Awareness of Digital Education among Pre-Service Teachers

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Abstract

Digital penetration in general has seen major improvement in recent years. This has come to rescue the education sector in times of global pandemic and consequent lock downs. There has been invent of various tools and platforms on which education is being provided to student and teacher community. This paper has examined the awareness of digital education among pre-service teacher of B.Ed. and M.Ed. in terms of knowledge about digital education and skill of using digital applications, digital medium and digital devices. The present study also explored the differences in awareness of digital education among pre-service teachers by gender, teacher education course, and level of educational qualification. The researcher prepared a close ended structured questionnaire measuring the responses in lieu of knowledge and skill about digital education. It was found that majority of the pre-service teachers were adequately aware about leaning management system, spam, MOOC and virtual labs. The pre-service teachers were found to have good skill in using word process application, presentation application and video sharing sites. Only around 20% of the pre-service teachers were part of any forum or interests' group and used virtual labs in teaching. It was also found that pre-service teachers have adequate knowledge about digital education and skill of using digital medium and digital devices as the mean score was more than fifty percent. It was observed that the awareness about government initiatives in digital education was not adequate among pre-service teachers.

Keywords : *Digital Education, Pre-Service teachers & government initiatives.*

Introduction :-

The NEP 2020 of India emphasises that India is a global leader in information and communication technology and in other cutting-edge domains, such as space. The Digital India Campaign is helping to transform the entire nation into a digitally empowered society and knowledge economy. While education will play a critical role in this transformation, technology itself will play an important role in the improvement of educational processes and outcomes; thus, the relationship between technology and education at all levels is bidirectional. It also recommends that suitable teacher training is required to prepare teacher as effective online educators. Digital education requires change in pedagogy, different approach for online assessment, blended approach, availability of educational programmes 24X7 hours, virtual labs, digital platforms, ICT initiatives, investment on creation of open, interruptive, evolvable, public digital infrastructure, providing assistive tools for monitoring progress of diverse groups of learners.

It is understandable that the role of teacher is important for development of digital education. The teacher needs to be well prepared to work in a digital world especially digital

classroom and be able to improve learning outcomes and enable them to integrate pedagogy and technology for transforming education in a progressive direction. Developed competency of a digital teacher will enable them to increase the learning outcome and integration of pedagogy and ICT. Therefore, it is essential to understand the current level of awareness of pre-service teachers for digital education so that future initiatives can be taken to improve the competency of pre-service teachers for digital education. Hence, this study has tried to understand the awareness of digital education among pre-service teachers in terms of knowledge and skill of preservice teachers for using digital tools and technologies in the process of teaching and learning.

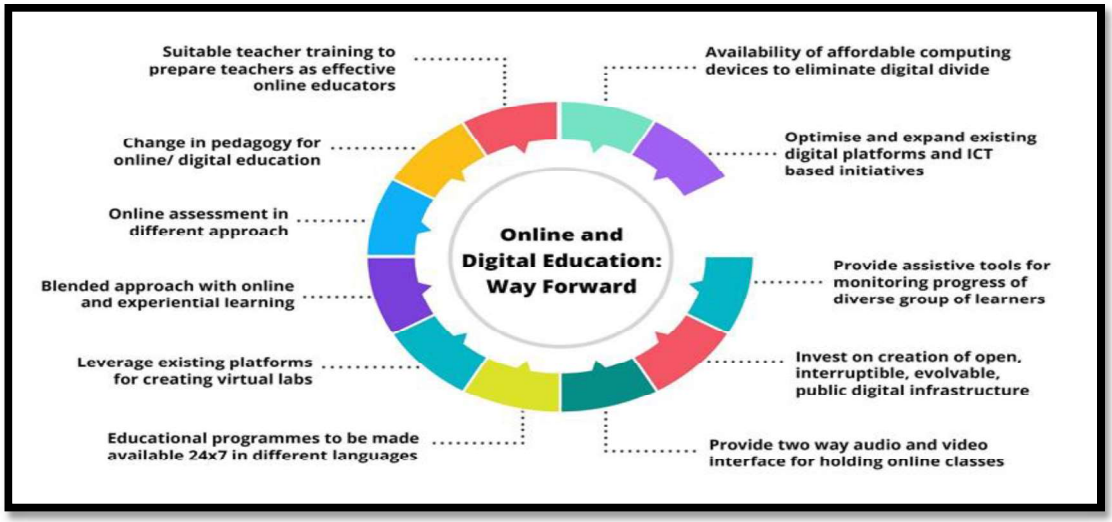


Figure1: Online and Digital Education: Way Forward

Need of the Study

With the outbreak of COVID-19, schools and teachers have no choice but to take on online teaching learning pedagogies. However, many teachers are unfamiliar or indifferent to online education using technology-led materials. Thus, this unique scenario has provided an ideal arena to understand the current level of awareness of pre-service teachers for digital education so that future initiatives can be taken to improve the competency of pre-service teachers for digital education.

Earlier studies have been conducted on digital literacy, digital competency, and awareness of SWAYAM, E-learning; M-learning among B.Ed. students or management students but no study has been done on the awareness of digital education holistically among B.Ed. as well as M.Ed. pre-service teachers.

There have been many government initiatives in digital education it would be an interesting to look at the awareness level of these initiatives in pre-service teachers.

The present study was conducted to explore differences in awareness of digital education among pre-service teachers by gender, teacher education course, and level of educational qualification.

Conceptual Framework of the Study:

For the present study the awareness of digital education has been defined in two dimension that is knowledge and skill. The knowledge dimension includes the familiarity with the concept of digital education, safety, and security in digital education. It also includes the awareness about various government initiatives for digital education. The skill dimension includes ability of pre-service teachers to use digital applications and digital medium and digital devices.

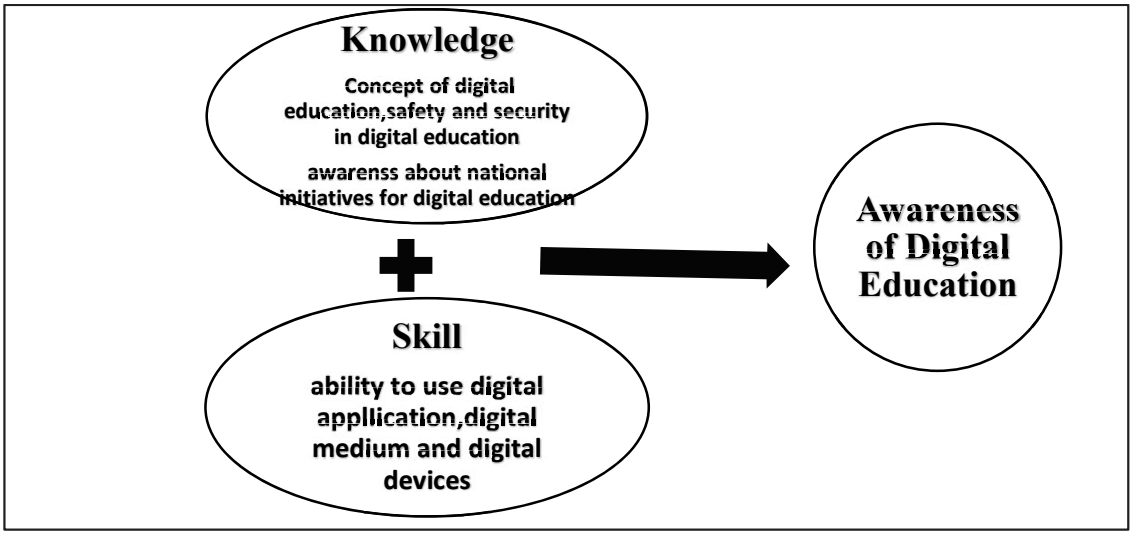


Figure2: Conceptual Framework of The Study

Review of Related Literature:-

The researcher explored various international and regional studies conducted in the field of digital education, digital literacy, e-learning, government initiatives in the field of digital education particularly in relation to teacher education and school education.

According to this all-inclusive view, digital literacy as a social practice is the core, which is the outcome, of digital education and digital education leadership. Digital education is the pedagogic mediation that will promote digital literacy among individuals. Digital education leadership is about providing direction to achieve the learning goal of digital literacy, in terms of digital education through enhancing access, building capacity in peers, making informed decisions, and cultivating innovation (Brown et al, 2016). (Homishak, 2014) conducted to understand perspectives and attitudes to aid in the development of technology and technical communication curriculums for pre-service teachers emphasized for serious contemplation on the reality that there is a significant issue in teacher education curriculum and the ineffective use and instruction of technology and technical communication in educational settings. (Baran, 2014) aimed to address trends and gaps observed in the literature regarding the integration of mobile into teacher education found that :(a)there was an increasing inclination in integrating mobile learning in teacher education contexts; (b) theoretical and conceptual perspectives are hardly reported; (c) differences exist in perceptions, attitudes and usage patterns; (d) engagement

with mobile learning and devices is primarily reported as being beneficial; (e) challenges were barely reported; and (f) several pedagogical affordances support mobile learning integration into teacher education settings. The study recommended to develop research-informed guidelines and theoretical models to propose methods on how to integrate mobile learning into teacher education. (Yuksel Goktas, 2009) studied the main barriers and possible enablers for integrating information and communication technologies (ICTs) in Turkey's pre-service teacher education programs and found that most of the stakeholders held that lack of in-service training, lack of appropriate software and materials, and lack of hardware are the main barriers for integrating ICTs in pre-service teacher education programs and having technology plans was the possible enabler. (Olusola A. Thomas, 2020) investigated the competency training needs of lecturers for e-learning instructional delivery in teacher education programs. The study found that lecturers required training for technology related competencies and pedagogical knowledge. It was recommended that workshops and seminars should be organized within and outside the country for sharing and development of ideologies and skills and updating of teaching and learning facilities. (Siu Cheung Kong, 2014) intended to discuss the research issues and policy implications for Developing 21st Century Skills in school reviewed literature in the related fields indicated that K-12 schools should take advantage of e-learning to maximize learning opportunities of learners for the development of 21st century skills. The researchers recognised six research issues critical for e-learning in school education, viz. the realization of developing 21st century skills of learners; the linking of the gap between curriculum in school and situations in society; the extension of learning opportunities in the learning process; the gathering of evidence of improvement and building awareness of progress; the assessment of 21st century skills; and the avenues of teacher development for enculturating learners to develop 21st century skills. (Mohile, 2021) was conducted to investigate Awareness of SWAYAM(MOOCs) among the undergraduate and Post Graduate students. The study revealed that there was less awareness of MOOCs and SWAYAM among the students, but students showed an encouraging attitude towards taking this online platform for various online courses provided by government. The study suggested that necessary steps should be initiated by government, Educational Institutions, Universities, and all coordinators of SWAYAM to promote it on larger scale among the student's community

Statement of the Problem:-

Awareness of Digital Education among Pre-service Teachers.

Operational Definitions

- **Awareness**: For the present study awareness is defined as the knowledge and skill of pre-service teachers for using digital applications, digital medium and digital devices.
- **Knowledge**: For the present study knowledge of digital education has been defined as the familiarity of pre-service teachers with the concept of digital education, safely and

security in digital education and about the various government initiatives in digital education.

- **Skill**: For the present study the skill has been defined as the ability of pre-service teachers for using digital applications, digital medium and digital devices.
- **Pre-service teachers:** Pre-service teachers for the present study are the students enrolled in B.Ed. and M.Ed. teacher education courses.
- **Digital education**- Digital education for the present study is defined as the process of teaching and learning using digital applications, digital medium and digital devices.

Aim of Study:

To Study the Awareness of Digital Education in B.Ed. and M.Ed. pre-service teachers

Research Questions:

1. What is the level of awareness of digital education among the pre-service teachers in terms of knowledge and skills for using digital tools and technology in teaching and learning?
2. Do pre-service teachers have adequate knowledge about digital education? Do pre-service teachers have adequate skill of using digital medium and digital devices in teaching and learning?
3. What are the differences in the awareness of digital education among pre-service teachers based on gender?
4. What are the differences in the awareness of digital education among pre-service teachers based on teacher education course?
5. What are the differences in awareness of digital education among pre-service teachers based on degree of level of educational qualification?
6. Were pre-service teachers enrolling for the courses on SWAYAM or DIKSHA? Were pre-service teachers aware of the various government initiatives for digital education in India? Do pre-service teachers have adequate awareness about government initiatives for digital education?

Objectives:

1. To examine the level of awareness of digital education among the pre-service teachers in terms of knowledge and skills for using digital tools and technology in teaching and learning
2. To find out whether pre-service teachers have adequate knowledge about digital education or not.
3. To find out whether pre-service teachers have adequate skill of using digital medium and digital devices in teaching and learning.
4. To compare the awareness of digital education among pre-service teachers based on gender.
5. To compare the awareness of digital education among pre-service teachers based on teacher education course
6. To compare the awareness of digital education among pre-service teachers based on level of educational qualification
7. To find out the percentage of students enrolled in SWAYAM and DIKSHA.

8. To find out whether pre-service teachers have adequate awareness about government initiatives in digital education.
9. To compare the awareness of digital education among pre-service teachers about various government initiatives based on gender, teacher education courses and level of educational qualification.

Scope and Delimitation of the Study:

- The study it has been subjected to only B.Ed. and M.Ed. students.
- The study is delimited to Mumbai region. So, there is scope that study can be done at large geographical region.

Methodology of the study:

The descriptive survey method has been adopted in the present research.

Sample and Sampling Technique:

The researcher considered the simple random sampling technique for the present study. The sample selected for the study consists of total of 98 pre-service teachers enrolled in B.Ed. and M.Ed. course in Mumbai. Out of 98 pre-service teachers, the number of female and male pre-service teachers was 85 and 13 respectively. The number of B.Ed. and M.Ed. Pre-service teachers was 76 and 22 respectively and the number of graduate and postgraduate preservice teachers was 44 and 54 respectively.

Data Collection Tool:

Self-developed questionnaire based on the awareness of digital education in the two domains that is knowledge about digital education and skill of using digital applications, medium and devices in teaching learning process. The validity of tools was ensured by taking expert comments. Total number of items were 43 in close ended form. The questionnaire was delivered to the pre-service teachers through Google forms and took approximately 1o to 15 min to respond.

Statistical Data Analysis and Procedure:

The collected data were analyzed as per the research questions of the study by using frequency and percentage and qualitative descriptions. The collected data was coded numerically and entered in MS Excel for analysis.

Data Analysis and Interpretation:

RQ 1 What is the level of awareness of digital education among the pre-service teachers in terms of knowledge and skills for using digital applications, digital medium and digital devices?

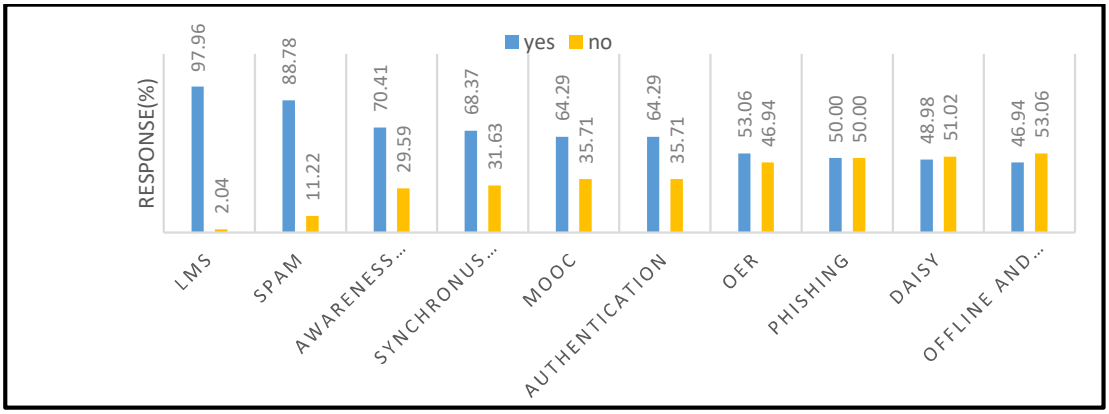


Figure 3: Pre-service teachers-Knowledge about Digital Education

Table 1: Pre-service teachers-knowledge about digital education

		Yes		No
items	**frequency**	**%**	**frequency**	**%**
LMS	96	97.96	2.00	2.04
spam	87	88.78	11.00	11.22
awareness about virtual labs	69	70.41	29.00	29.59
synchronous or asynchronous	67	68.37	31.00	31.63
MOOC	63	64.29	35.00	35.71
authentication	63	64.29	35.00	35.71
OER	52	53.06	46.00	46.94
phishing	49	50.00	49.00	50.00
DAISY	48	48.98	50.00	51.02
offline and online	46	46.94	52.00	53.06

Table1 indicates that more than 90% of pre-service teachers were aware about LMS and approx. 89% of pre-service teachers were aware about spam. Approx. 70% of pre-service teachers were aware about virtual labs. Around 64% of pre-service teachers were aware about MOOC and authentication. Approx. 53% of pre-service teachers were aware about OER. further, around 53% of pre-service teachers were not aware about offline and online mode of digital education.

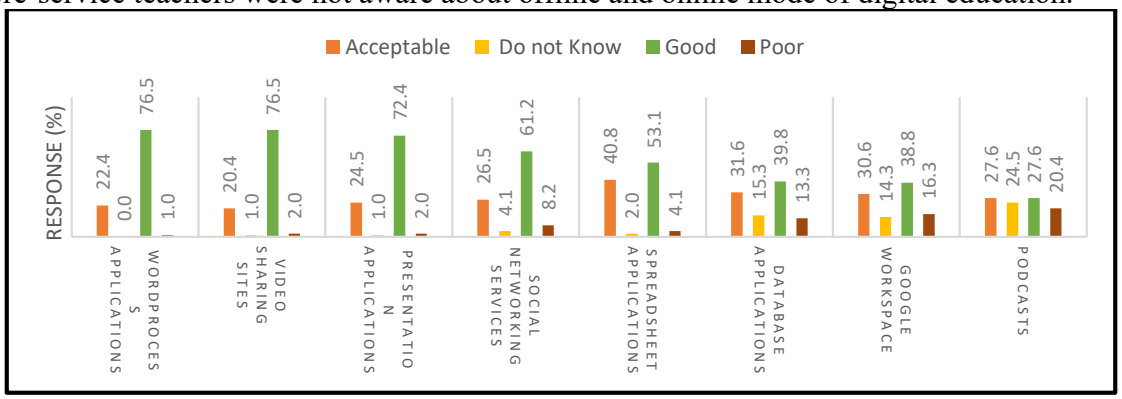


Figure 4: Pre-service teachers- Working with Digital Applications

Table 2: Pre-service teachers- Working with Digital Application

items	Acceptable	Do not Know	Good	Poor
word process applications	22.4	0.0	76.5	1.0
Video sharing sites	20.4	1.0	76.5	2.0
Presentation applications	24.5	1.0	72.4	2.0
Social networking services	26.5	4.1	61.2	8.2
Spreadsheet applications	40.8	2.0	53.1	4.1
Database applications	31.6	15.3	39.8	13.3
Google Workspace	30.6	14.3	38.8	16.3
Podcasts	27.6	24.5	27.6	20.4

The Table 2 indicates that around 76.5% of pre-service teachers had good knowledge about word process applications and video sharing sites. About 72% of pre-service teachers were observed to have good knowledge about presentation applications. Around 61% of pre-service teachers had good knowledge about social networking sites. Only around 40% of pre-service teachers were found to have good knowledge of database application and Google workspace. Only around 28% of pre-service teachers had good knowledge about podcasts.

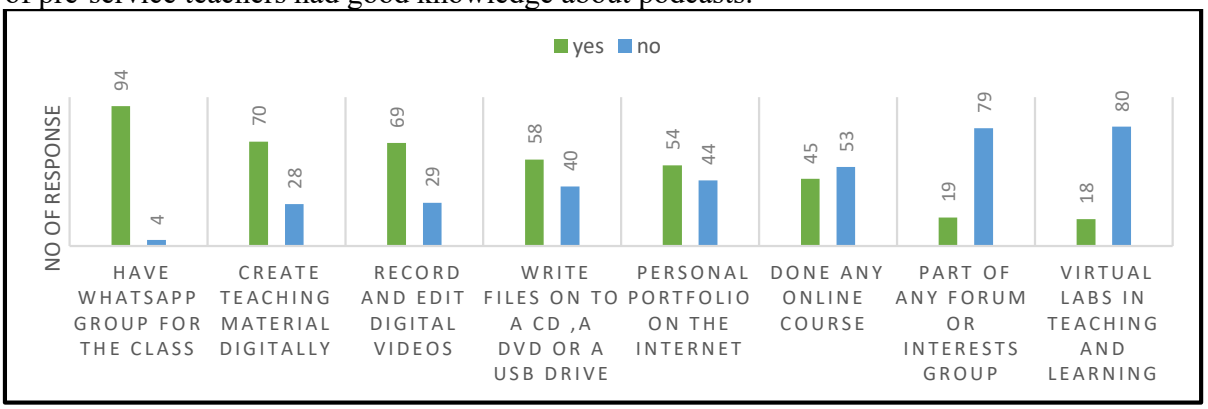


Figure 5: Pre-service teachers -Skill of using Digital Medium and Devices

Table 3: Pre-Service teachers -Skill of using Digital Medium and Devices

items	**Yes**	**No**
have WhatsApp group for the class	94	4
create teaching material digitally	70	28
record and edit digital videos	69	29
write files on to a CD, a DVD, or a USB drive	58	40
personal portfolio on the internet	54	44
done any online course	45	53
part of any forum or interests' group	19	79
virtual labs in teaching and learning	18	80

The Table 3 points out that 94 out of 98 pre-service teachers have WhatsApp group for class. 70 out of 98 pre-service teachers were able to create teaching material digitally. Only 45 pre-service

teachers were found to have done any online course. Very few pre-service teachers were part of any forum or interest group. Only 18 pre-service teachers were observed to have use virtual labs in teaching and learning.58 pre-service teachers can write files on to a CD, a DVD, or a USB drive.

RQ2 Do Pre-service teachers have adequate knowledge about digital education? Do pre-service teachers have adequate skill of using digital medium and digital devices in teaching and learning?

To find out whether pre-service teachers have adequate knowledge about digital education or not, the mean score of knowledge about digital education was calculated.

Table 4- Mean score of knowledge about digital education among preservice teachers

Preservice teachers	N	Mean	SD
Whole sample	98	6.4	1.9

It was found that the pre-service teachers have 6.4 out of 10 (64%) knowledge about digital education. It was declared that pre-service teachers have adequate knowledge about digital education as the mean score was more than fifty percent.

To find out whether pre-service teachers have adequate skill of using digital medium and digital services or not, the mean score of skill of using digital medium and digital devices was calculated.

Table 5 :Mean Score of Skill of using Digital Medium and Digital Devices

Pre-service teachers	N	Mean	SD
Whole sample	98	4.4	1.51

It was found that the pre-service teachers have 4.4 out of 8 (55%) skill of using digital medium and digital devices. It was declared that pre-service teachers have adequate knowledge about digital education as the mean score was more than fifty percent.

RQ3. What are the differences in the awareness of digital education among pre-service teachers based on gender?

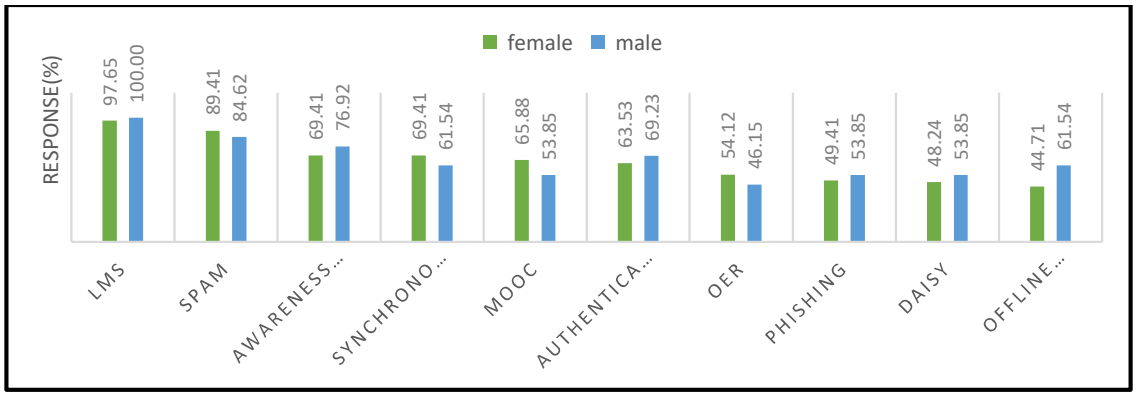


Figure 6: Male/Female-Knowledge about Digital Education

Table 6: Female/Male-Knowledge about Digital Education

Items		Female		Male
	frequency	%	frequency	%
LMS	83	97.65	13.00	100.00
spam	76	89.41	11.00	84.62
awareness about virtual labs	59	69.41	10.00	76.92
synchronous or asynchronous	59	69.41	8.00	61.54
MOOC	56	65.88	7.00	53.85
authentication	54	63.53	9.00	69.23
OER	46	54.12	6.00	46.15
phishing	42	49.41	7.00	53.85
DAISY	41	48.24	7.00	53.85
offline and online	38	44.71	8.00	61.54

The Table6 indicates that about 52% of female pre-service teachers and 46% of male pre-service teachers were aware about OER. About 74% of female pre-service teachers and about 635 of male pre-service teachers were aware about LMS. Further 69% of female pre-service teachers and 77% of male pre-service teachers were found aware about MOOC. The Table also reveals that 54% of female pre-service teachers and 46% of male pre-service teachers were aware about phishing. Nearly 41% of female pre-service teachers and 15% of male pre-service teachers had awareness about DAISY. Further, nearly 9% of female pre-service teachers and about 23% of male pre-service teachers were aware about virtual labs.

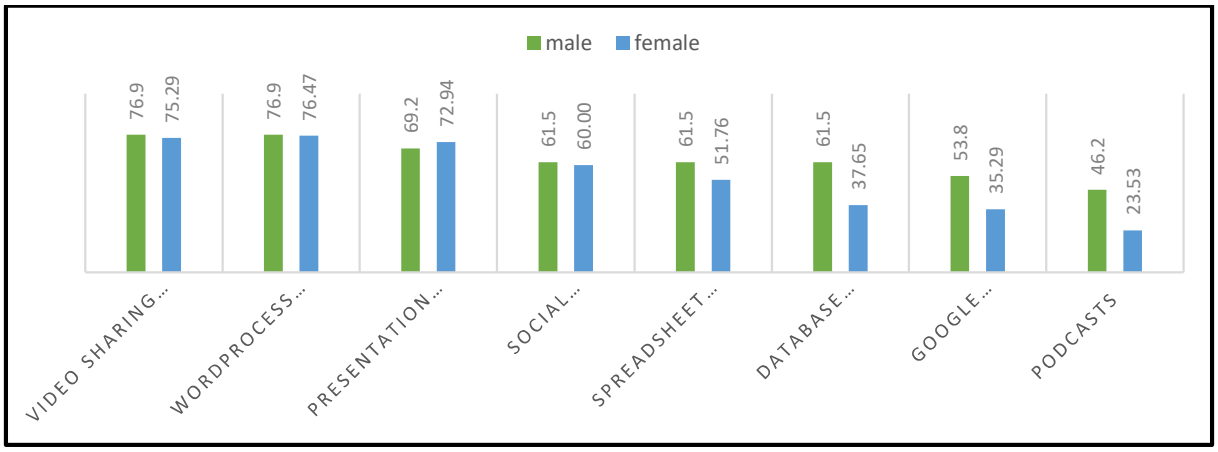


Figure 7:Male/Female- Skill of Working with Digital Applications

Table 7: Male/Female-Skill of working with Digital Application

Items	Frequency	Male %	Frequency	Female %
word process applications	10.0	76.9	65	76.47
Video sharing sites	10.0	76.9	64	75.29
Presentation applications	9.0	69.2	62	72.94

Social networking services	8.0	61.5	51	60.00
Spreadsheet applications	8.0	61.5	44	51.76
Database applications	8.0	61.5	32	37.65
Google Workspace	7.0	53.8	30	35.29
Podcasts	6.0	46.2	20	23.53

The Table 7 indicates that About 61.5 % of male pre-service teachers and 53% of female pre-service teachers have good knowledge about social networking Services. about 54% of male pre-service teachers and 44% of male pre-service teachers were found to have good knowledge about Google workspace. Further, 61.55% of male pre-service teachers and 38% of female pre-service teachers were found to have good knowledge about podcasts.

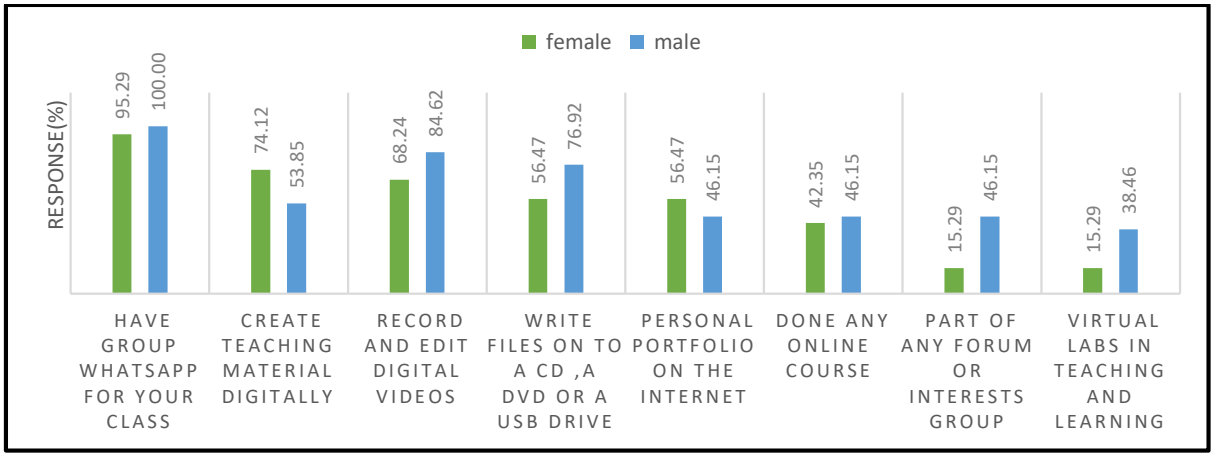


Figure 8: Male/Female-Skill of using Digital Medium and Devices

Table 8: Male/Female -Skill of using Digital Medium and Digital Devices

Items	Frequency	Female %	Frequency	Male %
have group WhatsApp for your class	81	95.29	13	100.00
create teaching material digitally	63	74.12	7	53.85
record and edit digital videos	58	68.24	11	84.62
write files on to a CD, a DVD, or a USB drive	48	56.47	10	76.92
personal portfolio on the internet	48	56.47	6	46.15
done any online course	36	42.35	6	46.15
part of any forum or interests' group	13	15.29	6	46.15
virtual labs in teaching and learning	13	15.29	5	38.46

The Table8 indicates that about 96% of female pre-service teachers and 77% of male pre-service teachers have What's App group for their class. Around 88% of female pre-service teachers and 100% of male pre-service teachers can record and edit digital videos. The Table also

reveals that 79% of female pre-service teachers and 92% of male pre- service teachers were found to be able to write files on to a CD, a DVD, or a USB drive. About 56% of female pre-service teachers and 46% of male pre-service teachers of male pre-service teachers create teaching material digitally. Further, 55% of female pre-service teachers and 69% of male pre-service teachers were part of any forum or interests 'group. About 27% of female pre-service teachers and around 38% of male pre-service teachers use virtual labs in teaching and learning.

RQ 4: What are the differences in the awareness of digital education among pre-service teachers based on teacher education course?

To find out differences in the awareness of digital education among pre-service teachers based on teacher education courses, the responses of pre-service teachers enrolled in B.Ed. and pre-service teacher enrolled in M.Ed. was compared.

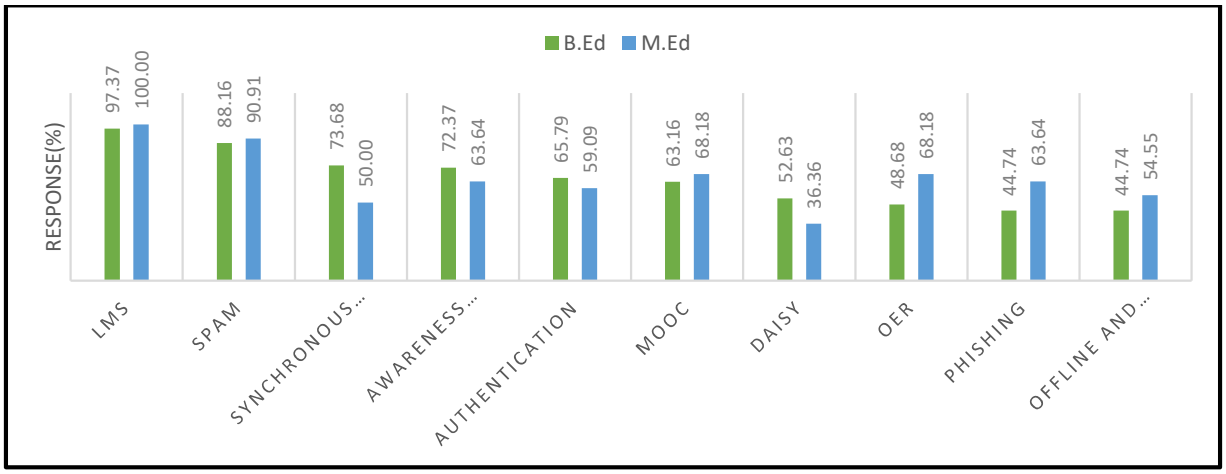


Figure 9: B.Ed./M.Ed.-Knowledge about Digital Education

Table 9: B.Ed./M.Ed.-Knowledge about Digital Education

Items	Frequency	B.Ed. %	Frequency	M.Ed. %
LMS	74	97.37	22	100.00
spam	67	88.16	20	90.91
synchronous or asynchronous	56	73.68	11	50.00
awareness about virtual labs	55	72.37	14	63.64
authentication	50	65.79	13	59.09
MOOC	48	63.16	15	68.18
DAISY	40	52.63	8	36.36
OER	37	48.68	15	68.18
phishing	34	44.74	14	63.64
offline and online	34	44.74	12	54.55

The Table9 indicates that around 74% of B.Ed. Pre-service teachers and 50% of M.Ed. Pre-service teachers were aware about synchronous and asynchronous mode of digital education. approx. 72% of B.Ed. Pre-service teachers and 64% of M.Ed. Pre-service teachers were aware about virtual labs. About 53% of B.Ed. Pre-service teachers and 36% of M.Ed. Pre-service teachers were aware about DAISY. Further, about 45% of B.Ed. Pre-service teachers and 65% of M.Ed. Pre-service teachers were aware about phishing.

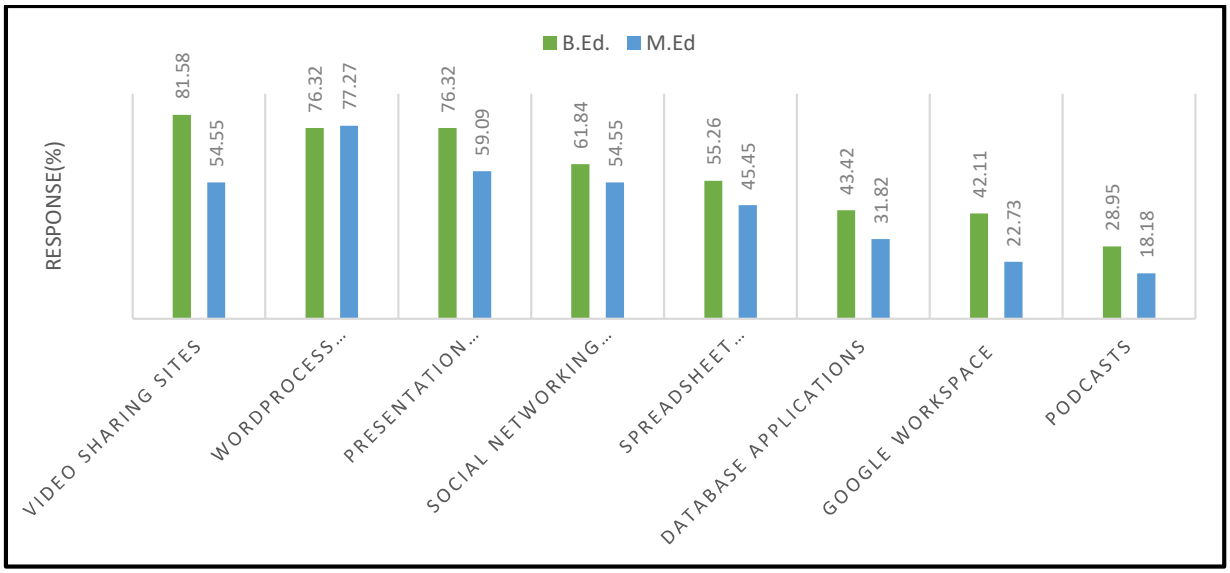


Figure 10: B.Ed./M.Ed.- Skill of working with Digital Applications

Table 10: B.Ed./M.Ed. -working with Digital Application

Items	Frequency	B.Ed. %	Frequency	M.Ed. %
Video sharing sites	62	81.58	12	54.55
word process applications	58	76.32	17	77.27
Presentation applications	58	76.32	13	59.09
Social networking services	47	61.84	12	54.55
Spreadsheet applications	42	55.26	10	45.45
Database applications	33	43.42	7	31.82
Google Workspace	32	42.11	5	22.73
Podcasts	22	28.95	4	18.18

Table 10 shows that approx. 82% of B.Ed. Pre-service teachers and around 54% of M.Ed. Pre-service teachers were found to have good knowledge about video sharing sites. about 76% of B.Ed. Pre-service teachers and around 59% of M.Ed. Pre-service teachers were observed to have good knowledge about word process applications. Further, around42% of B.Ed. Pre-service

teachers and 23 %of M.Ed. Pre-service teachers have good knowledge about blogs and Google workspace. Nearly 29% of B.Ed. Pre-service teachers and about 18% of M.Ed. Pre-service teachers have good knowledge about podcasts.

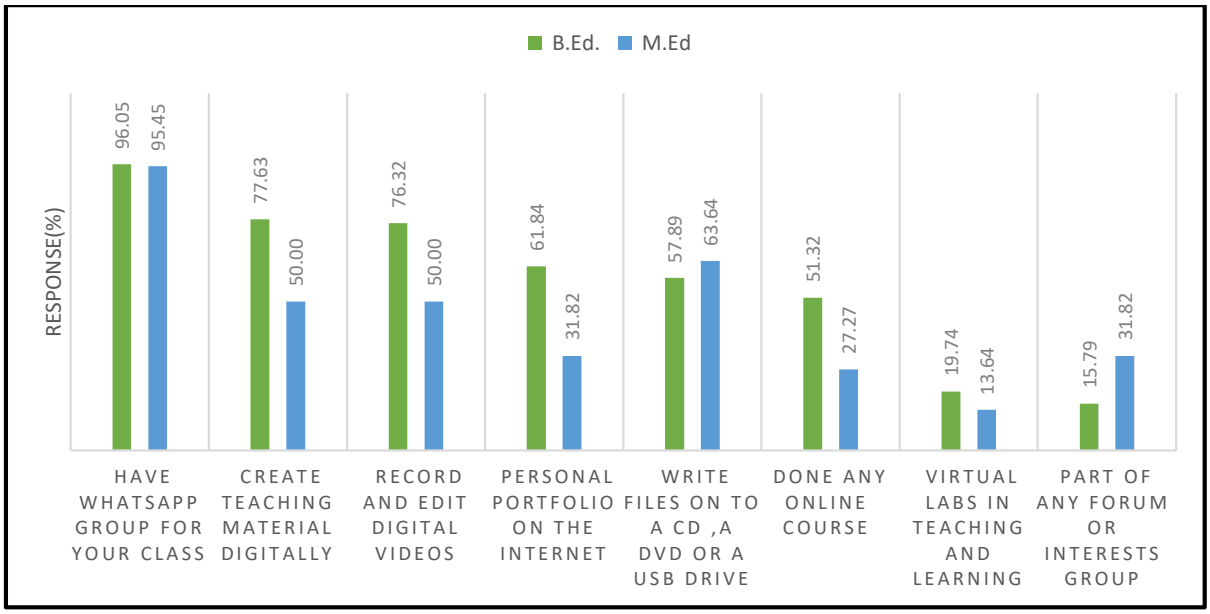


Figure 11: B.Ed./M.Ed.-Skill of using Digital Medium and Devices

Table 11: B.Ed./M.Ed.-Skill of using Digital Medium and Devices

Items	Frequency	B.Ed. %	Frequency	M.Ed. %
have WhatsApp group for your class	73	96.05	21	95.45
create teaching material digitally	59	77.63	11	50.00
record and edit digital videos	58	76.32	11	50.00
personal portfolio on the internet	47	61.84	7	31.82
write files on to a CD, a DVD, or a USB drive	44	57.89	14	63.64
done any online course	39	51.32	6	27.27
virtual labs in teaching and learning	15	19.74	3	13.64
part of any forum or interests' group	12	15.79	7	31.82

The Table 11 indicates that around 78% of B.Ed. Pre-service teachers and 50% of M.Ed. Pre-service teachers can create teaching material digitally and can record and edit digital videos. Around 62% of B.Ed. Pre-service teachers and 32% of M.Ed. Pre-service teachers have personal portfolio on the internet. About 51% of B.Ed. Pre-service teachers and nearly 27% of M.Ed. Pre-service teachers have done a course online. around16% of B.Ed. Pre-service teachers and 32% of M.Ed. Pre-service teachers are part of any forum or interests 'group.

RQ5. What are the differences in awareness of digital education among pre-service teachers based on degree of level of educational qualification?

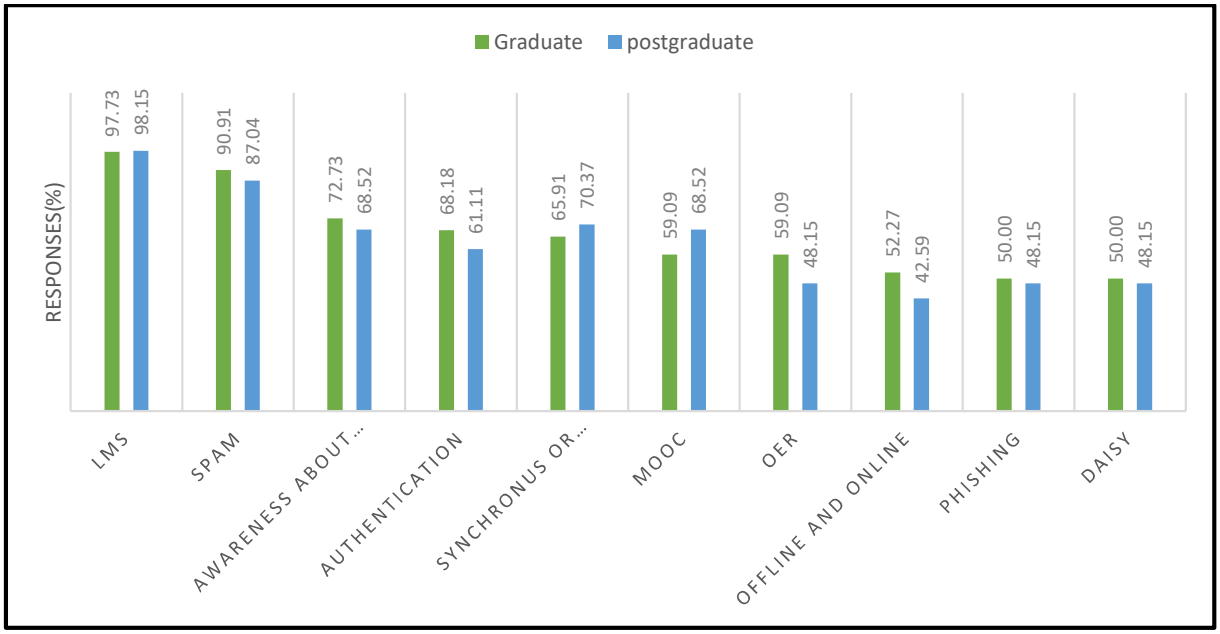


Figure 12: Graduate/Postgraduate: Knowledge about Digital Education

Table 12: Graduate/Postgraduate-Knowledge about Digital Education

	Graduate		Postgraduate	
Items	**Frequency**	**%**	**Frequency**	**(%)**
LMS	43	97.73	53	98.15
spam	40	90.91	47	87.04
awareness about virtual labs	32	72.73	37	68.52
authentication	30	68.18	33	61.11
synchronous or asynchronous	29	65.91	38	70.37
MOOC	26	59.09	37	68.52
OER	26	59.09	26	48.15
offline and online	23	52.27	23	42.59
phishing	22	50.00	26	48.15
DAISY	22	50.00	26	48.15

Table12 indicates that about 59% of graduate pre-service teachers and 48% of postgraduate pre-service teachers are aware about OER. Around 59% of graduate pre-service teachers and 69% of postgraduate pre-service teachers are aware about MOOC.

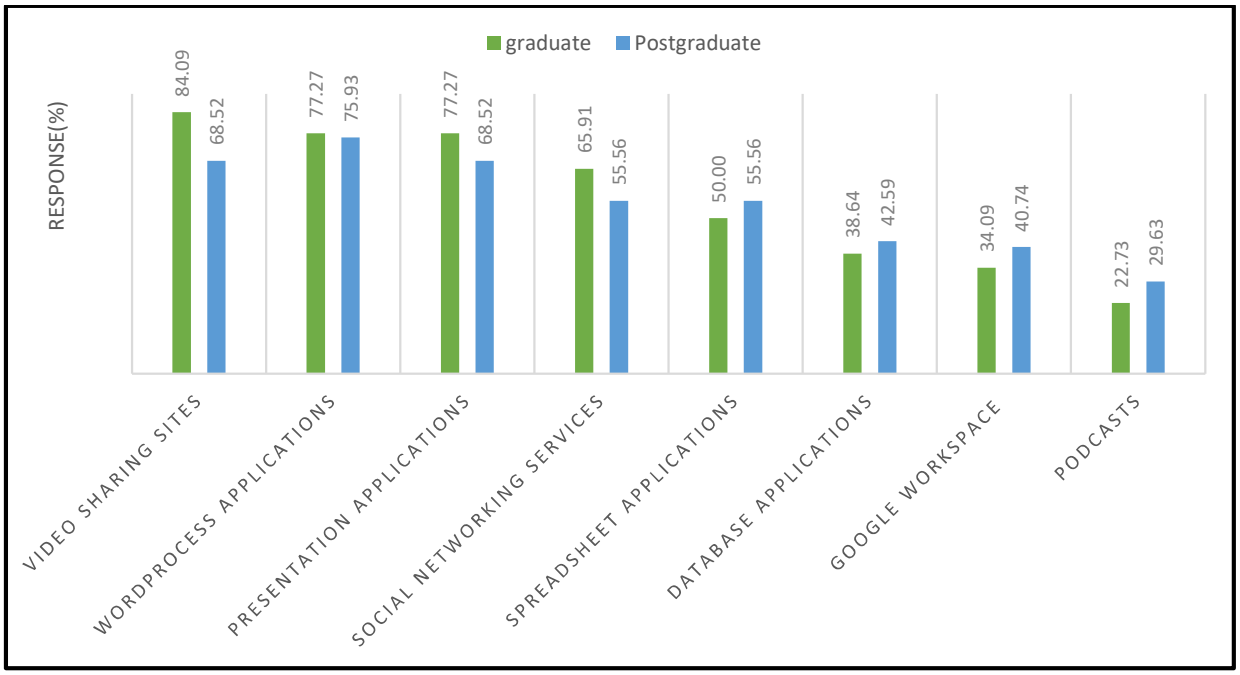


Figure 13: Graduate/Postgraduate-Working with Digital Application

Table 13: Graduate/postgraduate -Skill of working with Digital Applications

Items	Graduate		Postgraduate	
	Frequency	%	Frequency	%
Video sharing sites	37	84.09	37	68.52
word process applications	34	77.27	41	75.93
Presentation applications	34	77.27	37	68.52
Social networking services	29	65.91	30	55.56
Spreadsheet applications	22	50.00	30	55.56
Database applications	17	38.64	23	42.59
Google Workspace	15	34.09	22	40.74
Podcasts	10	22.73	16	29.63

Table13indicates that approximately 84% of graduate and around 69% of postgraduate have good knowledge about video sharing sites. about 66% of graduate and 56% of postgraduate have good knowledge about social networking services. Graduate preservice teachers as well as postgraduate preservice teachers were found to have inadequate skill of working with database application, google workspace and podcasts.

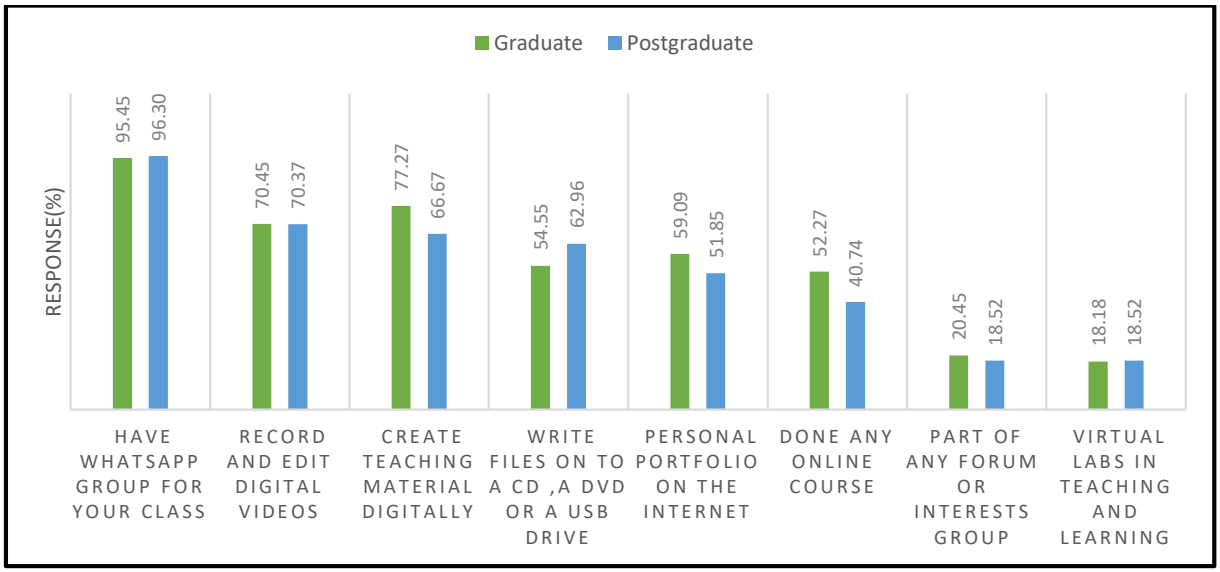


Figure 14: Graduate/Postgraduate-Skill of using Digital Medium and Devices

Table 14: Graduate/Postgraduate-Skill of using Digital Medium and Devices

Items	Graduate		Postgraduate	
	Frequency	%	Frequency	%
have WhatsApp group for your class	42	95.45	52	96.30
create teaching material digitally	34	77.27	36	66.67
record and edit digital videos	31	70.45	38	70.37
personal portfolio on the internet	26	59.09	28	51.85
write files on to a CD, a DVD, or a USB drive	24	54.55	34	62.96
done any online course	23	52.27	22	40.74
part of any forum or interests' group	9	20.45	10	18.52
virtual labs in teaching and learning	8	18.18	10	18.52

Table14 indicates that nearly 55% of graduate and 63% of postgraduate can write files on a CD, a DVD, or a USB drive. Around 52% of graduate and 41% of postgraduate have done an online course. Only around 20% of graduate and postgraduate pre-service teachers were found to be part of any forum and used virtual labs in teaching and learning.

RQ 6 Were pre-service teachers enrolling for the courses on SWAYAM or DIKSHA? Were pre-service teachers aware of the various government initiatives for digital education in India? Do pre-service teachers have adequate awareness about government initiatives for digital education? To answer this research question, each part of the research question was analysed separately.

Were pre-service teachers enrolling for the courses on SWAYAM or DIKSHA?

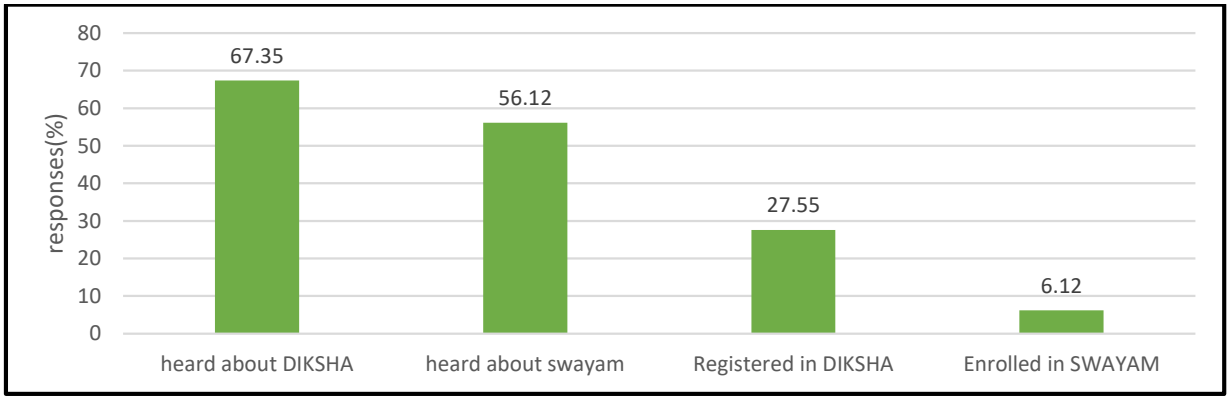


Figure 15: Pre-service teachers-enrolment in SWAYAM and DIKSHA

Table 15: Pre-service teachers-enrolment in SWAYAM and DIKSHA

Items	Preservice Teachers (%)
heard about DIKSHA	67.35
heard about SWAYAM	56.12
Registered in DIKSHA	27.55
Enrolled in SWAYAM	6.12

Table15 points out that about 28% of pre-service teachers have registered in DIKSHA and around 6% have enrolled in a SWAYAM course.

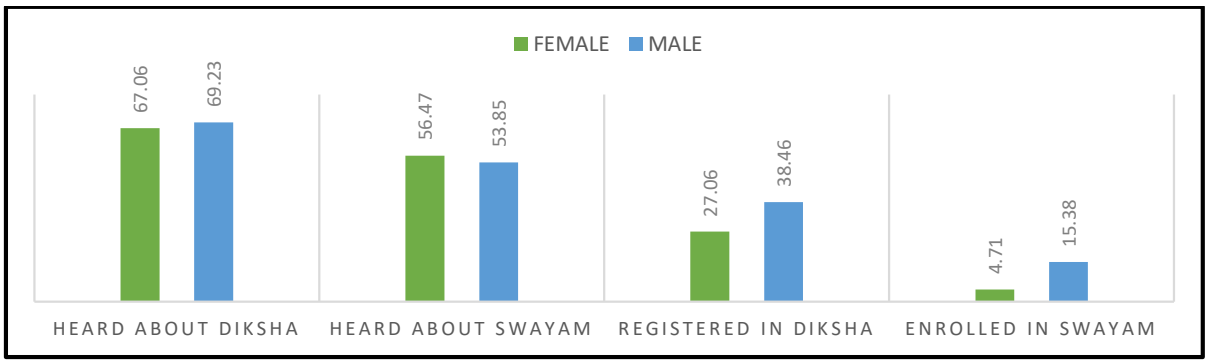


Figure 16: Male/Female-enrolment in SWAYAM and DIKSHA

Table 16 Male/Female-enrolment in SWAYAM and DIKSHA

Items	Female	Male
heard about DIKSHA	67.06	69.23
heard about SWAYAM	56.47	53.85
Registered in DIKSHA	27.06	38.46
Enrolled in SWAYAM	4.71	15.38

Table16 shows that 67% of female pre-service teachers registered in DIKSHA and about 38% of male pre-service teachers have registered in DIKSHA. Around 5% of female pre-service teachers have enrolled in a SWAYAM course and approximately. 15% of male pre-service teachers have enrolled in a SWAYAM course.

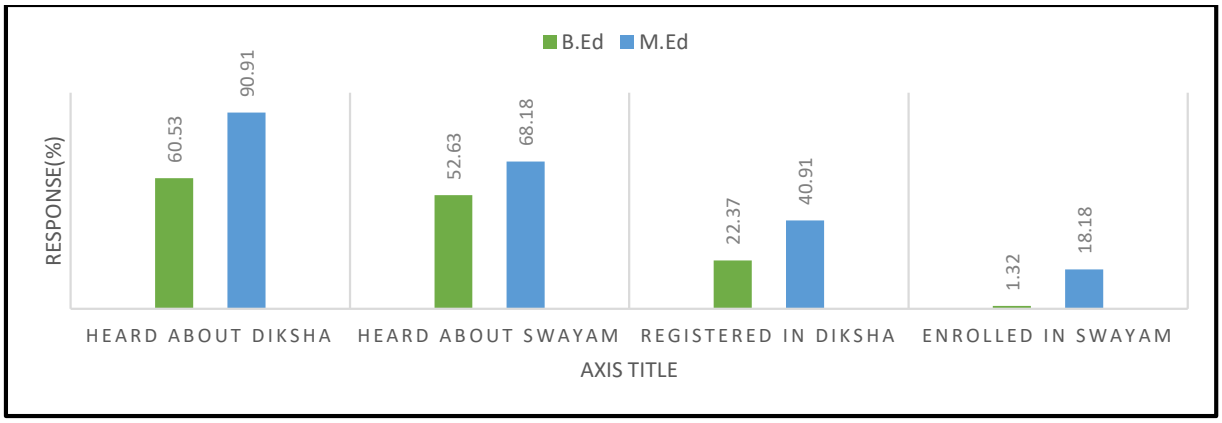


Figure 17: B.Ed. /M.Ed. -Enrolment in SWAYAM and DIKSHA

Table 17: B.Ed. /M.Ed. -Enrolment in SWAYAM and DIKSHA

items	B.Ed.	M.Ed.
heard about DIKSHA	60.53	90.91
heard about SWAYAM	52.63	68.18
Registered in DIKSHA	22.37	40.91
Enrolled in SWAYAM	1.32	18.18

Table17 indicates that approx. 90% of M. Ed. Pre-service teachers have heard about DIKSHA and approximately. 40% of M.Ed. pre-service teachers have registered in DIKSHA. On the other hand, about 61% of B.Ed. pre-service teachers have heard about DIKSHA and nearly 22% of B.Ed. pre-service teachers registered in DIKSHA. Only around 1% of B.Ed. pre-service teachers have enrolled in a SWAYAM course and approximately 18% of M.Ed. pre-service teachers have enrolled in a SWAYAM course.

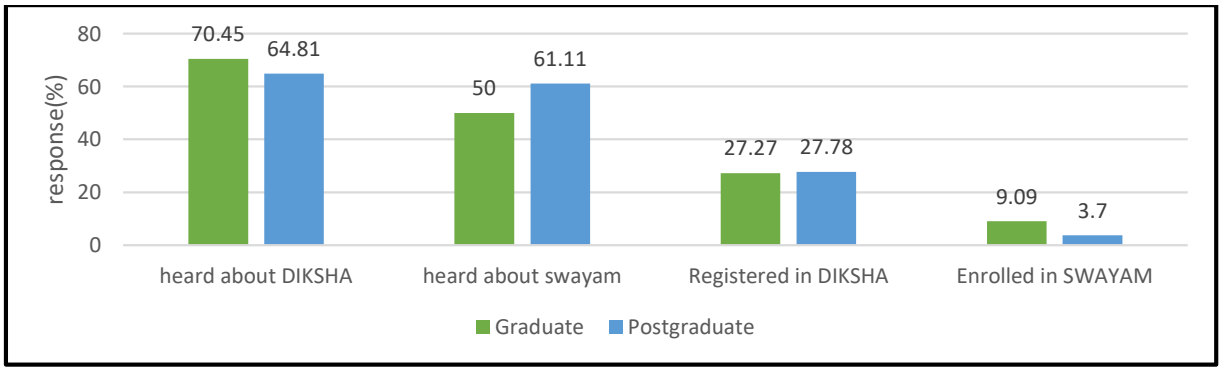


Figure 18: Graduate/Postgraduate enrolment in SWAYAM and DIKSHA

Table 18: Graduate/Postgraduate enrolment in SWAYAM and DIKSHA

items	Graduate	Postgraduate
heard about DIKSHA	70.45	64.81
heard about SWAYAM	50	61.11
Registered in DIKSHA	27.27	27.78
Enrolled in SWAYAM	9.09	3.7

Table18 indicates that around 50% of graduate- pre-service teachers have heard about SWAYAM and about 9% of graduate pre-service teachers have enrolled in SWAYAM course. The Table shows that 61% of postgraduate –pre-service teachers have heard about SWAYAM and about 4% of postgraduate pre-service teachers have enrolled in a SWAYAM course.

Were pre-service teachers aware of the various government initiatives for digital education in India?

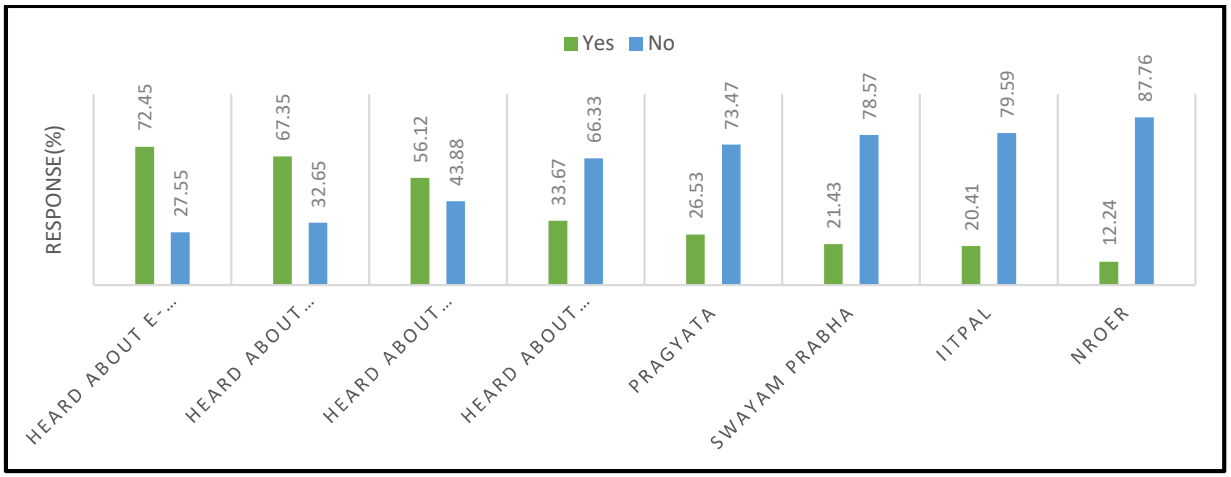


Figure 19: Pre-service teachers-awareness about government initiatives in digital education

Table 19: Preservice teachers-awareness about government initiatives in digital education

Items	Yes (%)	No(%)
Heard about e-Pathshala	72.45	27.55
heard about DIKSHA	67.35	32.65
heard about SWAYAM	56.12	43.88
Heard about NISHTHA	33.67	66.33
PRAGYATA	26.53	73.47
SWAYAM Prabha	21.43	78.57
IITPAL	20.41	79.59
NROER	12.24	87.76

Table19 indicates that approximately 72% of pre-service teachers have awareness about e-Pathshala and around 70% of pre-service teachers were aware about virtual labs. Nearly56% of pre-service teachers has heard about SWAYAM, about 21% of pre-service teachers have awareness about IITPAL and SWAYAM Prabha. The Table also reveals that only 12% of pre-service teachers have awareness about NROER.

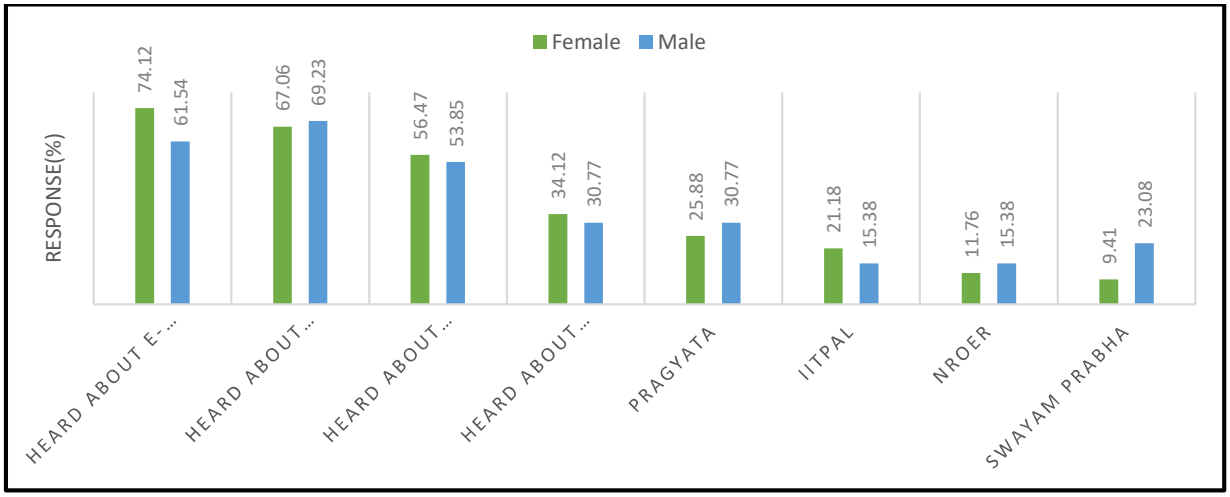


Figure*20*: Female/Male-awareness about Government initiatives in Digital Education

Table 20: Female/Male-Awareness about National initiatives in Digital Education

Items	Female (%)	Male (%)
Heard about e-Pathshala	74.12	61.54
heard about DIKSHA	67.06	69.23
heard about SWAYAM	56.47	53.85
Heard about NISHTHA	34.12	30.77
PRAGYATA	25.88	30.77
IITPAL	21.18	15.38
NROER	11.76	15.38
SWAYAM Prabha	9.41	23.08

Table20 indicates that approx. 74% of female pre-service teachers and approx. 62% of male pre-service teachers heard about e-Pathshala. Around 69% of female pre-service teachers and 77% of male pre-service teachers were aware about virtual labs. The Table indicates that nearly 21% of female pre-service teachers and about 15% of male pre-service teachers were aware about IITPAL. About 12% of female pre-service teachers and about 15% of male pre-service teachers were aware about NROER. Further, 9% of female pre-service teachers and about 23% of male pre-service teachers were aware about SWAYAM Prabha.

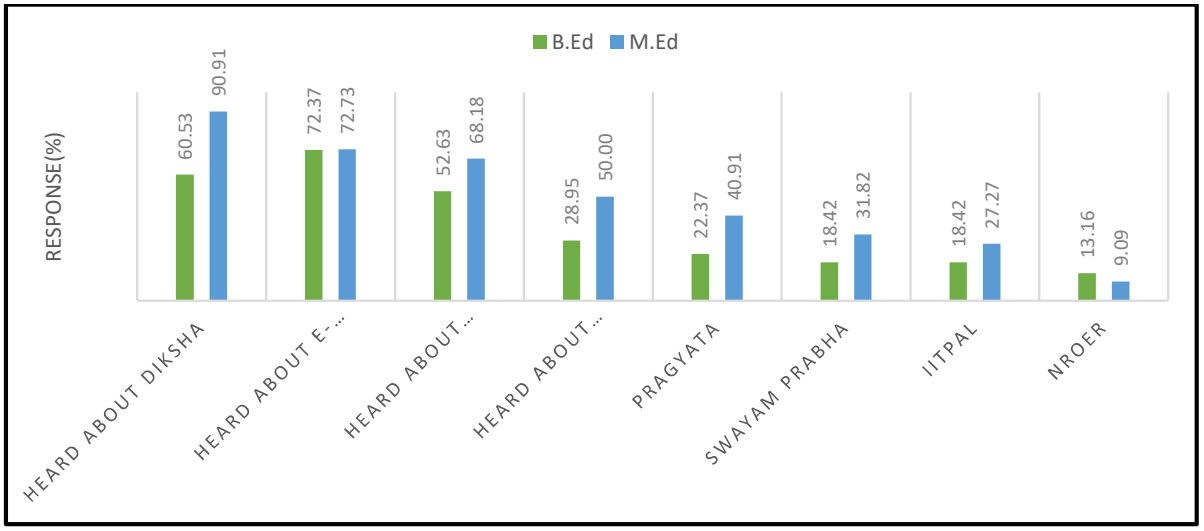


Figure 21: B.Ed./M.Ed.-Awareness about National initiatives in Digital Education

Table 21: B.Ed./M.Ed.-awareness about national initiatives in digital education

Items	B.Ed.	M.Ed.
		%
heard about DIKSHA	60.53	90.91
Heard about e-Pathshala	72.37	72.73
heard about SWAYAM	52.63	68.18
Heard about NISHTHA	28.95	50.00
PRAGYATA	22.37	40.91
SWAYAM Prabha	18.42	31.82
IITPAL	18.42	27.27
NROER	13.16	9.09

Table21 reveals that approx. 61% of B.Ed. pre-service teachers have awareness about DIKSHA and 91% of M.Ed. pre-service teachers have awareness about DIKSHA. Approx. 22% of B.Ed. pre-service teachers have awareness about PRAGYATA and approx. 41% of M.Ed. pre-service teachers have awareness about the PRAGYATA. Further, around 18% of B.Ed. pre-service teachers have awareness about SWAYAM Prabha and approx. 32% of M.Ed. Pre-service teachers have awareness about the same.

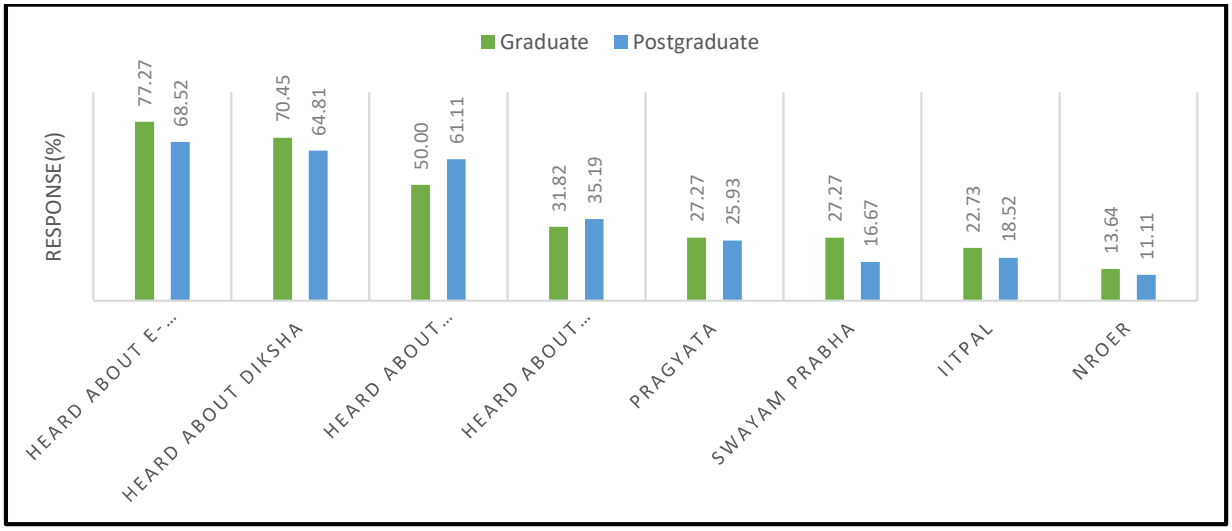


Figure *22*: Graduate/Postgraduate-Awareness about Government initiatives in Digital Education

Table 22: Graduate/Postgraduate-Awareness about National initiatives in Digital Education

Items	Graduate %	Postgraduate%
Heard about e-Pathshala	77.27	68.52
heard about DIKSHA	70.45	64.81
heard about SWAYAM	50.00	61.11
Heard about NISHTHA	31.82	35.19
PRAGYATA	27.27	25.93
SWAYAM Prabha	27.27	16.67
IITPAL	22.73	18.52
NROER	13.64	11.11

Table22 indicates that around 77% of graduate pre-service teachers heard about e-Pathshala and about 50% of graduate pre-service teachers and around 615of postgraduate pre-service teachers were aware about SWAYAM. The table also indicates that nearly 27% of graduate pre-service teachers and about 17% of postgraduate pre-service teachers were aware about SWAYAM Prabha.

Do pre-service teachers have adequate awareness about government initiatives for digital education?

To find out whether preservice teachers have adequate awareness about government initiatives or not, the mean score of awareness about government initiatives was calculated.

Table 23: Mean Score of Awareness about Government initiatives among Pre-Service Teachers

Preservice Teachers	N	Mean	SD
Whole sample	98	3.14	1.72

It was found that the pre-service teachers have 3.14out of 8(39.28%) awareness about government initiatives in digital education. It was declared that pre-service teachers do not have adequate awareness about digital education as the mean score was less than fifty percent.

Major Findings:

1. Majority of the pre-service teachers were adequately aware about learning management system and spam, virtual labs, MOOC and synchronous or asynchronous mode of digital education. Pre-service teachers were not adequately aware about DAISY, and offline and online mode of digital education.
2. Majority of the pre-service teachers had good skill of using word process application, video sharing sites and presentation application. Only around 20% of the pre-service teachers were part of any forum or interests' group and used virtual labs in teaching and learning.
3. Pre-service teachers have adequate knowledge about digital education as the mean score was more than fifty percent.
4. Pre-service teachers have adequate skill of using digital medium and digital devices in teaching and learning.
5. Male pre-service teachers had better skill of using digital application than female pre-service teachers.
6. Male pre-service teachers were found to have better skill in using digital medium and digital devices than female pre-service teachers.
7. B.Ed. pre-service teachers were found to have better ability to work with video sharing sites, presentation applications, spreadsheet, database application, Google workspace and podcasts as compared to M.Ed. pre-service teachers.
8. B. Ed pre-service teachers had better skill of using digital medium and digital devices than M.Ed. pre-service teachers.
9. Majority of the graduate pre-service teachers and post graduate pre-service teachers were found to have adequate knowledge about LMS, spam, virtual labs, MOOC, and synchronous and asynchronous mode of digital education.
10. Graduate pre-service teachers were found to have more ability in creating teaching material digitally, having personal portfolio on the internet, attending online course as compared to postgraduate pre-service teachers. On the contrary postgraduate pre-service teachers were found to have more ability in writing files on to a CD, a DVD, or a USB drive.
11. Male pre-service teachers and M.Ed. Pre-service teachers were found to have more registration in DIKSHA and SWAYAM.
12. Graduate pre-service teachers were found to have more registration in SWAYAM than postgraduate pre-service teachers.
13. M.Ed. pre-service teachers were more aware about government initiatives than B.Ed. pre-service teachers.
14. Awareness about NISHTHA, PRAGYATA, SWAYAM Prabha, IITPAL and NROER found to be inadequate

15. Pre-service teachers do not have adequate awareness about government initiatives as the mean score was less than fifty percent.

Educational Implications:-

Based on the research findings, the researcher has put forth the following educational implications of the study:

The teacher education institute must make it compulsory for pre-service teachers to deliver specific number of lessons by using digital tools and digital technologies. Pre-service teachers can explore digital technologies (LMS, apps, web portals, digital labs etc), repositories of Open Educational Resources (OERs) at national/ State/global level. Teacher education institutes should regularly organize webinars, online training programmes and online courses on ICT-Pedagogy-Content integration.

Teacher educators play facilitating role in motivating and engaging pre-service teachers in employing digital devices for teaching and learning. Therefore, training of all teacher educators must be organized so that they can utilize digital devices in teaching and assessing. They must show the uses of different digital devices in the field of school education and teacher education

Various social networking apps like What's App, Twitter, Blog, Face-book etc can be utilized for sharing and commenting in educational problems and issues so that pre-service teachers will develop skills and capabilities of using for learning and teaching. Students, Teachers, and Parents may be oriented on Do's and Don'ts of cyber safety and security.

Conclusion:-

To alleviate the impact of the pandemic, educational institutes will not only have to adapt and reimaging the way teaching and learning have happened so far but will also need to introduce a suitable method of delivering quality education. In this regard digital education has evolved as a saviour. The rapid increase in internet penetration and various government initiatives such as Digital India campaign have created an encouraging environment for moving towards digital education. The study has attempted to examine the awareness of digital education among pre-service teachers enrolled in B.Ed. and M.Ed. course. Although the results indicates that awareness of digital education in terms of knowledge and skill of using digital medium and digital devices was adequate, but it was not as expected for education in digital age. Hence there is a scope to work in this area so that knowledge and skill of pre-service teachers can be improved upon to reach higher level of adequacy. The results also revealed that the awareness of pre-service teachers about government initiatives was not adequate. This area needs to be further explored by various stakeholders in education. The future studies might help in coming out with ways that digital education becomes inherent part of the pre-service teacher education.

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