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Usage of Cloud Computing Application by Students from Kurukshetra University: the Current State and Perspectives

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Abstract

The term "cloud computing" refers to a variety of tools and applications used by organizations to manage their work processes online. Apart from providing the expected benefits, the gadgets and applications of the cloud are helpful for education. The purpose of this study is not to examine the outcomes of cloud computing in universities, but to examine how students use cloud applications. A survey research design was used to examine how students of Kurukshetra University use cloud computing applications. 200 students from the streams of science, management, social science, and arts were randomly selected to answer a structured questionnaire. A response rate of 95% was achieved by 48 students in Science, 50 in Management, 48 in Social Science, and 44 in Arts who completed and returned the questionnaire on time. The analyzed data is presented in a table that includes the Likert scale mean, standard deviation, and the cross-table Chi-square test. In the study, most students highly preferred G Suite Cloud (57%) and Microsoft (40%) learning applications. It can be seen from the study that WhatsApp (98%), Facebook (96%), and YouTube (97%) are the most preferred cloud-based social media among the students, most students preferred Google Meet (95%) and Zoom (91%) meeting application, and most students preferred Google Drive (68%) and pCloud (67%) for data storage.

Keywords: Cloud Application, Usage application, Digital era, online learning, University Students, Kurukshetra University, Haryana, India

1. Introduction

Recently, cloud computing has become the motivation and carrying out with the rapid development of the web to support without additional hardware and reduce upfront costs and costs caused by customer service techniques. Cloud computing is being used by just about every field that uses a structured program, hardware, and infrastructure. It refers to the components as processors, data sets, network hardware, and operating systems that extend as SaaS (software as a service), PaaS (platform as a service), and IaaS (information as a service). In today's world of information innovation, cloud computing is the ideal word effect on education that provides better opportunities for meaningful development. In the modern era, thanks to the advanced innovations by students learning throughout the day, they are traveling accordingly and are highly adept mechanically. A growing number of marginal applications are pushing

educational infrastructure toward digital learning. Several institutions are using cloud computing because of virtualized applications on the internet in combination with powerful quantification, better training, and better correspondence. In universities, diversity drives innovation. In order to transform the 21st century into a far better future, they inculcate a mechanical education in their students to prepare them for recognized professions. In order to increase innovation in universities, the most recent open aid program is beneficial. Innovation is a means of studying and monitoring issues that need to be certified daily. It can view mechanically future patterns with the capabilities of teachers and students.

Over the past ten years, Cloud computing applications have significantly changed how students learn. By integrating applications into classrooms, students and teachers are benefiting from improved outcomes and increased engagement. To be competitive in today's world, students need to be masters' essential skills in technology, such as computer literacy, database management, website development, digital marketing, project management, and cyber security. Multiple Cloud applications offer students safety and cost-effective opportunities for innovation. A student can, for instance, upload a video of an assignment they worked on, photograph a piece of artwork they made, or share a document they created. Cloud computing gives students the freedom to show their learning in the manner that best suits them and to use many cloud-based applications, such as Art Applications, File Storage Platforms, Image Editing Applications, Data Storage Applications, Antivirus Applications, Entertainment Applications, URL Conversion Applications, Meeting Applications, Presentation Applications, Social Media Applications, GPS Applications, Accounting Applications, and Teaching/Learning Applications. In the learning process, cloud applications have had the greatest impact, with teachers bearing the bulk of the responsibility for using them. Thus, considering the growing use of Cloud Computing in teaching and learning, a study has been carried out to examine the current status of using cloud applications by university students for education that can confirm and categorize the data.

2. Literature Review

The use of software-as-a-service for data and file storage was preferred over cloud computing because of its high subscription rate, unreliable online payment system, and lack of trading functionality [1]. It was found that perceived ease of use and perceived usefulness of cloud computing influenced students' adoption of cloud computing, which subsequently affected their academic performance [2]. The study found that students found Google Docs both useful and interesting, and also showed that Google Docs could foster communication, improve writing skills, and encourage constructive peer-to-peer discussion among students [3]. Researchers at Iraqi universities found they could improve their use of cloud applications by reducing security risks, enabling authorization and control, and improving performance [4]. The usage of cloud technologies for the educational process as based on communication (Gmail, Viber, and Telegram), store (Google Drive), educational video (YouTube), online classes (Google Meet), social networks (Facebook,

Instagram, TikTok), and literature search (Google Scholar, Science Direct, Web of Science) [5]. Among the Saudi university students, there was found a statistically meaningful difference between the mean scores of the two groups on the post-test of the experimental, while there was no meaningful difference between the mean scores of males and females [6]. Whereas in Nigerian Universities most students were ready-to-use cloud computing and found no meaningful difference between male and female undergraduates' readiness to use cloud computing for learning [7]. Although students of Federal universities in Anambra State were more aware of cloud computing services than State and private Universities students and it is recommended that higher authorities should make organize more ICT education awareness programs for students [8]. It is also found that cloud application services have significance for most students in distance learning with gained effective digital communication, self-organization and leadership, and time management, and they use centralized Moodle platform and G Suit for formal learning [9]. Although most participants preferred cloud applications due to their lower costs compared to traditional approaches, lack of expertise is the main challenge of implementing cloud applications [10]. The most frequent application of cloud computing in university education in Kuwait is in digital cloud libraries, then in electronic archiving of digital repositories, and in scientific research and information management [11]. Cloud computing integration in all aspects of human existence has changed the way people think, behave, communicate, work, and move from a service-oriented approach to a user-oriented approach [12], [13]. Furthermore, most students are aware and widely use the cloud as a storage, backup, and collaboration tool, as well as Google for academic purposes [14]. As technology advances, students are more interested in using social media cloud applications for learning [15]. In order to adopt Cloud Computing services, technology readiness is the most important predictor, followed by security and competitive pressure [16], that changed the way of storage, retrieval, manipulation, transmission, or receiving of any records electronically in a digital shape [17]. In UK HEIs, the adoption of the educational cloud is rising because of its cost savings, scalability, flexibility, mobility, and especially collaboration among students in UK HEIs, while the biggest barriers are security and cultural resistance, which still affect privacy and trust [18]. According to a study conducted at a mid-sized university in Southeast Michigan, perceived ease of use, computer anxiety, computer self-efficacy, and internet self-efficacy were significantly related to cloud applications' perceived usefulness [19]. Also, a study conducted at public universities in Benue State, Nigeria, and found a positive high-level impact of cloud services on students' confidence, affective engagement, and behavioral engagement with a high frequency of usage of smart phones, tablets, and laptops [20]. As Internet evolution has also affected the modern education system without a doubt, and 21st-century students, known as the Internet generation students, are showing great interest in growing educational proficiency. In the web world, it is possible to access all over the world at once with one click on devices connected to the internet [21], [22].

3. Objectives

- To find out the time length of the usage of cloud applications by students.
- To explore the commonly used cloud application by students.
- To explore the preferred cloud application services used by students.
- To explore the reason to use cloud computing services by students.
- To explore the problem faced by students while using cloud computing services.

4. Hypotheses

The following null hypotheses were developed and tested using the Chi-square tool.

H1- Cloud application usage among students is not having a similar time length.

H2- Students' preferences regarding cloud applications usage are not different.

H3- Among students, cloud computing services are not used for various reasons.

H4- Students face similar problems while using cloud computing services.

5. Methodology

It is clear that there are many benefits to cloud implementation and usage in universities, but none discuss how students use the cloud, which is integral to any university. The study is limited to the use of cloud applications by students of Kurukshetra University, Kurukshetra (Haryana). A survey method was used to conduct this study. In order to collect primary data from the students, a questionnaire tool was used. The questionnaires were randomly distributed to 200 students from the science, management, social science, and arts streams. With a 95% response rate, 48 students from Science, 50 from Management, 48 from Social Science, and 44 from Arts completed and returned the questionnaire. Data is presented in a table using percentages, Likert scale mean, standard deviation, and cross table Chi-square test at 0.05 signifance level.

6. Data Analysis

Length	Science *N* (%)	Management *N* (%)	Social Science *N* (%)	Arts *N* (%)	Total *N* (%)
1 to 2 years	16 (33)	16 (32)	10 (21)	8 (18)	50 (26)
1 year	12 (25)	14 (28)	16 (33)	10 (23)	52 (27)
6 to 12 months	8 (17)	9 (18)	8 (17)	17 (39)	42 (22)
3 to 6 months	5 (10)	5(10)	3 (6)	3 (7)	16 (8)
1 to 3 months	7 (15)	6 (12)	11 (23)	6 (14)	30 (16)

Total	48 (100)	50 (100)	48 (100)	44 (100)	190 (100)
*Notes: x^2 = 14.2**; df= 12, Critical value= 21.02**; Significant at 0.05 level*					

Table 1. The length of the use of the Cloud Technology Services

For the study purpose, a question related to the duration of cloud usage was asked to the students, the results of Table 1 show that the maximum number of students (53%) are using the cloud for more than a year, whereas less than 22% of the students are using cloud computing services from 6 to 12 months. Very few students (8%) are using cloud computing for less than 6 months. It is clear from the result of the table that most of the students are using cloud computing for over one year. Chi-square analysis shows a similarity in the time length of cloud application usage among students. Thus the null hypothesis H1 is rejected.

Cloud Application	Frequently N (%)	Sometimes N (%)	Occasionally N (%)	Rarely N (%)	Very Rarely N (%)	Mean	SD
Art Application	109 (57)	46 (24)	23 (12)	9 (5)	3 (2)	1.69	0.96
Learning Mgt S/W	129 (68)	23 (12)	27 (14)	5 (3)	6 (3)	1.61	1.03
Social Media	185 (97)	2 (1)	1 (1)	0 (0)	2 (1)	1.06	0.44
Storage and Backup	22 (12)	14 (7)	12 (6)	72 (38)	70 (37)	3.81	1.32
Image Editing S/W	85 (45)	54 (28)	21 (11)	2 (1)	28 (15)	2.13	1.38
Entertainment	119 (63)	11 (6)	18 (9)	3 (2)	39 (21)	2.12	1.62
Presentation	91 (48)	29 (15)	23 (12)	6 (3)	41 (22)	2.35	1.60
Meeting/Chatting	138 (73)	15 (8)	8 (4)	4 (2)	25 (13)	1.75	1.41
Cloud Antivirus	9 (5)	18 (9)	12 (6)	23 (12)	128 (67)	4.28	1.21
Accounting	14 (7)	13 (7)	7 (4)	120 (63)	36 (19)	3.79	1.06
GPS	182 (96)	4 (2)	2 (1)	1(1)	1 (1)	1.08	0.43
URL Conversion	2 (1)	3 (2)	6 (3)	9 (5)	170 (89)	1.69	0.96
Notes: x 2 = 2127.5**; df= 44, Critical value= 60.4**; Significant at 0.05 level							

Table 2. Commonly Used Cloud Computing Applications

To know the frequently used commonly cloud computing applications, students were asked which cloud applications frequently they use. It is clear from Table 2 that the Social media cloud application is frequently used by a majority of students (97%) with a mean value of 1.06 and SD being 0.44 followed by GPS (96%) with a mean value of 1.08 and SD being 0.43, Meeting/Chatting (73%) mean value 1.75 and SD 1.41, learning Mgt S/w (68%) with mean value 1.61 and SD being 1.03 and Entertainment by 63% (mean= 2.12, SD= 1.62) of students. Further, the table shows that Art

Application is very rarely used by less of students (2%) with a mean value of 1.69 and SD being 0.96, while 3% of students rarely used Presentation application (Mean=2.35, SD= 1.60) and Image Editing S/W is rarely used by fewer students (1%) with a mean value of 2.13 and SD is 1.38. It is found from the table that very less of students frequently use cloud computing applications are Storage and Backup (12%), Accounting (7%), Cloud Antivirus (5%), and URL Conversion (1%). From the Chai-square result, students' preferences regarding cloud applications are different. Based on the statistical result the structure null hypothesis H2 is rejected.

Teachining/ Learning Mgt S/W	Very High *N* (%)	High *N* (%)	Moderate *N* (%)	Low *N* (%)	Very Low *N* (%)	Mean	SD
G Suite	108 (57)	45 (24)	23 (12)	11 (6)	3 (2)	1.72	0.99
Microsoft	76 (40)	55 (29)	45 (24)	5 (3)	9 (5)	2.03	1.08
Cloud Guru	26 (14)	15 (8)	20 (11)	79 (42)	50 (26)	3.59	1.32
Edlio	15 (8)	9 (5)	18 (9)	90 (47)	58 (31)	3.88	1.13
Evernote	59 (31)	39 (21)	32 (17)	55 (29)	5 (3)	2.52	1.27
Coursera	45 (24)	45 (24)	30 (16)	25 (13)	45 (24)	2.89	1.50
Knowledge Matters	62 (33)	29 (15)	21 (11)	25 (13)	53 (28)	2.88	1.64
Muzzy Lane	48 (25)	23 (12)	18 (9)	41 (22)	60 (32)	3.22	1.60
Top Hat's	39 (21)	19 (10)	32 (17)	66 (35)	34 (18)	3.19	1.40
*Notes: $x^2 = 493.8$**; df= 32, Critical value= 46.19**; Significant at 0.05 level*							

Table 3. Usage Preference of Cloud-Based Teaching Learning application

Table 3 shows that the G Suite Cloud learning application is very highly preferred by most students (57%) with a mean value of 1.72 and SD is 0.99. G Suite is a tool offered by Google that brings together several Google products like Google Classroom, Google Docs, Google Sheets, Google Slides, Google Forms, and Google Drawings. Students work together, in class or at home, to complete assignments and group projects. Microsoft is the second high preference for 40% of students followed by Knowledge Matters (33%), Evernote (31%), Muzzy Lane (25%), Coursera (24%), and Top Hat`s (21%). Whereas, i.e. 14% and 8% respectively highly preferred Cloud Guru and Edlio cloud applications. It can be said that G Suite can fully satisfy all the needs of most students. Microsoft application offered by Microsoft is an application acting similar to G Suite, offered by Microsoft, but much less popular. Also, quite popular are Cloud Guru and Edlio, mainly because of their social dimension and their role. Because of the Chai-square result, students have different preferences regarding the usage of cloud learning applications, since the calculated value of Chai Square is more than the critical value.

Cloud Applications	Very High *N* (%)	High *N* (%)	Moderate *N* (%)	Low *N* (%)	Very Low *N* (%)	Mean	SD
WhatsApp	187 (98)	1 (1)	2 (1)	0 (0)	0 (0)	1.03	0.22
Facebook	182 (96)	4 (2)	2 (1)	1 (1)	1 (1)	1.08	0.43
yammer	11 (6)	36 (19)	27 (14)	70 (37)	46 (24)	3.55	1.21

LinkedIn	79 (42)	37 (19)	23 (12)	28 (15)	23 (12)	2.36	1.44
Twitter	115 (61)	40 (21)	17 (9)	13 (7)	5 (3)	1.70	1.06
You Tube	184 (97)	3 (2)	1 (1)	1 (1)	1 (1)	1.06	0.41
*Notes: x^2 = 686.3**; df= 20, Critical value= 31.4**; Significant at 0.05 level*							

Table 4. Usage Preference for Social Media-based Cloud Applications

Social media are becoming an important part of the student's life by offering a medium to promote their contact, sharing academic materials, and integrated applications that have now expanded beyond contact between friends. The study tries to explore which type of social media is preferred by students for academic purposes. Table 4 depicts that WhatsApp is very highly preferred by the majority of students (98%) with a mean value of 1.03 and SD being 0.22 followed by YouTube (97%) with a mean value of 1.06 and SD being 0.41, and Facebook by 96% of students (Mean 1.08 and SD being 0.43). Twitter is preferred by 61% of students (mean= 1.70, SD= 1.06) followed by LinkedIn (42%) with mean value 2.36 and SD being 1.44. Whereas yammer is preferred by less number of students (6%) in their academic purpose. It can be said that social media tools i.e. WhatsApp, YouTube, and Facebook very highly preferred by the majority of students in their daily life and they easily can create a group to share their learning materials. Communication is the intended core of social media. It provides excessive opportunities for the higher education sectors to link, share and study. Due to the higher calculated value than the critical value, the Chai-square result indicates students have different usage preferences when it comes to cloud-based social media.

Data Storage/Backup Applications	**Very High *N* (%)**	**High *N* (%)**	**Moderate *N* (%)**	**Low *N* (%)**	**Very Low *N* (%)**	**Mean**	**SD**
Google Drive	129 (68)	20 (11)	11 (6)	18 (9)	12 (6)	1.76	1.27
pCloud	127 (67)	45 (24)	3 (2)	10 (5)	5 (3)	1.53	0.96
Microsoft Drive	67 (35)	49 (26)	27 (14)	28 (15)	19 (10)	2.38	1.36
Sync.com	89 (47)	32 (17)	29 (15)	12 (6)	28 (15)	2.25	1.46
Dropbox	98 (52)	62 (33)	7 (4)	6 (3)	17 (9)	1.85	1.21
Box	102 (54)	58 (31)	9 (5)	12 (6)	9 (5)	1.78	1.10
Notes: x^2 = 140.4**; df= 20, Critical value= 31.4**; Significant at 0.05 level							

Table 5. Usage Preference of Cloud Data Storage and Backup Application

Table 5 shows students' usage of various cloud data storage and backup applications. The result shows that Google Drive is a highly preferred cloud storage application by the majority of students (68%) with a mean value of 1.76 and SD is 1.27. Google Drive is a free file storing application that permits educators to stock and access documents located in the cloud. This app is esteemed as one of the most resourceful

cloud storage services because of its ability to synchronize stored files across mobile devices and PCs. The second preference is pCloud with 127 (67%) numbers of students with a mean value of 1.53 and SD being 0.96 followed by Box (54%) mean value of 1.78 and SD is 1.10. Dropbox is a cloud storage service that is preferred by 52% of students. Dropbox allows educators to store practically any kind of file on cloud servers remotely with the capability to share these files across all PCs or mobile devices. 47% of students preferred Sync.com to store and backup data on the cloud. Whereas Microsoft Drive is a powerful cloud storage service preferred by less number of students (35%) with a mean value of 2.38 and SD is 1.36. Result clearly depicts that Google Drive has the highest usage preference. It is the most popularly used application by students. This App can be accessed through a Google account as long as an Internet connection is present. Students can create a Google account, and they can access it. According to the Chai-square result, students are using cloud storage and backup applications differently preference because the calculated value is higher than the critical value.

Meeting/Chat Application	Very High *N* (%)	High *N* (%)	Moderate *N* (%)	Low *N* (%)	Very Low *N* (%)	Mean	SD
Zoom	172 (91)	15 (8)	3 (2)	0 (0)	0 (0)	1.11	0.36
Google Meet	181 (95)	6 (3)	2 (1)	1 (1)	0 (0)	1.07	0.34
Cisco WebEx	142 (75)	26 (14)	19 (10)	1 (1)	2 (1)	1.39	0.77
GoToMeeting	117 (62)	45 (24)	12 (6)	7 (4)	9 (5)	1.66	1.07
Microsoft Teams	21 (11)	19 (10)	60 (32)	65 (34)	25 (13)	3.28	1.15
Whereby	9 (5)	18 (9)	64(34)	70 (37)	29 (15)	3.48	1.01
*Notes: $x^2 = 676.08$**; df= 20, Critical value= 31.4**; Significant at 0.05 level*							

Table 6. Usage Preference of Meeting/Chat Cloud Based Applications

Meeting and chatting cloud applications have become part of our everyday lives because of lively interactions such as face-to-face conversations and easy-to-use features. Table 6 shows that students use various chat applications. It is clear from the result that Google meet is a highly preferred application among the majority of students (95%) with a mean value of 1.07 and SD being 0.34 followed by Zoom (91%) mean value of 1.11 and SD being 0.36 and Cisco WebEx (75%) with mean value 1.39 and SD being 0.77. GoToMeeting is preferred by 117 (62%) numbers of students with a mean value of 1.66 and SD is 1.07. Further, the table shows that Microsoft Teams is preferred by less number of students (11%) with a mean value of 3.28, SD being 1.15 and whereby is by 5% (mean=3.48, SD=1.01) of students. Students preferred cloud Meeting/Chatting applications differently according to the Chi-square results because the calculated value is higher than the critical value.

Statements	Agree *N* (%)	Neutral *N* (%)	Disagree *N* (%)	Mean	SD
Additional electronic devices, such as CDs, DVDs, and Pendrive are not required.	180 (95)	4 (2)	6 (3)	1.08	0.37
Data stability and security.	152 (80)	27 (14)	11 (6)	1.26	0.55
It's easy to trace changes and return to a previously saved file.	125 (66)	46 (24)	19 (10)	1.44	0.67
Paper consumption is lower.	169 (89)	10 (5)	11 (6)	1.17	0.51
Reduced physical storage of documents.	172 (91)	16 (8)	2 (1)	1.11	0.34
Saving time by using electronic storage.	179 (94)	9 (5)	2 (1)	1.07	0.29
Reduced printer, toner, and paper costs.	126 (66)	52 (27)	12 (6)	1.40	0.61
Document access without a third party has better employment effects.	110 (58)	46 (24)	34 (18)	1.60	0.77
Use of cloud services is easier.	119 (63)	56 (29)	15 (8)	1.45	0.64
Has a positive impact on the environment by reducing paper, energy, and computer hardware.	156 (82)	21 (11)	13 (7)	1.25	0.57
*Notes: $x^2 = 225.6$**; df= 18, Critical value= 28.8**; Significant at 0.05 level*					

Table 7. Reasons for using Cloud Applications by students

Table 7 shows students' opinions toward the usage of Cloud Applications. It is clear from the table result that the highest number of students agree with the statement that the use of the cloud no need to carry around additional electronic devices, the reduced physical storage of documents, and time-saving in using electronic storage. 89% of students (mean= 1.17 and SD= 0.51) agree that cloud applications reduce paper consumption followed by has a positive impact on the environment by reducing paper, energy, and computer hardware (82%) with a mean value of 1.25 and SD being 0.57, and Data stability and security (80%) with mean 1.26 and SD 0.55. Further, the table shows that 66% of students agreed that cloud application is cost savings by reducing the use of printers, toner, and paper followed by trace changes and return to a previously saved file (66%), ease of use of clouds (63%) and Document access without a third party has better employment effects (58%). The calculated value of Chi-square does not indicate any similarity in opinion about using cloud applications among students and structure null hypothesis H3 is accepted.

Statements	Agree *N* (%)	Neutral *N* (%)	Disagree *N* (%)	Mean	SD
Limited technology experience	54 (28)	118 (62)	18 (9)	1.81	0.59
Lack of past experience on using Cloud application technology	90 (47)	63 (33)	37 (19)	1.72	0.77
Lack of motivation	120 (63)	40 (21)	30 (16)	1.53	0.75
Too challenging in usage	68 (36)	88 (46)	34 (18)	1.82	0.71
Lack of instructions	123 (65)	44 (23)	23 (12)	1.47	0.70
Avoiding commonly used online tools such YouTube, Facebook by instructors	24 (13)	152 (80)	14 (7)	1.95	0.44

Living close to educational institutions	79 (42)	67 (35)	44 (23)	1.82	0.78
Wi-Fi Internet Connectivity	29 (15)	153 (81)	8 (4)	1.89	0.43
Security	36 (19)	136 (72)	18 (9)	1.91	0.52
Password Security	30 (16)	20 (11)	140 (74)	2.58	0.75
Cost Management	21 (119	153 (81)	16 (8)	1.97	0.44
Multi-Cloud Environments	120 (63)	54 (28)	16 (8)	1.45	0.65
Lack of cloud infrastructure in Campus	39 (21)	135 (71)	16 (8)	1.88	0.52
*Notes: $x^2 = 1023.7$**; df= 24, Critical value= 36.4**; Significant at 0.05 level*					

Table 8. Barriers faced in using cloud application services by students

There are many problems associated with the use of cloud applications by students. While getting information from the students, they were asked to mention the problems faced by them during the usage of the Cloud Application. Table 8 reveals that the majority of students have faced the problem of lack of instructions (63%) with a mean value of 1.47 and SD being 0.70, lack of motivation (63%) with a mean value of 1.53 and SD being 0.75, and multi-Cloud environments (63%) with a mean value of 1.43 and SD being 0.63 to use the cloud applications. Although the majority of students are neutral with the statement of Wi-Fi Internet Connectivity (81%), Cost Management (81%), voiding commonly used online tools such YouTube, Facebook by instructors (80%), Security (72%), and lack of cloud infrastructure in Campus (71%). Using Chi-square, it is found that there is no similarity in the problems faced by students while using cloud applications and the structure null hypothesis H4 is accepted.

7. Conclusions

In the current years, cloud computing has created imaginative applications that help teachers and students in education structures. In order to improve students' virtual and visual abilities, worldwide educators are using cloud applications. By implementing cloud-based advancements in education and educational experiences, educators are promoting their learning plans and inspiring students to rely on cloud-based applications in their learning processes. A powerful framework is essential to implement cloud enhancements in teaching and learning centers, as they required positive support. In the usage of cloud computing students face can problems with a lack of instructions, motivation, multiple cloud environments, and limited internet Wi-Fi access.

According to the results of the study, the majority of students are familiar with cloud applications and have been using cloud-based services for more than a year. Further, the study shows that most students prefer to use G Suite, Microsoft, and Knowledge Matters cloud learning applications. The findings also show that students prefer to use social media applications for learning, like WhatsApp, Facebook, and YouTube. Most students in the study preferred Google Meet and Zoom for cloud-based meeting software. They offer video conferencing software and other meeting

software, allowing users to get in touch in no time through screen and desktop sharing. In the network-based environment, there are many popular video conferencing and meeting software in the market that attracts users who are looking for a simpler and more affordable option through their free tiers and accessibility. Many students use Google Drive and pCloud to store and secure their data. Study proved that students are facing the problem of instructions, motivation, multiple cloud environments, and limited internet Wi-Fi access while using cloud applications. The study concludes that it is very important to confirm that cloud-based applications support a greater level of goal consistency in the way students learn. Moreover, Kurukshetra University should make its students more educated about cloud services and increase their basic understanding of cloud applications and learning methods by conducted workshops, which will enhance their confidence in utilizing cloud applications for improving learning performance. Also, the university should try to remove the barrier to the usage of cloud application services by students. Because of the findings, cloud-based learning programs are currently in a period of great advancement in mechanical technology and are attracting students' attention. Using cloud-based advancements, the study predicts students' academic performances.

References

[1] Islam, M.N., Islam, M.S., Anwar, A. and Alam, M. K. (2022). Cloud computing applications in library services of Bangladesh: a study on librarians' perceptions, Information Discovery and Delivery, ahead-of-print, no. ahead-of-print, Available: https://doi.org/10.1108/IDD-08-2021-0095

[2] Raza, S.A. and Khan, K.A. (2022). Knowledge and innovative factors: how cloud computing improves students' academic performance, Interactive Technology and Smart Education, 19 (2), 161-183. Available: https://doi.org/10.1108/ITSE-04-2020-0047

[3] Aldossary, K. (2022). EFL Students' Perceptions of Google Docs as an Interactive Tool for Learning Writing, International Journal of English Linguistics, 12 (2), 60-69. Available: https://pdfs.semanticscholar.org/3e35/2f7ebd2acb0a2091cf27b9403983bc595df9.pdf

[4] Shakor, M. Y. and Shafiq, N. M. (2021). Cloud Computing Technologies Adoption in Higher Education Inistitutes During COVID-19 Pandemic: Case Study, Passer Journal of Basic and Applied Sciences, 3 (2), 187-193. Available: https://passer.garmian.edu.krd/article_137458_a4f71b59bee5584d008a4ed199a1ef8d.pdf

[5] Petrovych, O. B., Vinnichuk, A. P., Poida, O. A., Tkachenko, V. I., Vakaliuk, T. A. and Kuzminska, O. H. (2021). The didactic potential of cloud technologies in professional training of future teachers of Ukrainian

language and literature, In CTE (2021): 259-277. Available: http://ceur-ws.org/Vol-3085/paper32.pdf

[6] Nasr, M. A. A. N. (2021). The effectiveness of cloud computing in developing Saudi-university Students' writing skill, Jordan Journal of Educational Sciences, 17 (2), 313-324. Available: https://journals.yu.edu.jo/jjes/Issues/2021/Vol17No2/10.pdf

[7] Atanda, F. A., Soetan, A. K., Olubode, O. C. and Modupe, B. R. (2021). Undergraduates' Readiness for Utilizing Cloud Computing for Learning in Nigerian Universities, Nigerian Online Journal of Educational Sciences and Technology (NOJEST), 3 (2), 15-22. Available: http://nojest.unilag.edu.ng/article/view/1250/993

[8] Obiadazie, R. E. and Okigbo, E.C. (2021). Awareness of Cloud Computing Services by Non-Science Undergraduate Students in Anambra State, *South Eastern Journal of Research and Sustainable Development,* 4 (2), 73-96, Available at: https://sejrsd.org.ng/index.php/SEJRSD/article/view/152/114

[9] Afanasiev, I. V., Vysotskaya, N. V., Alferov, V. N., and Grigorieva, N. A. (2021). The use of cloud resources and services in distance learning of students in the context of restrictions caused by the pandemic, Revista Tempos e Espaços em Educação, 14 (33), e16103. Available: https://seer.ufs.br/index.php/revtee/article/view/16103/11973

[10] Kiswani, J.H., Dascalu, S. M. and Harris Jr, F. C. (2021). Cloud Computing and Its Applications: A Comprehensive Survey, International Journal of Computer Applications IJCA, 28 (1), 3-24. Available: https://www.cse.unr.edu/~fredh/papers/journal/77-ccaiaacs/paper.pdf

[11] Alfailakawi, A. (2021). The Reality of Using Cloud Computing in University Education from the Point of View of Faculty Members in Kuwait, International Journal of Business, Humanities and Technology, 11 (1), 8-25. Available: http://www.ijbhtnet.com/journals/Vol_11_No_1_March_2021/2.pdf

[12] Kumar, R. (2021). Application of Cloud Computing Technology for Library Re-designing: Moving Beyond Desktop Applications, Library Philosophy and Practice (e-journal), 5290. Available: https://digitalcommons.unl.edu/libphilprac/5290

[13] Kumar, R. (2020). Digital Information Literacy among the Engineering Students: A Survey, Library Philosophy and Practice (e-journal), 4326. Available: https://digitalcommons.unl.edu/libphilprac/4326

[14] Atikuzzaman, M. and Islam, M.A. (2021). Perceptions and use of cloud services: an empirical study on the students of a public university in Bangladesh, Digital Library Perspectives, 37 (2), 87-101. Available: https://doi.org/10.1108/DLP-04-2020-0016

[15] Mary, A. C. and Rose, P. J. (2020). The impact of graduate student's perceptions towards the usage of cloud computing in higher education sectors, Universal Journal of Educational Research, 8 (11), 5463-5478. Available: https://www.hrpub.org/download/20201030/UJER50-19517489.pdf

[16] Qasem, Y. A., Asadi, S., Abdullah, R., Yah, Y., Atan, R., Al-Sharafi, M. A., and Yassin, A. A. (2020). A multi-analytical approach to predict the determinants of cloud computing adoption in higher education institutions, Applied Sciences, 10 (14), 4905. Available: https://www.mdpi.com/2076-3417/10/14/4905

[17] Meenu and Kumar, R. (2020). Emerging Technological Innovations in Library Management and Services: Dynamic ways of Collaboration, International e- journal of Library Science, 8 (1), 5-9. Available: https://gnims.edu.in/wp-content/uploads/2020/06/E-Journal-January-June-2020.pdf

[18] Ali, M. (2018). The Barriers and Enablers of the Educational Cloud: A Doctoral Student Perspective, Open Journal of Business and Management, 7 (1), 1-24. Available: https://www.scirp.org/journal/paperinformation.aspx?paperid=88569

[19] Ashtari, S. and Eydgahi, A. (2017). Student perceptions of cloud applications effectiveness in higher education, Journal of computational science, 23, 173-180. Available: https://www.sciencedirect.com/science/article/abs/pii/S1877750316304975

[20] Iji, C.O., Abah, J.A. and Anyor, J.W. (2017). Impact of cloud services on students' attitude towards mathematics education in public universities in Benue State, Nigeria, International Journal of Research in Education and Science (IJRES), 3 (1), 228-244. Available: https://files.eric.ed.gov/fulltext/EJ1126763.pdf

[21] Kumar, R. (2014). Internet Access and Use among Students of Physical Education: A Study of Kurukshetra University, Kurukshetra, Journal of Information Science Theory and Practice, 2 (2), 59–68. Available: https://doi.org/10.1633/JISTAP.2014.2.2.5

[22] Kumar, R. (2013). Students and the Internet: A study of Internet use by the students of NIT Kurukshetra, Haryana, India, International Journal of Library and Information Studies, 3 (2), 17-25. Available: https://www.ijlis.org/articles/students-and-the-internet-a-study-of-internet-use-by-the-students-of-nit-kurukshetra-haryana-india.pdf