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Usage Of Digital Technology Among Collge Students With Respect To Their Metacognition

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Abstract

Education is a process of learning and acquiring knowledge from our country's various experts or resources. Technology-based learning refers to the style of learning that uses technology to help students learn new information. Nowadays, it is very useful in online, offline, and distance education systems all over the world. In the present study, the investigators intended to find out the significant difference of college students in the usage of digital technology based on gender, locality and type of management and also find the relationship between Digital Technology and Metacognition of College Students. We considered Digital Technology to be a dependent variable. For the purpose of investigation, the Normative survey method and the sampling technique used for the study is stratified random sampling. The sample comprised of 1023 College Students in Chennai, Chengalpattu, and Kanchipuram districts. The Digital Technology and Metacognition scale was constructed and validated by the researcher and supervisor. For the meaningful interpretation of the study, the collected data were processed and analyzed using appropriate statistical analysis. The statistical measures employed in processing and analyzing data and to test the hypotheses were measures of central tendency, students t-test, One way Anova, Correlation and Regression.

Keywords: Digital Technology, Metacognition, College Students, Hypothesis, t-test, F-test, Correlation, Regression

1. Introduction:

Education helps us to differentiate the various objects or materials and to understand the different people‟s behaviour or environmental changes in the world. Education empowers us to face issues and challenges in our lives. Education is beneficial for the uniform development of our country. Digital technology is the use of digital tools, methods, and
procedures for information creation, processing, storing, and sharing. Metacognitive skills include a wide range of learning and study strategies, including planning, mental scripting, positive self-talk, self-questioning, self-monitoring, and more. In this modern world, Mobile Technology, Internet of Things, Artificial Intelligence, Virtual Reality, and Cloud-based technology play a major role in today's education system. Metacognition is frequently seen to have four components: Metacognitive Knowledge, Metacognitive Skills, Metacognitive Regulation, and Metacognitive Experiences.

2. Review of related literature:

Ravichandran B & Shanmugam K (2024) examined on adoption of EdTech products among college students: a conceptual study. This conceptual study investigates the adoption of education technology (EdTech) products among college students, focusing on identifying the key factors influencing the adoption process within educational institutions. Technology integration in education has rapidly gained prominence, with EdTech offering innovative solutions to enhance teaching and learning experiences. However, understanding the determinants that affect EdTech adoption remains critical for its successful implementation and impact. This paper aims (1) to identify the factors influencing the adoption of EdTech by college students (2) to create a conceptual model that shows the connections between the

elements that lead to college students adopting EdTech.

Sukhraj Singh & Jagpreet Kaur (2024) conducted on a Study of Metacognition among Graduate Students of Punjab. Metacognition is one of the recent concepts of Cognitive Psychology. The aim of this study was to investigate the effect of gender and stream of study on the metacognition of graduate students. 300 graduates studying in science, arts, and commerce streams were selected by using a stratified random sampling technique from Punjabi University, Patiala, Punjab. Samples were administered personal data sheet and Meta-Cognition Inventory developed by Govil (2018). After the collection of the data and analysis of data, it was found that female graduate students had significantly better metacognition than male graduate students. It was also found that graduate students of the science stream had significantly better metacognition than students of the arts stream, but, the difference was found insignificant in graduate science and commerce stream students' metacognition.

Tchounwou M, Okoye E C & Iseguede F (2023) conducted on Comparison of the Efficacy of Metacognition on Students‟ Academic Performance Between Usa, France, Australia, and China. Prior research has emphasized the importance of metacognition as a contributing factor to increasing student retention at colleges and universities. Enhancing students' awareness of their cognitive skills is just as crucial. This research reviewed and compared metacognition studies conducted on students in Australia, China, France, and the USA. These studies used self-regulated learning, self-efficacy, and meta-learning factors to evaluate metacognition performance among undergraduate students, including 362 participants in the USA, 128 in Australia, 118 in France, and 517 in China. Results revealed a positive impact of metacognition skills on all students, increasing their academic performance. However, compared to the participants in China, the results revealed that the overall effect size of self-regulated learning on academic achievement in the USA, France, and Australia was small because the Chinese students learned those metacognition habits at a very young age. The results also indicated that their beliefs contributed significantly to learning outcomes.

He G. & Huang Y (2022) examined on Impacts of Mobile Media on the Ideological and Political Education in Colleges under 5G. With the advancement of digital technology, new tools and methods in education are being developed to improve teaching and learning. The use of technology in educational activities improves the functional, cognitive, and psychomotor skills of students. This study investigated the application of mobile media in the improvement of ideological and political education. The concepts, features, and types of the new media under 5G are defined, and specific forms, opportunities, and challenges of applications of new media in the ideological and political education of colleges are analyzed. The use of new media applications among college students is investigated using the "xuexi.cn"application software. Results show that various mobile applications of new media have the best foreground in the media technologies. Applying new media technologies to ideological and political education is not just an innovation in the method of ideological and political education but also is an extension and supplement to traditional ideological and political classes. Colleges should use new media technologies effectively and scientifically to create a good environment for college students and help them get a better knowledge of ideological and political education.

3. Objectives:

1. To find out the level of Digital Technology of College Students.
2. To find out the level of Metacognition of College Students
3. To find out the difference exists if any, between the following groups of College Students on their usage of Digital technology and Metacognition
   - Gender (Male /Female)
   - Locality (Rural / Urban)
   - Type of Management(Government/ Govt-Aided/ Self-financed)
4. To find out the significant relationship between Digital Technology and Metacognition of college students.

4. Hypothesis of the Study:

1. The level of usage of Digital Technology of college students is high.
2. The level of Metacognition of college students is high.
3. There is a significant difference between the following groups of College Students on their usage of Digital technology and Metacognition

- Gender (Male /Female)
- Locality (Rural / Urban)
- Type of Management(Government/ Govt-Aided/ Self-financed)

4. There is a significant relationship between Digital Technology and Metacognition of college students.

5. Methodology:

In this present study the researcher has employed the normative survey method to analyses the usage of Digital Technology among College Students in relation to their Metacognition.

5.1 Sample:

The investigator used random sampling technique for selecting the sample of 1023 college students from various colleges in Chennai, Chengalpattu and Kanchipuram districts in Tamil Nadu.

5.2 Tools used in the study:

The tools used for the present investigation are presented below:

- ✓ **Digital Technology Scale –** Prepared and Validated by the Researcher and the Research Supervisor.(2024).
- ✓ **Meta-Cognition Scale –** Prepared and Validated by the Researcher and the Research Supervisor.(2024).

5.3 Analysis and interpretation of data:

For the meaningful interpretation of the study, the collected data were processed and analyzed using appropriate statistical analysis. The statistical measures employed in processing and analyzing data and to test the hypotheses were measures of central tendency, students t-test, One way Anova, Correlation and Regression.

6. Testing of Hypotheses:

Hypothesis 1: The level of usage of Digital Technology of college students is high.

Table 1 Level of usage of Digital Technology among College students

Variable	N	Maximum Score	Mean	Standard Deviation	Percentage of Mean
Digital Technology	1023	200	166.89	18.524	83.45 %

The mean and standard deviation of usage of digital technology among college students is presented in the Table 1. The maximum possible score in the usage of Digital Technology is
200. The mean score of usage of digital technology is 166.89 and its percentage is 83.45%. Hence, from the mean score and its percentage it is clear that the College students have high level in the usage of digital technology. Therefore, the framed hypothesis that, "the level of usage of Digital Technology among college students is high" is accepted.

Hypothesis 2: The level of Metacognition of college students is high.

Table 2 Level of Metacognition of College students

Variable	N	Maximum Score	Mean	Standard Deviation	Percentage of Mean
Metacognition	1023	179	141.70	13.476	79.16 %

The mean and standard deviation of Metacognition among college students is presented in the Table 2. The maximum possible score in the Metacognition level is 179. The mean score of Metacognition level is 141.70 and its percentage is 79.16 %. Hence, from the mean score and its percentage it is clear that the College students have high level in their Metacognition. Therefore, the framed hypothesis that, "the level of Metacognition of college students is high" is accepted.

Hypothesis 3(a): There is a significant difference between male and female College Students with respect to their usage of Digital Technology.

Table 3.1

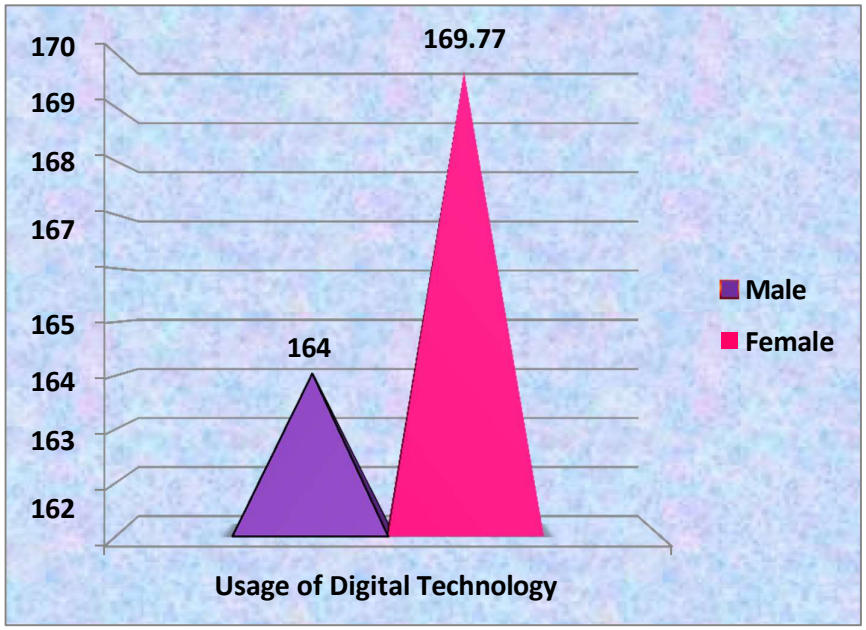
Table showing the significant difference of College students in their usage of Digital Technology and its dimensions based on Gender

Sl. No.	Dimensions of Digital Technology	Gender	N	Mean	SD	't' Value	Significance
1	Mobile Technology	Male	511	38.62	6.382	5.513	**0.01 Significant**
		Female	512	40.48	4.170		
2	Internet of Things	Male	511	29.67	4.443	3.491	**0.01 Significant**
		Female	512	30.58	3.885		
3	Artificial Intelligence	Male	511	33.10	5.920	3.864	**0.01 Significant**
		Female	512	34.35	4.375		
4	Virtual Reality	Male	511	30.83	4.280	4.819	**0.01 Significant**
		Female	512	32.04	3.700		
5	Cloud Based Technology	Male	511	31.78	4.841	1.992	**0.05 Significant**
		Female	512	32.32	3.753		
Digital Technology Total Score		**Male**	**511**	**164.00**	**21.757**	**5.042**	**0.01 Significant**
		Female	**512**	**169.77**	**14.041**		

From the above table 3.1, It is inferred that the calculated "t" value (5.042) for the usage of digital technology among college students is greater than the table value (2.58) at 0.01, level of significance. It is concluded that there is a significant difference between male and female college students in their usage of digital technology and its dimensions namely, Mobile Technology(5.513 > 2.58) at 0.01 significant, Internet of Things(3.491 > 2.58) at 0.01 significant, Artificial Intelligence(3.864 > 2.58) at 0.01 significant, Virtual Reality(4.819 > 2.58) at 0.01 significant and Cloud Based Technology(1.992 > 1.96) at 0.05 significant. Hence, the formulated hypothesis that "There is a significant difference between male and female College Students with respect to their usage of Digital Technology" is accepted.

Figure 3.1

Significant difference between male and female College Students with respect to their usage of Digital Technology



Hypothesis 3(b): There is a significant difference between male and female College Students with respect to their Metacognition.

Table 3.2

Table showing the significant difference of College students in their Metacognition and its dimensions based on Gender

Sl. No.	Dimensions of Metacognition	Gender	N	Mean	SD	't' Value	Significance
1	Meta Cognitive Knowledge	Male	511	34.71	4.886	0.464	**Not Significant**
		Female	512	34.84	4.428		
2	Meta Cognitive Skills	Male	511	28.48	4.018	1.295	**Not Significant**
		Female	512	28.80	3.965		
3	Meta Cognitive Regulation	Male	511	33.69	3.821	0.777	**Not Significant**
		Female	512	33.89	4.155		
4	Meta Cognitive Experiences	Male	511	44.37	5.494	0.674	**Not Significant**
		Female	512	44.61	5.778		
Meta Cognition Total Score		**Male**	**511**	**141.25**	**13.137**	**1.056**	**Not Significant**
		Female	**512**	**142.14**	**13.804**		

From the above table 3.2, It is inferred that the calculated "t" value (1.056) for the level of Metacognition among college students is lesser than the table value (1.96) at 0.05, level of significance. It is concluded that there is no significant difference between male and female college students in their Metacognition level and its dimensions namely, Meta Cognitive Knowledge, Meta Cognitive Skills, Meta Cognitive Regulation and Meta Cognitive Experience. Hence, the

formulated hypothesis that "There is a significant difference between male and female College Students with respect to their Metacognition" is not accepted.

Hypothesis 3(c): There is a significant difference between rural and urban locale College Students with respect to their Digital Technology.

Table 3.3

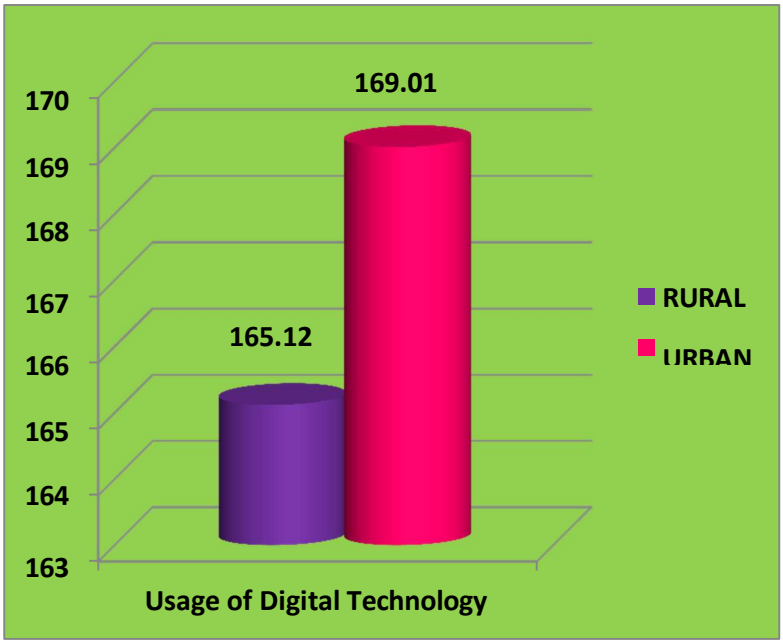
Table showing the significant difference of College students in their usage of Digital Technology and its dimensions based on Locality

Sl. No.	Dimensions of Digital Technology	Locality	N	Mean	SD	't' Value	Significance
1	Mobile Technology	Rural	558	38.98	6.075	3.676	**0.01 Significant**
		Urban	465	40.23	4.546		
2	Internet of Things	Rural	558	29.76	4.426	3.014	**0.01 Significant**
		Urban	465	30.55	3.863		
3	Artificial Intelligence	Rural	558	33.38	5.511	2.290	**0.05 Significant**
		Urban	465	34.14	4.870		
4	Virtual Reality	Rural	558	31.18	4.405	2.206	**0.05 Significant**
		Urban	465	31.74	3.543		
5	Cloud Based	Rural	558	31.81	4.874	1.980	**0.05**
	Technology	Urban	465	32.35	3.571		**Significant**
Digital Technology Total Score		**Rural**	**558**	**165.12**	**20.766**	**3.365**	**0.01 Significant**
		Urban	**465**	**169.01**	**15.159**		

From the above table 3.3, It is inferred that the calculated "t" value (3.365) for the usage of digital technology among college students is greater than the table value (2.58) at 0.01, level of significance. It is concluded that there is a significant difference between rural and urban locale college students in their usage of digital technology and its dimensions namely, Mobile Technology(3.676 > 2.58) at 0.01 significant, Internet of Things(3.014 > 2.58) at 0.01 significant, Artificial Intelligence(2.290 > 1.96) at 0.05 significant, Virtual Reality(2.206 > 1.96) at 0.05 significant and Cloud Based Technology(1.980 > 1.96) at 0.05 significant. Hence, the formulated hypothesis that "There is a significant difference between rural and urban locale College Students with respect to their usage of Digital Technology" is accepted**.**

Figure 3.2

Significant difference between Rural and Urban Locale College Students with respect to their usage of Digital Technology



Hypothesis 3(d): There is a significant difference between rural and urban locale College Students with respect to their Metacognition.

Table 3.4

Table showing the significant difference of College students in their Metacognition and its dimensions based on Locality

Sl. No.	Dimensions of Metacognition	Locality	N	Mean	SD	't' Value	Significance
1	Meta Cognitive Knowledge	Rural	558	34.72	4.658	0.446	**Not Significant**
		Urban	465	34.85	4.668		
2	Meta Cognitive Skills	Rural	558	28.70	3.952	0.556	**Not Significant**
		Urban	465	28.56	4.044		
3	Meta Cognitive Regulation	Rural	558	33.76	4.038	0.263	**Not Significant**
		Urban	465	33.83	3.937		
4	Meta Cognitive Experiences	Rural	558	44.41	5.650	0.522	**Not Significant**
		Urban	465	44.59	5.625		
Metacognition Total Score		**Rural**	**558**	**141.59**	**13.418**	**0.286**	**Not Significant**
		Urban	**465**	**141.83**	**13.557**		

From the above table 3.4, It is inferred that the calculated "t" value (0.286) for the level of Metacognition among college students is lesser than the table value (1.96) at 0.05, level of significance. It is concluded that there is no significant difference between rural and urban locale college students in their Metacognition level and its dimensions namely, Meta Cognitive Knowledge, Meta Cognitive Skills, Meta Cognitive Regulation and Meta **Cognitive Experience. Hence, the**

formulated hypothesis that "There is a significant difference between rural and urban locale College Students with respect to their Metacognition" is not accepted.

Hypothesis 3(e): There is a significant difference between College Students based on the type of management of colleges with respect to their Digital Technology.

Table 3.5

Table showing the significant difference of College students in their usage of Digital Technology and its dimensions based on their Type of Management of Colleges

Sl. No.	Dimensions of Digital Technology	Source	Sum of Squares	df	Mean Square	F	Significance
1	Mobile Technology	Between Groups	345.307	2	172.653	5.832	**0.05 Significant**
Sl. No.	**Dimensions of Digital Technology**	**Source**	**Sum of Squares**	**df**	**Mean Square**	**F**	**Significance**
		Within Groups	30197.851	1020	29.606		
		Total	30543.157	1022			
2	Internet of Things	Between Groups	30.753	2	15.376	0.873	**Not Significant**
		Within Groups	17960.217	1020	17.608		
		Total	17990.970	1022			
3	Artificial Intelligence	Between Groups	297.398	2	148.699	5.462	**0.05 Significant**
		Within Groups	27766.416	1020	27.222		
		Total	28063.814	1022			
4	Virtual Reality	Between Groups	107.664	2	53.832	3.307	**Not Significant**
		Within Groups	16604.019	1020	16.278		
		Total	16711.683	1022			
5	Cloud Based Technology	Between Groups	194.153	2	97.077	5.204	**0.05 Significant**
		Within Groups	19028.781	1020	18.656		
		Total	19222.935	1022			
Digital Technology Total Score		**Between Groups**	**4137.830**	**2**	**2068.915**	**6.090**	**0.05 Significant**
		Within Groups	**346543.466**	**1020**	**339.748**		
		Total	**350681.296**	**1022**			

From the above table 3.5, It is inferred that, the calculated „F" value (6.090) is greater than the table value (3.84) at a 0.05 level of significance. It is concluded that there is a significant difference among College Students based on type of management of colleges (Government/ Govt-aided/ Self-financed) in their usage of digital technology and its dimensions namely Mobile Technology(5.832 > 3.84) at 0.05 Significant, Internet of things(0.873) Not- significant, Artificial Intelligence(5.462 > 3.84) at 0.05 Significant, Virtual Reality(3.307) Not Significant and Cloud Based Technology(5.204 > 3.84) at 0.05 Significant. Hence, the formulated hypothesis that "There is a significant difference between College Students based on the type of management of colleges with respect to their Digital Technology" is accepted.

Hypothesis 3(f): There is a significant difference between College Students based on the type of management of colleges with respect to their Metacognition.

Table 3.6

Table showing the significant difference of College students in their Metacognition and its dimensions based on their Type of Management of Colleges

Sl. No.	Dimensions of Metacognition	Source	Sum of Squares	df	Mean Square	F	Significance
1	Meta Cognitive Knowledge	Between Groups	16.630	2	8.315	0.382	**Not Significant**
		Within Groups	22183.108	1020	21.748		
		Total	22199.738	1022			
Sl. No.	**Dimensions of Metacognition**	**Source**	**Sum of Squares**	**df**	**Mean Square**	**F**	**Significance**
2	Meta Cognitive Skills	Between Groups	30.467	2	15.233	0.955	**Not Significant**
		Within Groups	16261.987	1020	15.943		
		Total	16292.454	1022			
3	Meta Cognitive Regulation	Between Groups	1.767	2	.883	0.055	**Not Significant**
		Within Groups	16276.048	1020	15.957		
		Total	16277.814	1022			
4	Meta Cognitive Experiences	Between Groups	79.289	2	39.644	1.248	**Not Significant**
		Within Groups	32390.406	1020	31.755		
		Total	32469.695	1022			
Metacognition Total Score		**Between Groups**	**255.925**	**2**	**127.963**	**0.704**	**Not Significant**
		Within Groups	**185332.528**	**1020**	**181.699**		
		Total	**185588.454**	**1022**			

From the above table 3.6, It is inferred that, the calculated „F" value (0.704) is lesser than the table value (3.84) at a 0.05 level of significance. It is concluded that there is no significant difference among College Students based on type of management of colleges (Government/ Govt-aided/ Self-financed) in their Metacognition level and its dimensions namely Meta Cognitive Knowledge, Meta Cognitive Skills, Meta Cognitive Regulation and Meta Cognitive Experiences. Hence, the formulated hypothesis that "There is a significant difference between College Students based on the type of management of colleges with respect to Metacognition" is not accepted.

Hypothesis 4: There is a significant relationship between Digital Technology and Metacognition of College students.

Table 4

Correlation Coefficient Values for Digital Technology and Metacognition

Sl.No.	Digital Technology and its dimensions of Metacognition	N	Correlation Coefficient	Result
1	Meta Cognitive Knowledge	1023	0.097	**0.01 Significant**
2	Meta Cognitive Skills	1023	0.100	**0.01 Significant**
3	Meta Cognitive Regulation	1023	0.088	**0.01 Significant**
4	Meta Cognitive Experiences	1023	0.087	**0.01 Significant**
Total Metacognition		**1023**	**0.102**	**0.01 Significant**

From the above table 4, It is inferred that the value of correlation between Digital Technology and Metacognitive Knowledge (0.097), Digital Technology and Metacognitive Skills (0.100), Digital Technology and Metacognitive Regulation(0.088), Digital Technology and Metacognitive Experiences(0.087), Digital Technology and Metacognition(0.102), which are higher than the table value 0.081 to be significant at a 0.01 level of significance.

The correlation between these two variables is positive and significant. Therefore, it is found that there is a significant and positive relationship between Digital Technology and Metacognition, and hence, the formulated hypothesis is accepted.

7. Implication:

From the findings of the study, the investigator intends some recommendations are:

- The College management has to organize Seminars or Conference for UG/PG college students to improve the usage of digital technology in the modern education system.
- Need to provide some training to use some important educational apps to improve e- learning.
- Organize short-term training courses for the College students to improve their technological knowledge in Chengalpattu and Kanchipuram districts.
- Organize some Workshops for College students and Educators with the innovative educational applications on the digital platform.
- Create an opportunity for College students to apply innovative ideas in their digital classrooms or in the computer laboratory.

8. Conclusion:

Education has been profoundly impacted by digital technology, which has changed how people teach and learn. Learning can become more individualized with the use of digital technology. Education may become more dynamic and interesting with the help of digital technologies. Technology-based strategies may minimize bullying and its associated effects. Students' abilities to learn throughout their lives can be improved with the use of digital technologies. It has made information more accessible, allowing for more individualized instruction, and created new chances for global learning.

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