USE OF THE INTERNET FOR LEARNING AMONG STUDENTS IN AGRICULTURE AND RELATED DISCIPLINES IN NIGERIAN UNIVERSITIES

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THE internet use is acknowledged to facilitate enriched networking and multiple collaborations among agents across geographic domains. However, use of the internet for social interaction appears to be at the expense of use for academic purposes among users particularly students.

Purpose: *This study is, therefore, designed to analyse the use of internet by students in agriculture and related disciplines in Nigeria.*

Design/Methodology/Approach: *Data used for this study were collected from 232 randomly selected students enrolled in agriculture and related fields in the University. Data were subjected to descriptive and inferential statistics.*

Findings: *Findings indicate that the general awareness of Information & Communication Technology (ICT) applications and knowledge and attitude to the use of the internet for learning were high among respondents ($p<0.01$). Daily use of the internet was, however, highest for social chatting followed by its use for academic purpose ($p<0.01$). The Tobit regression indicates that proportion of hours spent on the internet for academic purpose was positively reinforced by attitude to use ($p<0.05$) and age of respondents ($p<0.1$), and negatively by total hours spent on browsing ($p<0.01$). Identified constraints include the slow speed of internet and lack of awareness of appropriate academic search engines.*

Research Limitations: *The study is limited to Agriculture-based students in Tertiary institutions sampled in University of Ilorin, Nigeria, hence the findings is limited to the study area. It may be required that similar studies need to be carried out on agriculture-based students drawn from other institutions in Nigeria.*

Practical Implications: *The study recommends an improvement in logistics; the supply of electricity, the increase in the bandwidth for internet users, and the training of students on appropriate searching techniques.*

Key Words: Internet, Education, Students, Agriculture.

Introduction

The use of the World Wide Web and the use of digital technologies for research and training are positive indicators in the domain of agriculture-led sustainable national development (Gabre-Madhin and Haggblade 2003; Diao et al., 2006; World Bank, 2007). In agricultural education, training and research, the use of the internet can be effective in the design and development of locally relevant and acceptable forms of curriculum, bridge research gaps across geographic domain (Huang and Alessi, 1996), and

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facilitate better ways of learning that will provide immense opportunities for research and development (Gurumurthy et al., 2005). This will ultimately ensure that sensitivity to individual learner and researcher's options and interests are accommodated, thereby facilitating the research and learning process (Surendran, 2008). In a study conducted on the students of University of Delhi, Singh and Sahi (2012) found that preference for particular learning style (Concrete Experience, Abstract Conceptualization, Reflective Observation, and Active Experimentation) does not differ among males and females. So gender differences should not be considered while selecting instruction approach and designing curriculum for the students. The study further concluded that learners have high preference for learning something by actually doing it and judging its practical value, such as, facilitator instructor approach where learners are encouraged to think, read, and challenged to learn about the subject?.

The use of digital technologies and the internet is however not without potential abuse and misuse among adolescents particularly students (DeBell and Chapman, 2003). The increased use of the internet may facilitate cheating and plagiarism on school assignments (Lathrop and Foss, 2000) and on research activities. The time spent on online communication through instant messaging and social networking sites may displace the time spent for academic purposes (Valkenburg and Peter, 2009), and the extensive use of the internet may contribute to a sedentary lifestyle that increase the risk for obesity and associated health disorder (DeBell and Chapman, 2003). Further concerns centre around its tendency to increase social isolation among adolescents (Kraut et al., 1998; Sanders et al., 2000) and the potential of violent games to cause increases in hostility and aggression (Irwin, 1995; Kirsh, 1998; van Schie, 1998) and unhealthy exposure to inappropriate materials that may include pornography and sexual solicitation (Mitchell et al., 2003).

In view of the conflicting ends that the internet could be used, there is a need to bring into perspective the context in which it is used by students in agriculture-related disciplines and the identification of the constraints that hinders its effective use for agricultural research in Nigerian Universities. In view of this, the objectives of this study are, to:

1. examine respondents' knowledge of ICT applications and devices that could facilitate learning;
2. identify the specific usage of the internet and relative frequency for each specific usage;
3. describe respondents' knowledge and attitude to the use of the internet for learning;
4. assess the constraints to the use of the internet for learning; and
5. highlight the factors influencing time spent for academic purpose on the internet.

Several works have been done to examine the use of the internet by students. Njagi and Isbell (2003) examined students' attitudes towards web-based learning resources. The findings point out that the majority of the students in both web-based and the traditional textbook groups had owned personal computers and had Internet access in their homes and concluded that it was possible that computer use was equal for all groups of all students.

Biradar (2008) assessed university students' and teachers' use of search engines for retrieval of scholarly information. Findings show that 100% of the students and 97.91% of faculty members, use search engines for retrieval of information on the internet. Google and Yahoo receive the highest overall ratings. The study reveals that majority of the respondents takes help from their friends and use help messages of search engines to learn the search strategy.

Al-Ansari (2006) conducted a survey on the Internet use by the faculty members of Kuwait University. Findings indicate that a large majority have been using the computer and the internet for more than five years mainly for communication, research, and publication. It has helped them to save time, find up to date information, and cooperate with their colleagues. Slow speed, lack of time, and lack of access from home are the major problems. Most of them are interested in improving the internet use skills through formal training.

The study of Khan et al., (2011) conducted a survey of the use of ICT by students of the faculty of Education at Islamia University of Bahawalpur (IUB). Findings indicate that the majority of the respondent's knowledge about computer applications was quite sufficient for learning purposes and agreed that ICT has great impact on their learning as it helps in improving their GPA. The result further shows that the respondents use 7 to 9 hours weekly in different online information searching activities and major problems identified facing the use of internet include slow speed of PCs due to viruses, inadequate number of PCs in laboratories, lack of time in utilizing e-resources, slow internet connection, and electricity failure.

Thanuskodi (2010) examined the use of Internet and Electronic Resources for Agricultural Science Information by using a Case Study of agricultural colleges of Tamil Nadu, India. Findings indicate that Library and information centres are playing a crucial role in the growth and development of the nation directly/indirectly by providing better services to the members of the society.

Rezaei et al., (2008) investigated the acceptance of the e-learning in agricultural higher education institutions in Tehran, Iran. The study modeled the prediction of e-learning application in agricultural higher education using technology acceptance model. Behavioural intention to use e-learning instead of actual use of e-learning, was used to measure the use of e-learning because there was no e-learning system that students could apply in the faculty of agriculture. Results showed that perceived usefulness, internet experience, computer self-efficacy and affect had a positive relationship with the students' intention to use e-learning system. Instead, computer anxiety and age had a negative relationship with the students' intention to use e-learning. From the literature reviewed, it appears that studies on the use of the internet by students in the fields of agriculture and related disciplines are relatively scanty in Nigeria. This study, therefore, seeks to bridge this gap in knowledge.

Materials and Methods

This study was conducted in Nigeria. University of Ilorin was purposively chosen as the study area because of the strong presence of agriculture and related disciplines in the University. The University has over eight departments that are related to agricultural development and had over time contributed to the development of manpower and the conduct of research in various fields of relevance in agriculture. In addition, the University operates a wireless and Wi Fi Hotspot internet subscription service which is made available to staff and students of the University to ensure access to the internet with a view to enhance the quality of the learning environment.

Sampling Procedure and Data Collection

The target population for this study comprised of registered students in the University of Ilorin, Nigeria. A two-stage sampling procedure was used in selecting the respondents for this study. The first stage involved the purposive sampling of registered students in the faculty of Agriculture and Agriculture related faculties in University of Ilorin, Nigeria. The second stage involved the simple random sampling of 232 respondents across the identified departments in the faculties.

Data were collected through the use of a questionnaire. The questionnaire was pretested and the reliability tests were used in validating the variables on the questionnaires. Out of the 232 questionnaires administered, 4 were returned with incomplete information and missing data. Data collection was done towards the tail end of the second semester examination of the 2012/2013 academic calendar of the University.

Data Analysis

Descriptive and inferential statistical analysis was utilized in analysing the data. Specifically, objectives one and two were analysed with descriptive (frequency distribution, mean, and standard error) and the inferential statistics (chi square) which was used to make an inferential statement about the distribution of respondents' responses.

Respondent's knowledge and attitude to the use of the internet was measured with a nine-item statement ranked on a five-point psychometric scale. Respondents were presented with the following statements: Use of the internet has great impact on the learning process; the internet accelerates learning process; use of the internet improves my GPA (academic assessment); lecturers should use the internet for updating their knowledge; our course outline does not support the use of the internet; the author prefered the use of the e-library to the conventional university library; the author knew how to use the internet but not interested in using it for learning; the author could not study without consulting the internet to further my scope; and the author found it time consuming to use the internet for learning. Each respondent was asked to rank these statements on a five-point scale ranging from strongly disagree (1 point) to neutral (3 point) and strongly agree (5 point). A Cronbach's alpha test of the reliability of the items was 0.65. A score was generated for the knowledge and attitude level to the internet use by each respondent by summing the total points scored on the scale and dividing it by 45 (highest score that could be obtained on the scale) and expressed as a percentage.

Respondents constraints to internet use measured by presenting respondents with the following 8-item constraints after a review of literature: lack of time; lack of knowledge; lack of access to application facilities; inconsistent electricity; slow internet services; lack of knowledge on search engines for academic purpose; the use of the ICT and the internet is too expensive; and inadequate facilities to encourage learning through the ICT and the internet. Each item was ranked on a five point scale .Cronbach's alpha reliability test of internal consistency of items was 0.74. Descriptive analysis (frequency and percentages) and statistical significance (chi square) of the spread of the agreement or disagreement of responses to each of the statements was carried out. Additionally, a composite score was generated for each respondent's constraint by summing up the scores.

The Tobit regression model was used to identify the factors that influence the time spent by respondents on the internet for academic purpose. The Tobit model is a statistical model used to describe the relationship between a non-negative dependent variable and an independent variable (Tobin, 1958). It assumes that there is a latent unobservable variable underlying the observed dependent variable. The two are equal when the latent variable is greater than zero, but the observed variable is zero when the latent variable is negative. Basically, the model takes the form

$y_i^* = X_i\beta + e_i$

$y_i = 0$ if $y_i^* \leq 0$

$y_i = y_i^*$ if $y_i^* > 0$

Where,

yi* is the proportion of the hours spent/week on the internet for academic purpose as a fraction of the total hour spent by the *ith* respondent.

Xi represents the explanatory variables that are hypothesized to influence the use of the internet for academic purpose and it ranges from; X_1(age), X_2(sex); X_3(year of study), X_4 (degree in view), X_5 (composite score of respondents' knowledge and attitude to the use of the internet), X_6 (score of respondents' constraints to the use of the internet). e_i is the error term that is randomly distributed with mean zero and variance as described by Greene (2003).

Results and Discussion

Distribution of Respondents based on Selected Characteristics

The distribution of the respondents based on their sex, marital status, age, degree in view and year of study is presented in Table 1.

Table 1: Distribution of Respondents Characteristics

Variables		Frequency	Percent
Sex	Male	156	68.4
	Female	72	31.6
	Total	**228**	**100.0**
Marital	Single	225	98.7
	Married	3	1.3
	Total	228	100.0
Age	<= 20.00	53	23.2
	21.00 - 23.00	100	43.9
	24.00 - 26.00	54	23.7
	27.00 - 29.00	13	5.7
	30.00+	8	3.5
	Total	**228**	**100.0**
Year of Study	First Year	15	6.6
	Second Year	34	14.9
	Third Year	52	22.8
	Fourth Year	89	39.0
	Fifth Year	38	16.7
	Total	**228**	**100.0**
Degree in View	B. Agri.	89	39.0
	B. Eng.	137	60.1
	B. Ed.	2	0.9
	Total	**228**	**100.0**

Source: Field Survey, 2013.

As identified in the Table No. 1, the majority of the respondents were male, single, and had the award of Bachelor of Engineering degree in view (Table 1). The mean age was 22 years while the modal age group was between 21 to 23 years. The larger percentage of our respondents being male may be accounted for by the spread of the degree pursued. Males are observed to be more into engineering related disciplines than female. The age distribution is closely supported by the study Khan et al., 2011 which reported that about 96% of university student internet users fall between the age range of 20 to 25 years.

Knowledge and Awareness of ICT applications Used to Facilitate Learning

The result of the knowledge and awareness of respondents' knowledge and awareness of ICT applications and devices that could facilitate learning is presented in Table 2.

Table 2: Awareness of ICT Applications used for Learning by Respondents

	Aware		Not Aware	
	Frequency	**Percentage**	**Freq**	**Percentage**
Phone	219	96.1	9	3.9
Camera	217	95.2	11	4.8
YouTube	212	93	16	7
iPods	209	91.7	19	8.3
Video Conferencing	195	85.5	33	14.5
Voice Projection systems	156	68.4	71	31.1
Podcasting	135	59.2	93	40.8
Virtual Learning Environment	133	58.3	95	41.7
Interactive white boards	133	58.3	95	41.7
Archos	55	24.1	173	75.9

Source: Field Survey, 2013.

As revealed in the Table No. 2, over 90% of affirmative responses were received from respondents on the use of phone, camera, YouTube and iPods (Table 2). About 85% of respondents indicated that they are aware of the use of video conferencing for learning, and 68 to 58% of responses indicated awareness of the use of voice projection systems, podcasting, the Virtual learning environment and Interactive white boards. Less than 25% of responses indicated the awareness of the use of the Archos to facilitate learning.

The relatively higher percentage response to the use of phone, camera, YouTube, and iPods could be due to the relative flexibility and adaptability of these applications particularly in environments where ICT equipments are minimal. The camera can facilitate photograph taking during field work and farm visits which can be further analysed and transferred for more detailed examination. Video cameras on phones can also facilitate the live footage of practical sessions on farm which can be further reviewed to inspire and develop a focus for research. An iPod has alternative uses and it may help to transfer photographs, videos, contact information, e-mail settings, web bookmarks, and calendars. Its use can engage and motivate students through analysis of performance from practical field experience. The use of video conferencing can facilitate practical demonstration from guest lecturers and scientists in the field. Multi-collaborative researchers can connect and interact through the use of the video conferencing. The equipment required includes a TV monitor, camera, microphone, speaker and a compressed video system which can be transmitted through an Integrated Services Digital Network (ISDN).

Purpose and Relative Frequency of Internet Use by Respondents

The result of the identified purposes and the relative frequency of internet for identifying purpose is presented in Table 3.

Table 3: Purposes and Relative Frequency of Use of Internet

	Never		Rarely		Often		Daily		Chi Square (diff)
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	
General Knowledge	5	2.2	16	7	118	51.5	90	39.3	168.407 (3)***
Academic Purposes	0	0	7	3.1	136	59.4	86	37.5	111.619 (2)***
Chatting & Social Interaction	1	0.4	40	17.5	67	29.3	121	52.8	128.230 (3)***
Reading Mails	8	3.5	61	26.6	96	41.9	64	27.9	78.7 (3)***
Playing Games	31	13.5	91	39.7	59	25.8	48	21	35 (3)***
Online Shopping	35	15.3	64	27.9	88	38.4	42	18.3	32.9 (3)***

Source: Field Survey, 2013.

The variance indicated by respondents for frequency of use ranging from; daily, often, rarely, and never, is significantly different at each level of purpose of use ($p<0.01$). As revealed in Table 3, on a daily basis, the use of the internet was highest for chatting and social interaction (52%) and followed by its use for learning on general knowledge. Its use on a daily basis for academic purpose was at 37%. No respondent reported not to have used the internet for academic purpose, while only 1% reported not to have ever used it before for chatting and social interaction purpose. The higher value of responses received for daily use of the internet for social interaction and chatting confirms observed trends and dimension of subscribing to these interaction applications uses. Facebook in particular is recognized as the third largest country in the world by virtue of the number of subscribers it has all over the countries in the world (The Economist, 2010).

Knowledge and Attitude to Use of the Internet for Research and Learning by Students in Agriculture

The result of the distribution of respondents based on their responses to the knowledge and attitude to the use of the internet for learning is presented on a five-point psychometric ranking in Table 4.

The chi-square test indicate that the variation in the spread of responses given for each of the statement was significantly different ($p<0.01$). As revealed in the Table, 58% and 25% of the respondents strongly agree respectively that internet has great impact on their learning and that it has greatly improved on their GPA performance in school. On the other hand, 30% and 26% of the respondents respectively strongly disagree that they are not interested in the use of the internet and that it is time consuming. About 37% are neutral to the use of the e-library or the conventional library and are neutral to the impact of the internet on their studies.

Furthermore, the points indicated by respondents on the five point scale on knowledge and attitude

Table 4: Distribution of Respondents' Knowledge and Attitude to the Use of the Internet

	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		
	Freq.	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**	**Chi Square**
Internet has great impact on my learning	16	7	4	1.8	9	3.9	66	28.9	133	58.3	260(4)***
It accelerates learning process	6	2.6	10	4.4	14	6.1	100	43.9	97	42.5	07.8(4)***
Lecturers should use the internet for updating their knowledge	9	3.9	18	7.9	17	7.5	79	34.6	104	45.6	63.9(4)***
Our course outline does not support the use of the internet	51	22.3	80	35.1	53	23.2	23	10.1	21	92	52(4)***
I know how to use but simply not interested in its use	69	30.3	90	39.5	24	10.5	35	15.4	10	4.3	97.7(4)***
I cannot study without consulting the internet	17	7.5	46	20.2	56	24.6	75	32.9	34	14.9	41(4)***
I find its use time consuming	60	26.3	94	41.2	32	14	31	13.6	11	4.8	89.2(4)***
I prefer the use of the e-library to the conventional library	13	5.7	29	12.7	85	37.3	51	22.4	50	21.9	64.6(4)***
Use of the internet improves my GPA	4	6.1	18	7.9	60	26.3	77	33.8	58	25.9	68(4)***

Source: Field Survey, 2013.

assessment were scored and expressed as a percentage. The result of the distribution of the scores is presented in Table 5.

Table 5: Distribution of Respondents' Score of knowledge and Attitudes to the use of the internet for Academic Learning

Distribution of Respondents' Score (%)	Frequency	Percent
<= 40	8	3.5
41 – 55	12	5.3
56 – 70	123	53.9
71 – 85	80	35.1
86+	5	2.2
Total	228	100.0

Source: Field Survey, 2013.

The distribution as revealed in Table 5 shows that the modal score of the respondent was between 56 to 70%. This is followed by 71-85% by about 35% of the respondents. Less than 4% of the respondents scored less than 40% and 2.2% of the respondent scored above 85%. The result indicates a relatively high knowledge and attitude to the use of the internet for learning and academic purposes.

Constraints to the use of the Internet for Learning by Respondents

The result of the distribution of respondents to identified statements indicating constraints to the use of the internet for academic purpose was examined using on a five point psychometric ranking.

The statistical test carried out to examine the significance of the variation expressed for each statement indicates a significant difference in the responses ($p<0.01$). About 29% and 24% strongly agreed respectively that inconsistent electricity and slow speed of the internet as major constraints to the use of the internet for academic learning. Furthermore, 21%, 16%, and 10% strongly agreed respectively that inadequate facilities, high rate of subscription to and lack of knowledge of operational and search engine as major constraints. On the other hand, 16% and 14% respectively strongly disagreed that lack of access and time consuming were constraints to the use of the internet for learning. In addition, the study quantified the respondents' constraints to the use of the internet and responses were scored using the five-point scale and expressed as a percentage. The result of the distribution of respondents' scores on constraints is presented in Table 7.

As revealed in Table 7, about 63% of the respondents scored the constraints associated with the use of the internet to be between 56 to 85%. About 4.8% scored the constraints higher than 86% and 5.2% scored the constraints to be less than 40%. As indicated the high value of the scores of the constraints show that respondents rank the constraints affecting their use of the internet as high.

Factors Influencing Time spent on the Internet for Academic Purpose

The result of the factors influencing the amount of time spent on the internet for learning and academic purpose is presented in Table 8.

Table 6: Distribution of Respondents' Constraints to the use of the internet for Academic Learning

	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		
	Freq.	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**	**Chi Square**
It is too time consuming	33	14.4	81	35.3	35	15.3	66	28.8	14	6.1	59(4)***
Lack of operational knowledge	30	13.1	113	49.1	17	7.4	56	24.5	13	5.7	141(4)***
Lack of access to application	37	16.2	51	22.3	21	9.2	99	43.1	21	9.2	85(4)***
Inconsistent electricity	13	5.7	18	7.9	22	9.6	109	47.6	67	29.3	143.5(4)***
Slow speed of internet	7	3.1	22	9.6	15	66	129	56.3	56	24.5	211(4)***
Lack of knowledge on appropriate search engines	27	11.8	66	28.8	45	19.7	78	33.1	13	5.7	59(4)***
Subcription rate is not affordable	16	7	65	28.4	34	14.8	77	33.6	37	16.2	57(4)***
Inadequate facilities to encourage learning	11	4.8	37	16.2	23	10	110	47.1	48	21	118(4)***

Source: Field Survey, 2013.

Table 7: Distribution of Respondents' Score on the Constraints to the use of the Internet

Distribution of Respondents' Score of Constraints	Frequency	Percent
<= 40	12	5.2
41 – 55	59	25.8
56 – 70	74	32.3
71 – 85	72	31.4
86+	11	4.8
Total	228	99.6

Source: Field Survey, 2013.

Table 8: Determinants of Hours spent on the Internet for Academic Purpose

Independent Variables	COEFF.	Std. Error	t-Value
Constraints to the use of the internet	-0.65622	0.7200	-0.91
Knowledge and attitude to the use of the internet	0.0061**	0.002888	2.12
Sex	0.0125	0.0322	0.39
Marital status	-0.04322	0.1194	-0.36
Age	0.0096*	0.0057	1.69
Year of study	-0.0002	0.0144	-0.00
Total hour spent on the internet	-0.0013***	0.00388	-3.24
Constant	-0.1199	0.2155	-0.56
Sigma	0.1795805	0.0121957	
Prob > chi^2=0.001; Log likelihood = -18.100225			

Note: single asterisk (*), double asterisks (**) and triple asterisks (***) indicate significance of coefficient at 10%, 5% and 1% respectively

Source: Field Survey, 2013.

The Tobit model parameters indicate that the model significantly explained the predictors of the variation in the hours spent on the internet for academic purpose ($p<0.001$) as a fraction of the total hours spent on the internet. As revealed in the Table, respondent's knowledge and attitudinal score to internet use for learning ($p<0.01$) and age of the respondent positively influenced the time spent for academic activities. Total hours spent on browsing, on the other hand, negatively influenced the hour spent on the internet for academic purpose, all other factors remaining constant. Essentially, a respondent with a higher attitudinal and knowledge score to internet use may have an interest in using it for learning. Respondents with higher ages may equally tend to use the internet more for academic purpose. It may be that such respondents happen to be in more advanced year of study

where research, term papers and seminars are required of them before they can successfully complete their degrees. The negative influence of the total amount of time spent on the internet may be due to the higher time spent by such respondents on other uses like social chatting which may cause a relatively reduced time spent for academic purpose.

Conclusion and Recommendations

This study examined the use of the internet for learning. It specifically analyzed respondents' awareness of the ICT applications used to facilitate learning, examined the knowledge and attitude to the use of the internet for academic, frequency of internet use for identified purposes, constraints to its use for learning, and determinants of the time spent for academic purpose. Respondents were randomly drawn from students registered with Agriculture and related fields in University of Ilorin, Nigeria. From the findings, the study concludes that the knowledge and attitude to the use of the internet was high and specific purpose of use was highest for social chatting followed by its use for general knowledge acquisition and its use for academic purpose. Constraints identified to hinder effective use for learning include inconsistent power supply, slow speed of the internet, inadequate facilities, and lack of knowledge on the appropriate search engine to use for information retrieval. Specific factors determining effective use of the internet for academic purpose were the age of the respondents, knowledge, and attitudinal score of respondents to the internet use for learning and the total duration of time spent on the internet for all purposes.

To enhance the effective use of the internet for learning among students of agriculture and related disciplines, the study, therefore, advances the following recommendation:

1. provision of regular power supply;
2. upgrading the internet bandwidth so as to increase the speed of the internet;
3. organizing training and workshop for students to enhance their knowledge of appropriate search engine they could use in their respective fields; and
4. an overall upgrade the internet and ICT facilities of the university.

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