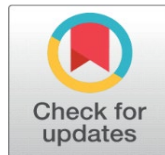


DIGITAL PROFICIENCY AMONG LIS POSTGRADUATE STUDENTS: AWARENESS AND USAGE OF ADVANCED TECHNOLOGIES AND SOFTWARE TOOLS IN KARNATAKA UNIVERSITIES

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ABSTRACT

This study investigates the awareness and use of various technological tools, including data compression tools, statistical software, web design software, plagiarism detection software, virtual meeting platform tools and advanced technologies among LIS postgraduate students in universities across Karnataka state. A structured questionnaire used for data collection and personally distributed questionnaire to students at selected universities. A total of 153 duly filled questionnaires were received from LIS students. The study highlights the levels of awareness and use of software among LIS students. WinZip and WinRAR are identified as the frequently used data compression tools. Additionally, the study found that the highest number of female students were enrolled in LIS programs. The findings suggest that advanced technologies should be included in the LIS curriculum. Students should regularly share their feedback on the curriculum, this feedback can help make improvements and keep the curriculum useful and up to date.

Keywords: Data Compression Tools, Statistical Tools, Web Design Software, Plagiarism Detection Tools

1. INTRODUCTION

Information and communication technology has become a major part of society, with its applications being widely used. As a result, it is often assumed that most people, especially university students, have basic ICT skills and can use simple ICT tools (Verhoeven et al., 2020). ICT skills help improve learning, change education methods, make learning more accessible, manage education better and improve teaching techniques (Caluza et al., 2017). ICT has spread globally, allowing people to benefit from the latest information available on the Internet. Similarly, university students spend a lot of time searching for information online (Chhachhar et al., 2013).

ICT-based information systems are important for academic libraries to offer training programs in partnership with university computer centers. These programs help provide high-quality information services to their users (Husain and

Nazim, 2015). Students with good ICT skills often perform better academically, as ICT literacy has a strong positive effect on academic success (Lei et al., 2021). However, there is a noticeable gap between the digital skills students develop informally and how these skills are used in academic settings. ICT and information literacy as part of students' learning process (Guzmán-Simón et al., 2017).

2. REVIEW OF LITERATURE

The main purpose of a literature review is to analyze and compare earlier theoretical and empirical research, offering a summary of existing knowledge in a particular field. It critically evaluates and synthesizes previous studies to provide insights into a specific topic. The study by Ajeemsha and Madhusudhan (2012) focused on ICT skills and competencies. It highlighted several specific skills and abilities essential for individuals in the ICT field, such as digital library competencies, computer skills, web page creation, Internet proficiency and the use of technological tools. Arthur-Durett (2014) conducted a study on data compression tools. The RAR format has gained popularity over the years compared to other tools, such as 7Z and ZIP, because it offers a better data compression rate and uses a lossless compression technique. Abdul and Ahmed (2018) examined the impact of web applications in teaching and computer curricula to enhance students' academic achievement. Reducing effort and saving time, thereby creating an engaging and enjoyable learning environment. Rajni and Khan (2019) discussed the provision of information services through library portals, websites and web pages. These serve as gateways to the library and other useful resources, with the services being delivered using web design software tools.

Arifin et al. (2021) conducted a study on the use of various virtual meeting platforms, the study found that Zoom Meetings and Google Meet were the most frequently used. The study revealed that both platforms were easy to understand and use and Their interactions were efficient and quick. Masuadi et al. (2021) aimed to assess trends in statistical software usage, showing that SPSS was the most used statistical tool (52.1%), followed by SAS (12.9%) and Stata (12.6%). SPSS was a leading software during the study period, widely used for both observational and experimental studies. Stata were primarily used for systematic reviews and meta-analyses. Subaveerapandiyan and Sakthivel (2022) recognized the reasons for not using plagiarism detection software: Among the respondents, 30.5% felt they didn't need it, 41.7% reported that it was too expensive and 27% opined inadequate funding as the reason for not subscribing. Olayode et al. (2023) ICT and related devices have become integral to human existence, including for students. The extensive use of information resources is essential for enhancing the quality of academic work and delivering digital reference services to students.

2.1. OBJECTIVES OF THE STUDY

The following objectives are formulated to explore the awareness and use of software's and advanced applications by LIS students.

- To assess the awareness and usage of data compression tools among LIS postgraduate students.
- To evaluate the level of awareness and usage of virtual meeting platforms among LIS postgraduate students.
- To examine the awareness and usage of plagiarism detection software among LIS postgraduate students.
- To explore the awareness of advanced technologies among LIS postgraduate students.
- To identify the reasons for the lack of awareness of technological tools and software among LIS postgraduate students.

3. RESEARCH HYPOTHESIS

The following research hypotheses were formulated for the present study.

H1. There is a significant association between the awareness and use of data compression tools and gender.

H2. There is a significant association between the awareness and use of virtual meeting platform tools and gender.

H3. There is a significant association between the awareness of advanced technologies and gender.

SCOPE AND LIMITATION OF THE STUDY

The study focused on postgraduate students in the Library and Information Science departments of universities in Karnataka State. In Karnataka, there are a total of 75 universities offering various postgraduate courses, including central university, state universities, deemed universities and private universities. Among these, there are 35 state universities, 25 private universities, 14 deemed universities and 1 central university. Out of the 75 universities, 11 universities offered Library and Information Science programs. Therefore, the study is confined to students from these 11 selected universities. The study explicitly excludes LIS students studying in postgraduate colleges, PG centers and private universities.

4. METHODOLOGY

To collect data for this study, a structured questionnaire was developed to gather information on various aspects of students' use of technological tools, including Data compression tools, statistical tools, web design software, plagiarism detection tools, virtual meeting tools and advanced technologies. The researcher personally visited the universities to distribute the questionnaires to the selected students. A total of 153 duly filled questionnaires were received from postgraduate students enrolled in LIS programs, out of a total of 167 postgraduate students across 11 universities in Karnataka State. After collection, the data was coded and analyzed using SPSS software version 26.0.

5. DATA ANALYSIS AND INTERPRETATION

Table 1 University-wise Distribution of Students by male and female

Name of the Universities	Male	Female	Total
Akkamahadevi Women's University, Vijayapura	00	09	09
Bangalore University, Bengaluru	14	17	31
Bangalore North University, Kolar	05	07	12
Gulbarga University, Kalaburagi	08	03	11
Karnatak University, Dharwad	06	09	15
Kuvempu University, Shivamogga	03	10	13
Mangalore University, Mangaluru	02	09	11
Rani Channamma University, Belagavi	03	06	09
Tumkur University, Tumakuru	01	09	10
University of Mysore, Mysuru	13	13	26
Vijayanagara Sri Krishnadevaraya University, Bellari	02	04	06
Total	57	96	153

The data presented in the Table-1 shows the university wise distribution of the students, specifically focusing on gender. Of the 153 students, 57 (37.25%) of male students and 96 (62.75%) of female students. Akkamahadevi Women's University exclusively has female students (9), as expected from its designation as a women's university. Bangalore University has the highest number of students (31), with a slightly higher number of female students (17) compared to male students (14). University of Mysore also shows an equal gender ratio, with 13 male and 13 female students, totaling 26. A smaller number of student enrollments is observed at Vijayanagara Sri Krishnadevaraya University, with six students. The data highlights a consistent trend of higher female student's enrollment in LIS programs across the universities in Karnataka state.

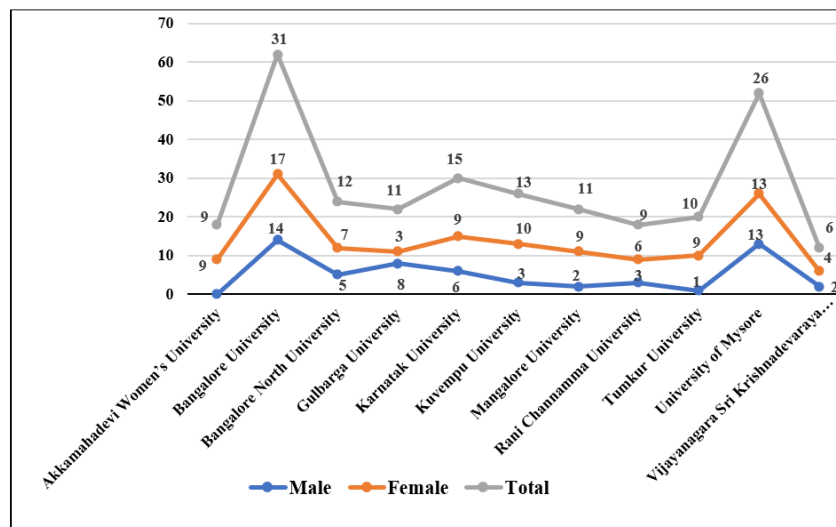


Figure 1 University-wise Distribution of Students by male and female

Table 2 Awareness and use of Data Compression tools

Data Compression tools	Aware and Use	Aware	Not aware	f-value	p-value
WinZip	38 (24.8)	60 (39.2)	55 (35.9)	2.308	.131
WinRAR	23 (15)	93 (60.8)	37(60.8)	2.422	.122
7-zip	22 (14.4)	82 (53.6)	49 (32)	.003	.957
ZIP Extractor	19 (12.4)	94 (61.4)	40 (26.1)	.358	.551
RAR File Extractor	20 (13.1)	104 (68)	29 (19)	5.441	.021
Express Zip	14 (9.2)	121 (79.1)	18 (11.8)	2.502	.116

Table 2 presents the awareness and usage of data compression tools among LIS students. The data shows that the most recognized and widely used data compression tool is WinZip (24.8%), followed by WinRAR (15%). The study also reveals that moderate levels of awareness and usage for 7-Zip (14.4%) and RAR File Extractor (13.1%). Interestingly, the table highlights that Express Zip has the lowest levels of awareness and usage, with only 9.2% of respondents using this tool. The findings also emphasize that more than 35% of students are aware of data compression tools. However, the lower preference for Express Zip compared to other data compression by LIS students.

A One-Way ANOVA was applied to determine the significant difference between the awareness and use of data compression tools and gender. The analysis revealed there is no statistically significant difference between the awareness and use of data compression tools and gender ($p > 0.05$). However, a significant difference ($p < 0.05$) was observed in the awareness and use of the RAR File Extractor with respect to gender. This finding indicates that gender has a significant influence on the awareness and use of the RAR File Extractor, while no such differences were found for other data compression tools.

Table 3 Awareness and use of Web designing software's

Web designing software	Aware and Use	Aware	Not aware
WordPress	38 (24.8)	40 (26.1)	75 (49)
Wix	15 (9.8)	87 (56.9)	51 (33.3)
Weebly	16 (10.5)	97 (63.4)	40 (26.6)

Webflow	24 (15.7)	93 (60.8)	36 (23.5)
Adobe dreamweaver	37 (24.2)	65 (42.5)	51 (33.3)
Google web designer	32 (20.9)	65 (42.5)	56 (36.6)

The awareness and usage of various web design software are presented in Table 3. The most utilized web design software among LIS students is WordPress, with 24.8% actively using it, followed by Adobe Dreamweaver, which demonstrates significant awareness and usage at 24.2%. Google Web Designer is used by 20.9% of students. The table also indicates that Wix has lower levels of awareness and usage, with only 9.8% of students using it. Regarding overall awareness, Weebly is recognized by 63.4% of LIS students are aware, followed by Webflow at 60.8%. Notably, Wix exhibits the lowest levels of awareness and usage among web design software among LIS students.

Table 4 Awareness and use of the Virtual meetings platforms tools.

Virtual meetings platforms tools	Aware and Use	Aware	Not Aware	f-value	p-value
Zoom cloud meetings	110 (71.9)	5 (3.3)	38 (24.8)	1.288	.258
Google meet	114 (74.5)	00	39 (25.5)	.341	.560
Cisco Webex	24 (15.7)	98 (64.1)	31 (20.3)	.668	.415
Microsoft Teams	23 (15)	64 (41.8)	66 (43.1)	.165	.685
Google Hangouts	17 (11.1)	75 (49)	61 (39.9)	.046	.830
GoToMeetings	22 (14.4)	97 (63.4)	34 (22.2)	.829	.364

The data presented in Table 4 shows the awareness and use of virtual meeting platform tools among LIS students. The most widely recognized virtual meeting platform is Google Meet, with 74.5% of students, followed by Zoom Cloud Meetings, which also shows significant awareness, with 71.9% of students using the virtual meeting platform. Cisco Webex has moderate levels of awareness and usage at 15.7%, while Microsoft Teams is recognized by 15% of students and GoToMeetings by 14.4%. Google Hangouts has the lowest awareness and usage, with only 11.1% of students using it. Google Hangouts has the lowest awareness and usage, with only 11.1% of students using it. This table indicates that Google Hangouts is not a widely recognized virtual meeting platform among LIS students. A One-Way ANOVA was applied, the study found that there is a significant difference between the awareness and use of virtual meeting platform tools and gender. The results indicated there is no statistically significant difference between the awareness and use of virtual meeting platform tools and gender ($p > 0.05$).

Table 5 Awareness and use of the Statistical software.

Statistical software	Aware and Use	Aware	Not Aware
SPSS	27 (17.6)	65 (42.5)	61 (39.9)
SYSTAT	06 (3.9)	121 (79.1)	26 (17)
SAS	14 (9.2)	99 (64.7)	40 (26.1)
R Software	11 (7.2)	118 (77.1)	24 (15.7)
PSPP	13 (8.5)	119 (77.8)	21 (13.7)
STATA	4 (2.6)	127 (83)	22 (14.4)
Minitab	2 (1.3)	128 (83.7)	23 (15)

The data presented in Table 5 highlights the awareness and usage of statistical software among LIS students. SPSS emerges as the most recognized and widely used software, with 17.6% of students aware of and using it. SAS also

demonstrates significant awareness and usage, with 9.2% of students, followed by PSPP with 8.5% and R Software with 7.2% of students aware of and using these software's. Minitab statistical software shows lower levels of awareness and usage 1.3% of students using it. Additionally, more than 40% of LIS students are aware of the various statistical software revealed in the study. This indicates that SPSS is the most widely used statistical software among students. Conversely, the lower awareness and usage of Minitab indicate that it is not a widely used statistical software among LIS students.

Table 6 Awareness and use of the Plagiarism detection software.

Plagiarism detection software	Aware and Use	Aware	Not Aware
Turnitin	9 (5.9)	86 (56.2)	58 (37.9)
iThenticate	6 (3.9)	118 (77.1)	29 (19)
Ouriginal (Urkund)	7 (4.6)	126 (82.4)	20 (13.1)
Plagiarism Checker	14 (9.2)	97 (63.4)	42 (27.5)
PlagScan	9 (5.9)	118 (77.1)	26 (17)
Plagiarisma	5 (3.3)	108 (70.6)	40 (26.1)
DrillBit Plagiarism	6 (3.9)	124 (81)	23 (15)
Duplichecker	4 (2.6)	123 (80.4)	26 (17)

The data presented in Table 6 highlights the awareness and usage of plagiarism detection software among LIS students. Ouriginal is the most recognized software, with 82.4% of students being aware of it. DrillBit Plagiarism also shows significant awareness, with 81% of students familiar with the software. Duplichecker shows moderate levels of awareness, with 80.4% of students are aware. In contrast, Plagiarism Checker and Turnitin exhibit lower levels of awareness, with only 63.4% and 56.2% of students are aware. Notably, less than 10% of LIS students are aware of and using the various plagiarism detection software's revealed in the study. This table indicates that Ouriginal is the most widely recognized plagiarism detection software among LIS students.

Table 7 Awareness of Advanced Technologies Among male and female Students

Advanced Technologies	Male		Female		Both		p-value
	Frequency	%	Frequency	%	Frequency	%	
Internet of Things	41	26.79	65	42.48	106	69.28	.587
Internet security	39	25.49	69	45.09	108	70.58	.653
Big data	32	20.91	30	19.60	62	40.52	.002
Web scale discovery	19	12.41	18s	11.76	37	24.18	.042
Artificial Intelligence	32	20.91	44	28.75	76	49.67	.220
Cloud Computing	41	26.79	63	41.17	104	67.97	.422
Communication Protocols	34	22.22	45	29.41	79	51.63	.128

The data presented in Table 7 shows the awareness of advanced technologies among male and female students. The most recognized technology among both male and female students is Internet security, with 70.58% of respondents aware of this technology. Other major advanced technologies identified include the Internet of Things (69.28%), followed by Cloud Computing (67.97%). The table also reveals a moderate level of awareness of technologies such as Communication Protocols (51.63%) and Artificial Intelligence (49.67%). The study reveals lower levels of awareness of advanced technologies like Big Data (40.52%) and Web-Scale Discovery (24.18%). The table highlights that the awareness of Big Data and Web-Scale Discovery is significantly lower among students.

The Chi-square test was applied to determine the association between the awareness of advanced technologies and gender. The study found that there is no statistically significant association between the awareness of advanced technologies and gender ($p>0.05$). However, a significant association ($p<0.05$) was found between gender and the awareness and use of Big Data and Web-Scale Discovery tools.

Table 8 Reasons for unawareness of advanced technologies and Software's

Reasons	Male		Female		Both	
	Frequency	%	Frequency	%	Frequency	%
It is not included in the syllabus	21	13.72	22	14.37	43	28.10
Teacher has not taught it	10	6.53	15	9.80	25	16.33
It is not essential to learn	19	12.41	22	14.37	41	26.79
It is not needed for PG course	14	9.15	16	10.45	30	19.60
Lack of knowledge	14	9.15	18	11.76	32	20.91
lack of interest in learning	01	0.65	10	6.53	11	7.18

The data presented in Table 8 highlights the reasons for the lack of awareness of advanced technologies and software among male and female students. The primary reason by LIS students is that these topics are not included in the syllabus, with 28.10% of students expressing this opinion. Other significant reasons, it is not essential to learn (26.79%), followed by a lack of knowledge (20.91%) and it is not needed for PG course (19.60%). Additionally, some students opined that the teacher has not taught it (16.33%) and a lack of interest in learning them (7.18%). LIS postgraduate students identified three main reasons for their lack of awareness: the absence of these topics in the syllabus, the belief that learning them is not essential and a lack of knowledge.

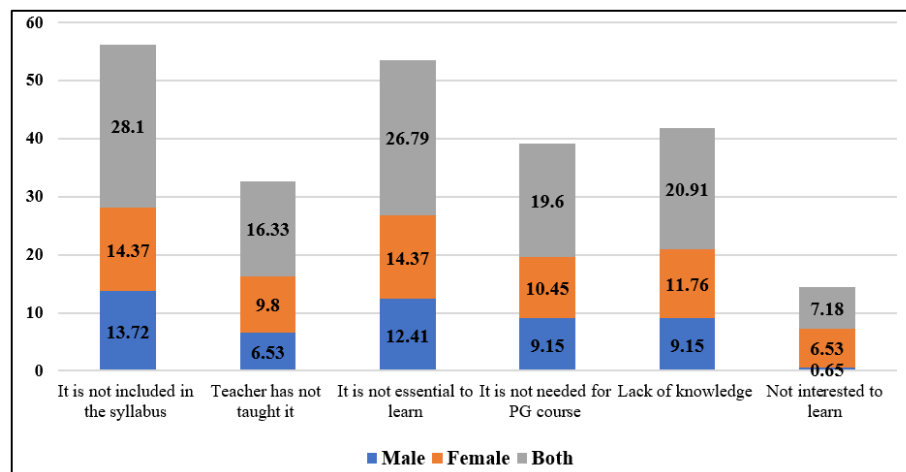


Figure 2 Reasons for unawareness of advanced technologies and Software's

Table 9 Testing of formulated hypothesis

Sl. No	Hypothesis	Table No.	Test Applied	P-value	Result
1	There is a significant difference between the awareness and use of data compression tools and gender.	Table-2	One-way ANOVA	($p>0.05$)	Rejected
2	There is a significant difference between the awareness and use of virtual meeting platform tools and gender.	Table-4	One-way ANOVA	($p>0.05$)	Rejected

3	There is a significant association between the awareness of advanced technologies and gender.	Table-7	Chi-Square test	(p>0.05)	Rejected
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6. CONCLUSION AND DISCUSSION

The study provides valuable insights into technology awareness and usage among LIS students. The university-wise distribution reveals that Bangalore University has the highest percentage of students. WinZip and WinRAR are the most widely used data compression tools. WordPress and Adobe Dreamweaver are identified as the leading web design software's. Google Meet and Zoom Cloud Meetings are the most popular virtual meeting platforms tools. SPSS and SAS are recognized as the most widely used statistical software's, while Ouriginal and DrillBit Plagiarism are the most preferred plagiarism detection software, reflecting their importance in ensuring academic integrity. The study also identifies the primary challenges faced by both male and female LIS postgraduate students and reports three major reasons for the lack of awareness of advanced technologies: these topics are not included in the syllabus; they are not considered essential to learn and there is a lack of knowledge. To encourage students to explore and learn advanced technologies by highlighting their practical benefits in research, academic work and job opportunities. The findings suggest that web technologies should be included in the LIS curriculum. Students should regularly share their feedback on the curriculum, this feedback can help make improvements and keep the curriculum useful and up to date.

7. RECOMMENDATIONS

- The current LIS curriculum in many Karnataka universities lacks comprehensive coverage of advanced technologies, software tools and digital skills. Universities should revise and update syllabus to include these areas, making them relevant to the current academic and professional needs of LIS students.
- There is insufficient exposure to popular software tools among students. Universities should organize workshops, seminars and hands-on training sessions on tools like data compression software (e.g., WinZip, WinRAR), web design software (e.g., WordPress, Adobe Dreamweaver) and statistical tools (e.g., SPSS, SAS).
- Many students are not aware of the importance of advanced technologies. Universities should conduct awareness programs to help students understand how advanced technologies can support their academic and professional growth.
- Several universities faced problems with technological infrastructure. Universities should ensure that necessary facilities like high-speed Internet, updated software and well-equipped computer labs are available and easily accessible to students.
- There are limited opportunities for students to work with peers and faculty on technology-related projects. Universities should create opportunities for students to collaborate with their peers and faculty to improve their technical skills through group activities and projects.

CONFLICT OF INTERESTS

None.

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