
Adoption of Digital Information Resources and Students' Academic Activities in Nigerian Federal University Libraries

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Abstract

This study investigated the adoption of Digital Information Resources as correlates of Academic Activities of students in Federal universities in Nigeria. The study was guided by two research questions and one hypothesis tested at 0.05 alpha level. Survey research designed was adopted and 306 respondents, determined from population of 1,695 in 12 selected Federal universities in Nigeria, were involved in the study. Questionnaire was used for data collection. Descriptive statistics such as frequency count, percentage (%), mean score and standard deviation as well as inferential statistic such as Chi-Square Test of Independence with Cramer's V (Pearson's chi-squared statistic) were used to determine and test hypothesis at 0.05 level of confidence. The findings of the study revealed that e-books, e-journals, e-conference proceedings, e-magazines, e-greys, e-newspapers, e-theses/dissertations, and multimedia resources were adopted by the students while reading for tests and examinations, writing seminar papers, workshop papers, conference papers, articles, projects/theses/dissertations, and class assignments. The study concludes that there is relationship between students' adoption of digital information resources and their academic activities $X^2(1) < 23.625a$, $P = .001$, and that the relationship is positive but weak ($\phi_c = .278$, $P = .001$). The study recommends that free and high-speed internet service should be made available in the library and emails should be used to select and disseminate titles of articles and books to students to strengthen their adoption of digital information resources with their academic activities.

Introduction

Separating the concept of adoption from use when discussing the application or utilisation of library resources for better academic excellence has been a much debatable issue as evidenced in many studies (Eiriemiokhale, 2015; Isah, Serema, Mutshewa & Bwalya, 2014; Joseph, Hamzat, & Izuagbe, 2016; Isah, 2015; Uddin, Al Mamun, & Rahman, 2019). From the titles to the discussion of findings, the two concepts have always appeared as either synonymous or interchangeable. However,

some authors like Rogers (2003) in his “Diffusion of Innovation Theory”; Fishbein and Ajzen (1975) in their “Theory of Reasoned Action”; Ajzen (1985) in his “Theory of Planned Behaviour”; Davis (1989) in his “Technology Acceptance Model”; Davis (1989), in their article titled: “Perceived usefulness, perceived ease of use and user acceptance of information technology”; Venkatesh, et al (2003, 2012) in their “Theory of Acceptance and Use of Technology”, and many more have treated adoption distinctively from use of new technology or product or system or idea. These authors treated adoption as action(s), which involve stages, processes, and evaluations with psychological factors as major determinants. Contrary to adoption, use is looked at as action geared towards satisfaction or attainment of utility. This study is anchored on the former school of thought, considering adoption of digital information resources as a phenomenon that relate with students’ academic activities.

Specifically, adoption is being used to predict the behavioural intention rather than use of something like new product or idea, system, and the likes (Wong, Shakir, Tong, Alias, Aghamohammadi & Arumugam (2018). Unlike “use”, which describes the actual consumption, or implementation or deployment or application of something to derive satisfaction or utility, adoption is more of a process or a stage in making decision to use something. In retrospect, Rogers (1962) reiterated that “Adoption of a new idea, behaviour, or product (i.e., "innovation") does not happen simultaneously in a social system; rather it is a process whereby some people are more apt to adopt the innovation than others”. Rogers, therefore enlisted five types of adopters: Innovators, Early Adopters, Early Majority, Late Majority, and Laggards. Rogers stated that to accomplish diffusion, the stages of adopting innovation, idea, or behaviour include awareness of the need for an innovation, decision to adopt (or reject) the innovation, initial use of the innovation to test it, and continued use of the innovation.

Adoption is a process in acting towards use and therefore precedes use itself. Adoption is a decision-making activity or action or process, which is employed to predict an individual behaviour towards usage (Basri & Alandejani, 2018). Therefore, many researches are always geared towards identifying factors that determine or influence adoption, because it is believed that adoption is more of attitudinal behaviour, which is centred on feelings, motivation, attitudes, needs, and thoughts. For example, Venkatesh, et al. (2012) professed that there are seven elements which influence adoption viz: performance expectancy, effort expectancy, social condition, and facilitating condition, hedonic motivation, price value and habit with additional three moderating variables such as age, gender, and experience. In the theory, facilitating condition and habit directly influencing use behaviour. In the light of the above explanation, the need to identify the relationship between adoption of digital information resources and students’ academic activities in higher institution such as universities, becomes eminent.

Universities are established with the core mandate of values, resources and objectives for teaching, learning, research, and services to the host communities. Libraries established within the university community offer supports to attain those set objectives. One of such objectives is to provide resources for the running of academic activities of both students and faculty members. Such academic activities are not limited to teaching, research, examinations, assignments, but include conference, workshop and article writing for presentation or publication (Ankamah, Akussah & Adams, 2018). Academic activities are outlined in the institutions’ curriculum designed to engage students and teachers in learning, teaching and researches (Wong, et al., 2018; Basri & Alandejani,

2018). The successes of students' engagement in academic activities in universities are to support academic activities which, are reflected in successes they attain in tests, examinations, writing of quality conference papers, seminar papers, publishable article, projects / theses / dissertations, and attainment of knowledge (Ankamah, Akussah & Adams, 2018). Academic activities are also lined up in higher institutions to ensure that students are properly guided towards attaining academic excellence and certificate of honour for the successful completion of such programme.

Since the emergence of digital information resources in the hemisphere of education as pedagogical tools for learning, research and teaching and coupled with the development of Internet, World Wide Web, Web-browsers and smartphones, researchers and library patrons including students in higher institutions seem to exercise preference towards digital information resources because of the characteristics of flexibility, simplicity, and ease of use. There are also facts about remote access, transferability, shareability, and portability associated with digital information resources, which makes academic libraries to acquire, subscribe and disseminate digital information resources in response to the needs of library users. Thus, digital information resources are used to compliment the shortages, obsolescence, wear and tear, theft, cost of purchase and maintenance linked to printed books and journals. Library users also like to use digital information resources because likely because of ease, and flexibility associated with them.

The engagement in academic activities by students can hardly be successful without use of trustworthy and reliable information resources (Ogbebor, 2011; Mohammed, Alhassan & Oyedum, 2018). Use of information resources is preceded by and regulated by the behavioural intention to use the resources (Venkatech, 2012). Such behavioural intention is determined by several psychological factors such as ease of use of the resources, benefits of using the resources, persuasion from colleagues or relatives towards the use of digital information resources (Venkatech, 2012; Uddin, Al Mamun, & Rahman, 2019). Nonetheless, in view of academic libraries' subscription to online databases and dissemination of digital information resources, students' academic activities could positively and strongly correlate to the adoption of digital information resources in terms of their academic successes.

Academic activities are laid down components of curriculum in higher institutions of learning that give students the academic privilege to partake in tests, examinations, and researches which usually lead to the presentation of seminar, conference, and workshop papers (Ali, Tariq, and Topping, (2013); Osakwe, Keavey, Uzoka, Fedoruk and Osuji (2015); Kansas State University (2021) and Lawinsider (2021). Academic activities offer students the necessary and important learning channels and protocols to interact proactively in various learning instructions such as digital information resources, create enabling opportunities for students to engage in researches as part of their contributions to discovery, innovation, and problem solving. Academic activities can easily be improved if students are able to regularly adopt digital information resources. This view is confirmed by Joseph, Izuagbe and Hamzat (2016) who investigated the electronic information resources adoption in private university libraries: the moderating effect of productivity and relative advantage on perceived usefulness. Their findings revealed that quality of job output improved, job performance increased, ease of carrying out task as manifestation of relative advantage of adopting digital information resources. Similarly, Pinigas, Cleopas, and Phiri (2018) investigated the acceptability of electronic information resources in Zimbabwe State universities' libraries by students where 233

respondents were involved. Their study revealed that, there was sufficient statistical evidence pointing out that social influence, price value and habit had a statistically significant and positive influence on behavioural intention to adopt electronic information resources.

Though the relationship between adoption and academic activities is usually considered to be moderated by actual use, the impacts of adoption on academic activities cannot be underestimated (Venkatesh, et al., 2012). In pursuit of academic excellence, electronic theses and dissertations are good sources of refined knowledge because the results of the researches are carefully produced under the guidance of experience scholars (Gasaymeh, Al-Taweel, Al-Moghrabi & Al-Ghonmein, 2017; Kaba and Ellala, 2019). In other words, empirical literatures are prerequisite for successful academic engagement. Based on this reason, postgraduate students are expected to make wider consultations of current and up-to-date e-journals and e-conference proceedings in search of supporting ideas, views, opinions, findings or contradictory opinions or findings. Ho (2015) appraised those higher institutions of learning usually offered research seminars which introduce graduate students to the process of developing the skills they need to read and evaluate the previous research studies.

Multimedia resources as types of digital information resources are known to play significant roles in academic activities when learning to attain not only knowledge but also skills and experience that are requisite for academic excellence. Mahajan (2012) reported that multimedia technology uses a variety of interactive means; make originally dull lectures into interactive two-way information exchange. Neo and Neo (2009) emphasised that multimedia technology is recognised as having the ability to empower educational process by means of increased interaction between teachers and the students. Tulinayo, Ssentume and Najjuma (2018) reported that students who used animated visuals scored significantly higher on mental rotation tests than those who used static visuals. Smaldino, Deborah, Lowther, and Russell. (2015) similarly suggested that visual learning could increase students understanding of abstract concepts because a student's perception of ideas can be enriched by visual example. Therefore, visuals can promote development of perceptual thinking.

Wang and Bai (2016) investigated the students' awareness, usage, and attitude towards e-books at the Zhejiang University in China. Their findings indicated that there was a significant difference of students' awareness and usage of general e-books and academic e-books. There was a higher awareness but lower adoption of general e-books. The awareness and level of usage of library provided e-books were both very low. A search engine was generally used to access e-books. Senior undergraduates and postgraduate students mainly accessed e-books from the library website and library catalogue. Students, particularly undergraduate students, used e-books mainly for the purpose of leisure. In contrast, postgraduate students tended to use e-books more for academic purposes.

Khan, Bhatti, and Khan (2016) conducted a study on e-books usage by agricultural, engineering, and social science students in selected universities of Pakistan. The results showed that the adoption of e-books has reached a level where they have become an integral component of academic library services. The results of this study verify the previous findings that the students are relying on e-book adoption for various academic and research purposes. Comparatively, male students, postgraduate students, and those between the ages of 21 and 40 years are more frequently e-book users.

Narang and Suman (2016) carried out a study on the use of periodical literature by engineering students: a study of Baddi University of emerging sciences and technology. The

outcomes of the study demonstrated that most of the students prefer to use online journals instead of printed journals; prolific publishers having engineering journal databases are substantially known to the respondents; students use journal literature to understand various key concepts of a particular discipline and to improve writing skills.

Omeluzor, Akibu and Akinwoye (2016) investigated students' perception, use and challenges of electronic information resources in Federal University of Petroleum Resources Effurun, Nigeria. The result revealed that electronic information resources are used at different level by the respondents with e-journal, e-database, web OPAC and repositories recording high usage. It shows that users' perception influences use of electronic information resources in academic libraries with ($\beta = .214$, $p < .05$). From the findings, it is deduced that lack of awareness, lack of training, unreliable Internet connectivity, insufficient e-resources in various study areas, unavailability of e-resources on 24/7 and difficulty of identifying relevant information to meet users' needs are challenges hindering use of e-resources.

Several studies have reported the extent of use, frequency of use, and negative attitude of students towards using digital information resources that are acquired and disseminated by academic libraries (Olatundun, Yemisi & Adegun, 2014; Morris, 2017). Nse and Okorafor, (2017) have also acknowledged that students are eschewing libraries' resources because of their accessibility to search engines. It is pertinent to understand the relationship between students' adoption of digital information resources and academic activities. This where a research gap exists to be bridged.

Statement of the Problem

Academic libraries subscribe to online databases to make digital information resources such as e-books, e-journals, available for library users to adopt and use. Studies have shown that library users are being enlightened on how to use libraries and information resources therein. Unfortunately, most students seem to be staying away from information resources in academic libraries (Fofodilea. & Ifijehb, 2013; Nse, & Okorafor, 2017). Some studies associated students' attitude towards libraries to epileptic electricity, unorganised information resources, inefficient library staff and availability of alternative sources of information such as online databases and search engines or social media applications. Little or nothing is known about the roles of adoption of digital information resources on the academic activities of students. The consensus among scholars that library users are satisfied with the information resources being disseminated by most academic libraries (Wong, et al., (2018); Kaba and Ellala, 2019; Wong, Shakir, Tong, Alias, Aghamohammadi and Arumugam, 2018); Kaba and Ellala, 2019), do not directly reveal the positive or negative association between students' academic activities and digital information resources being adopted. For academic activities to fully justify their expenses on acquisition of information resources and claim of impact of library usage on students' educational pursuit, it is pertinent to fully understand that the influence of adoption of digital information resources on the academic activities of students in higher institution of learning. The findings of this research are expected to provide such information gap. Therefore, this study investigated the adoption of digital information resources as correlates of students' academic activities in Federal university libraries in Nigeria.

Research questions

What are the types of academic activities that postgraduate engineering students engaging in at Federal universities under study?

What are the types of digital information resources that postgraduate engineering students adopt for academic activities in the universities under study?

Research Hypothesis

There is no significant relationship between adoption of digital information resources and postgraduate engineering students' academic activities in the universities under study.

Research Methodology

Cross-sectional survey research design was used for the study. The population of the study consisted of 1,695 postgraduate engineering students registered for 2018/2019 academic session in 12 Federal Universities, 2 each from six geopolitical zones in Nigeria. Using multistage sampling technique, the population was subjected to sample size determined with the help of Raosoft Sample Size Calculator (www.raosoft.com/sample_size.html). The result obtained was three hundred and fourteen (314) sample. Furthermore, proportional sampling technique was used to distribute the sample size among the 12 universities. Simple sampling technique was used when administering the copies of questionnaire. The collected data were sorted, collated, and computed for analysis with Microsoft Excel application (V.13) and subjected to statistical analysis with the help of Statistical Package for Social Science (SPSS. V.23). The results of the statistical analysis are presented in descriptive statistics such as frequency counts, percentages, mean scores and standard deviations. Because of the categorical and dichotomous value of the data collected, the inferential statistics of such as Chi-Square Test of Independence and Cramer's V were used to determine the association, strength, and direction of relationship between the independent variable (adoption of digital information resources) and dependent variable (academic activities) respectively by testing the formulated hypothesis at 0.05 alpha level of significance.

Results

Table 1: Academic Activities Engaged In by postgraduate engineering students

S/NO	Academic activities	N	Response (E=2, NE=1)		Decision		
			Freq. (%)	Freq. (%)	\bar{X}	Std.	\bar{X}_d
	Seminar paper writing	306	223(72.9)	83(27.1)	1.73	.444	A
	Workshop paper writing		80(26.1)	226(73.9)	1.28	.440	D
	Conference paper writing		244(79.7)	62(20.3)	1.80	.474	A
	Article for publication writing		235(76.8)	71(23.2)	1.77	.500	A
	Writing the Project/Thesis/Dissertation		306(100.0)	306(100.0)	2.00	.000	A
	Writing Class assignments		306(100.0)	306(100.0)	2.00	.000	A
	Reading for tests and examination		306(100.0)	306(100.0)	2.00	.000	A
	Weighted Mean					1.79	

Source: Fieldwork, 2020

Key: Engage (E), Not Engage (NE), N (306), Mean score (\bar{x}), Standard Deviation (Std.) Decision mean ($\bar{x}_d = 1.50$)

Table 1 presents the various academic activities that the respondents were engaged in for which they adopted and used digital information resources. The findings show that the respondents were engaged in class assignment writing ($\bar{x} = 2.00$, Std. = .000), reading for tests and examinations ($\bar{x} = 2.00$, Std. = .000), Project/Thesis/Dissertation writing, ($\bar{x} = 2.00$, Std. = .000), conference paper writing ($\bar{x}=1.80$, Std. = .474), article paper writing ($\bar{x} = 1.77$, Std. = .500), seminar paper writing ($\bar{x}=1.73$, Std. = .444), workshop paper writing ($\bar{x}=1.28$, Std. = .440). The mean score for the findings is $\bar{x}= 1.26$, Std. = .440.

The finding shows that very large number of respondents participated in seminar paper writing as part of their academic activities. The finding also revealed that few numbers of respondents engaged in workshop paper writing. The result portrayed that significant number of respondents engaged in writing conference paper as academic activities. The finding equally revealed that the number of respondents that engaged in writing article paper as academic activity were large. However, the findings showed that every respondent engaged in academic activities such as report/thesis/dissertation, class assignment, and test/examination as part of academic requirement.

Table 2: Types of Digital Information Resources Adopted by postgraduate engineering students

SNO	Digital information resources adopted	N	Response (A=2, NA=1)		\bar{X}	Decision Std.	\bar{X}_d	
			Freq. (%)	Freq. (%)				
	e-books	306	236(77.1)	70(22.9)	1.77	.421	A	
	e-journals		261(85.3)	45(14.7)	1.85	.355	A	
	e-project/e-thesis / e-dissertation		244(79.7)	62(20.3)	1.80	.403	A	
	e-conference papers		242(79.1)	64(20.9)	1.79	.407	A	
	Multimedia		222(72.5)	84(27.5)	1.73	.447	A	
	e-Reference materials		209(68.3)	97(31.7)	1.68	.466	A	
	e-seminar Papers		246(80.4)	60(19.6)	1.80	.398	A	
	e- Zines		192(62.7)	114(37.3)	1.63	.484	A	
	e-Newsletters		107(35.0)	199(65.0)	1.35	.478	D	
	e-Grey document		168(54.9)	138(45.1)	1.55	.498	A	
Weighted Mean					1.59			

Source: Fieldwork, 2020

Key: Agree (A), Disagree (D), N=306, Mean score (\bar{x}), Standard Deviation (Std.) Decision mean ($\bar{x}_d = 1.50$)

Table 2 shows the types of Digital information resources adopted by postgraduate engineering students. These include e-journals ($\bar{x} = 1.85$, Std. = .355), e-project/e-thesis / e-dissertation ($\bar{x} = 1.80$, Std. = .403), e-seminar Papers ($\bar{x}=1.80$, Std. = .398), e-conference proceedings ($\bar{x} = 1.79$, Std. = .407), e-books ($\bar{x} = 1.77$, Std. = .421), multimedia resources ($\bar{x} = 1.73$, Std. = .447), e-reference ($\bar{x} = 1.68$, Std. = .466), e-zines ($\bar{x} = 1.63$, Std. = .484), e-Grey document ($\bar{x} = 1.55$, Std. = .498) and e-Newsletters ($\bar{x}=1.35$, Std. = .478). Statistically, the weighted Mean is greater than the decision mean ($\bar{x}_w = 1.59 > \bar{x}_d = 1.50$).

As can be observed in Table 2 the findings showed that significant number of respondents adopted e-books for academic activities. The finding revealed that large number of respondents adopted e-journals for academic activities. It is also found out that the respondents adopted e-projects/theses/dissertations for academic activities. The finding revealed that e-conference proceedings were adopted for academic activities. In addition, multimedia resources were also found to have been adopted by the respondents. The findings revealed that e-reference materials, e-seminar papers, e-zines, and e-grey were significantly adopted by the respondents for academic activities. However, the finding showed that few numbers of the respondents adopted e-newsletter for academic activities.

Table 3: Chi-Square Test of Independence for Adoption of Digital Information Resources*Academic Activities

	N	Value	Cramer's V	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	306	23.625 ^a	.278	1	.000
Continuity Correction ^b		18.303		1	.000
Likelihood Ratio		12.564		1	.000
Linear-by-Linear Association		23.548		1	.000

The Table 3 which presents the Chi-square Test of Independent was carried out to test the association between students' adoption of digital information resources and their academic activities. Since the p-value is less the chosen the significance level (0.05), we therefore reject the null hypothesis and conclude that there is statistical evidence to suggest an association between students' adoption of digital information resources and academic activities. the relationship between students' adoption of digital information resources and their academic activities ($X^2(1) < 23.625a$, $P = .000$). In addition, the Cramer's V function was used to determine the direction and strength of relationship between the two categorical dichotomous variables, and found a positive but weak relationship exists between the two categorical variables ($\phi_c = .278$, $P = .001$).

Significant number of the postgraduate engineering students, as indicated in Table 1, engaged in academic activities such as class assignment writing, reading for tests and examinations, project/Thesis/Dissertation writing, conference paper writing, article paper writing as well as seminar

paper writing. However, few numbers of the respondents engaged in academic activities like workshop paper writing.

Significant number of the respondents as indicated in Table 2 adopted e-journals, e-project/e-thesis/e-dissertation, e-seminar papers, e-conference papers, e-books, ` multimedia resources, e-reference materials, e-zines, and e-grey document for academic activities, except for e-newsletters, which were not adopted for academic activities.

A positive but weak association exists between students' adoption of digital information resources and their academic activities.

Discussion of the Findings

The result of the analysis of the academic activities as shown in Table 1, revealed that postgraduate engineering students engaged in Seminar paper writing, workshop paper writing, conference paper writing article writing, writing the project/thesis/dissertation, writing class assignments, and reading for tests and examination. No wonder all the enumerated academic activities are the core mandate of postgraduate students. The finding is in line with the discoveries of Ogbebor, 2011; Mohammed, Alhassan & Oyedum, 2018) who variably reported that students' participation in academic activities are mandatory requirements on which the students are examined and rewarded with academic credits. The findings of the authors, as confirmed by this study, are reflection of the activities outlined and specified in the curriculum of education in high institutions like universities (Zohrabi, 2011; Kansas State University, 2021; Lawinsider, 2021). Academic activities are mandatory for students, and as requirements, students are examined based on their level of engagement in such academic activities. For example, writing of seminar papers, conference papers, and workshop papers are used to allow university management to measure the degree of learning and level of excellence in mastery of specialisation (Osakwe, et al. (2015). The academic activities also allow students to express their understanding on the subject matter, present and discuss their findings, show their discoveries and innovations as well as demonstrate their skills and knowledge in the field they pursue. Also, writing of theses and dissertations are mandatory for students to identify problems and find possible solutions through research activities (LawInsider, 2021). In addition, reading for tests and examinations are measures established as part of academic activities to examine the level of knowledge and skills acquired by students while learning.

The findings on the types of digital information resources as displayed in Table 2 revealed that significant number of postgraduate engineering students adopted various digital information resources for academic activities. It is not surprising that postgraduate students always surf and evaluate different information resources before they include them in their researches. The revelation agreed with the findings of Venkatesh, et al (2012) in which they stated that adoption is a requisite aspect of use behaviour. The revelation of this study also corroborates the findings of Gasaymeh, Al-Taweel, Al-Moghrabi & Al-Ghonmein (2017); Kaba and Ellala (2019); Wong, et al., 2018); Basri and Alandejani (2018); Ankamah, Akussah and Adams (2018), who reported that university students' perceptions and adoption of the digital information resources or digital technologies are the determinant of subsequent use of the resources. The authors also added that the driving force behind students' use of digital information resources is the level of their adoption. This revelation is not unlikely because, it is typical of individual students to evaluate the usefulness of information

resources, the ease and flexibility or difficulty associated with the use of such information resources before they use them. The revelation of this study is also in congruent with the findings of the Ankamah, Akussah and Adams (2018); Andrew, et al., (2018); Wong, et al., (2018); Kaba and Ellala (2019) who also reported that adoption of electronic resources and information technology define the level of use of the information resources in a way that if the level of adoption is low, there is a likelihood that use of such information resources also may be low, and vice-versa.

Conclusion

The data presented and discussed showed that postgraduate engineering students in some selected higher institutions in Nigeria engaged in various academic activities, and adopted digital information resources to facilitate their academic activities. The hypothesis tested at 0.05 level of significance revealed positive but weak association between the adoption of digital information resources and academic activities of the postgraduate engineering students. The implication of the study for the libraries in Nigeria are that if the quality of library services is not improved and the approach in providing access to the digital information resources in the libraries are not enhanced, students may no longer rely and be interested in using libraries for academic activities. Consequently, the quality of education may likely be jeopardised and goals of education may not be fully achieved.

Recommendations

Library administrators and governments at all levels should consider using encouragement and motivation to boost students' confidence in full engagement in academic activities.

Postgraduate engineering students should consider full adoption of digital information resources for their academic activities because such types of information resources acquired and disseminated by academic libraries are likely to be more scholarly with reliable empirical findings and authoritative information that are likely to be more suitable for learning, research, and leisure

The librarians and students should consider learning and research as long-live opportunity that would positively influence individuals, government and, societies. Therefore, while students consider adoption as the basis for usage of digital information resources to facilitate academic activities, the librarians should give all necessary supports to increase students' level of adoption for better academic activities.

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