000
	senior. lecturer	4.738	2.905	.362
senior. lecturer	assistant lecturer	6.922	2.895	.080
	lecturer	4.738	2.905	.080

Significant* at P-value < 0.05

Tukey’s result shows a statistical significant relationship existing in the perceived proficiency use of DASP between assistant lecturers and lecturers at p-value 0.005. This means that assistant lecturers perceived more of themselves in the usage of their preferred DASP when compared to lecturers. Also, no statistically significant relationship exists between assistant lecturers and senior lecturers while lecturers and senior lecturers do not also relate in the perceive of their usage of DASP.

IV. Discussion

Most Frequently Used DASP among Lecturers at DUFUHS

Results of this study indicates that in the order of SPSS, Excel and STATA are the most often used DASP by lecturers in DUFUHS while the least or rarely utilized are Hyper Research and QDA Miner Lite. These results agree with what was found by Akinngbe and Baiyeri (2011) and Abatan and Olayemi (2014). These studies also noted that all the DASP frequently used by lecturers are just quantitative DASP. According to Jacobson & Weller, (1988); Schrum, (1999); Willis, et al (1999), the main obstacle to the use of technology

in education is due to lack of training and weak technical support (Schrum, 1995). Lack of training for some software and difficulty in accessing them has been the issue surrounding the use of qualitative DASP even when one is familiar with some of them. Again, many of the works carried out by students are quantitative in nature. What this result implies is that more effort should be channeled towards capacity building programmes in DASP usage for qualitative data by developing competence in the use of the software that employ the qualitative approach to research more than the quantitative approach.

Perceived levels of proficiency of lecturers in using their preferred DASP

DUFUHS academic staff considered themselves on the average to be proficient moderately in using their preferred DASP. This is an interesting development that implies an appreciable level of confidence on the part of the lecturers in their own capacity to use their preferred DASP. Effort should be made by academic staff of universities to acquire software skills considering the academic rigor involved in carrying out research. They should develop utmost confidence in their levels of proficiency in using this software. Although a self-rating of lecturers moderate proficient may be considered good enough, there is still more opportunity for improvement. Implementation of capacity building programme development should be taken seriously by all lecturers largely for quantitative DASP utilization by making effort to possess all the required skills in their usage. There is need for more training programmes organization to help lecturers build their capacities in using DASP which they know.

Readiness to train in using DASP

If the lecturers do not have the required skills for the kind of work expected of them, then there is high need to provide them with the needed training. Are they ready for the capacity building programmes on DASP usage? Results in this study showed that lecturers possessed the needed background knowledge to help them acquire new DASP. Also lecturers were sure that training in the use of DASP would increase their confidence on the job. In all, lecturers could be seen as very ready for future training in DASP use. This result is contrary to the results obtained by Ibezim (2015) and Omotunde (2017) because according to them academic staff does not possess the basic computer skills for future training in DASP use. This therefore implies that capacity building programmes in DASP use by lecturers would render good patronage from them.

Preferred Training Approaches by Lecturers in enhancing their Competencies for their use of Preferred DASP.

Lecturers considered developing their capacity most in certain areas as their preferred DASP and these areas were live lecture/demonstration, one-on-one, instruction small group discussion, and a combination of one-on-one instruction, live lecture/demonstration, independent reading, hands-on practice and small group discussion, following that pattern. This means that though the need for lecturers vary, some training approaches that are common would best be okay for majority of them, but few of them may need special attention. The choice of small group discussions is in line with what Georgina and Olson (2007) found out in their work whereas online tutorials in the form of computer assisted instructions by the American Library Association (2005) were not be a better option. Therefore, it implies that capacity building programme in DASP utilization by traditional approaches of live lecture/demonstration is in agreement with lecturers' interest and should be an option in providing the needed training for lecturers.

Perception of lecturers about establishing a support centre for data analysis

Result showed that majority of the lecturers who joined in the study was of the view that the centre for data analysis should be established in DUFUHS to assist faculty members with data analysis for their research. They argued that such a centre would help increase research creative output, enhance the turn-around period for data analysis for research work, improve lecturers' knowledge of new software and provide guide to lecturers on analysis of data and DASP utilization. Therefore, the establishment of the data centre would enjoy good patronage by lecturers in their desire to develop their skills in DASP utilization.

Distinction between lecturers ages and perceived levels of proficiency in DASP utilization by them

The Analysis of Variance result in the table showed a significant difference between lecturers ages and perceived levels of proficiency in their use of DASP while the post hoc analysis noted that younger lecturers perceived showed more proficient in using DASP compared to older ones. This result is in support that those aged 25–34 are seen according to Oblinger & Oblinger (2005) and Prensky (2001) as active experimental learners, proficient in multi-tasking, and dependent on communication technologies for getting information and for reaching out to others. This however is not in agreement with the results from Akinagbe and Baiyeri (2011) who concluded that age does not in any way play any role in lecturer's need for training in DASP usage. They were of the view that lecturers who are older might need more training when compared to the lecturers that are

younger. This may be that lecturers who are younger may be more technologically driven more than the older lecturers. This therefore means that the training for capacity building programmes should put ages of lecturers into consideration. This implies that older lecturers should be allotted more time and attention during training programmes in DASP utilization.

Distinction between rank and perceived level of proficiency by lecturers in their DASP utilization

The Analysis of Variance test showed a significant difference between lecturers' rank and perceived proficiency in their use of preferred DASP while the post-hoc test result showed only a difference between assistant lecturers and lecturers out of others. While assistant lecturers perceived themselves as more proficient than lecturers may be due to the fact that they were mainly new from school and might have acquired certain DASP knowledge during their training, when compared to other lecturers who completed their education a longtime ago and who may have not had the opportunity of acquiring any skill on new software. This means that regular training in using DASP would assist greatly to keep lecturers in line with current realities and also enhance their proficiency. This also means that there should be changes in the DASP training that will be organized for lecturers so that younger lecturers with better chances of learning faster should be given separate training other than the one that will be organized for the older lecturers since they have less proficient in DASP.

V. Summary And Conclusion

We summarize and conclude as follows:

1. DUFUHS lecturers often use quantitative more than qualitative DASP and the most frequently used quantitative DASP are SPSS, Excel and STATA.
2. DUFUHS lecturers see themselves as averagely proficient in using their preferred DASP.
3. DUFUHS lecturers have the needed aptitude combined with readiness for future training in using DASP
4. DUFUHS lecturers would prefer live lecture, discussion in small group, one-on-one instruction, and a combination of live lecture, one-on-one instruction, reading independently, hands-on practice and small group discussion approaches for learning regarding DASP.
5. DUFUHS lecturers advise for establishing a support centre for data analysis so as to provide assistance to lecturers in DASP usage. This would likely enjoy huge patronage of lecturers
6. DUFUHS younger lecturers see themselves as more proficient in DASP usage compared to older lecturers
7. Perceived proficiency among lecturers in using DASP is taken as rank sensitive at DUFUHS. A situation where by Assistant lecturers are perceived as proficient more than lecturers.

Recommendations

We are recommending the following based on the results of the research work:

1. There is need for regular training and opportunities for development to be organized for universities staff (academic and non-academic) to increase their skills in DASP utilization.
2. Regular use of DASP should be encouraged among academic staff especially in their research work and practice of teaching.
3. There is need for the provision of adequate infrastructure and technical aid to speed up the use of software for data analysis.
4. Through the Directorate of ICT, DUFUHS should build a support centre for data analysis in the university. This will provide help to academic staff and students in data analysis of their research and help build up their capacity as lecturers in DASP utilization.
5. The Directorate of Human Resource in DUFUHS, in collaboration with relevant bodies should from time to time organize special training programmes for staff to build the capacity of lecturers in DASP utilization more especially for data that are qualitative in nature.
6. The Development and Training Section in DUFUHS should pay close attention to lecturers that are old and lecturers at higher ranks more especially during capacity building programmes in DASP utilization since they are less proficient compared to younger and assistant lecturers.

Further Studies

Future studies should dwell more on the use of advanced statistical methods such as R, Python by university staff and the challenges involved.

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