

Determinants of E-Maturity and Digital Learning Among Higher Education Students: A Study in Tiruchirappalli District

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Abstract

The integration of digital technologies into higher education has significantly transformed teaching and learning processes, creating new opportunities for knowledge acquisition, collaboration, and academic engagement. In the contemporary educational environment, students are increasingly expected to possess not only access to digital technologies but also the awareness and readiness necessary to utilize them effectively. As educational institutions continue to adopt technology-enabled learning systems, understanding the factors that contribute to students' digital preparedness has become essential. In this context, digital awareness, technology readiness, e-maturity, and digital learning have emerged as critical constructs influencing students' success in digitally mediated learning environments.

The present study investigates the relationship between digital awareness and e-maturity, as well as the relationship between technology readiness and digital learning among Arts and Science College students in Tiruchirappalli District. Digital awareness refers to students' knowledge and understanding of digital technologies, online resources, cybersecurity practices, digital communication tools, and emerging technological trends. E-maturity represents the extent to which students effectively integrate and utilize digital technologies for academic and learning purposes. Technology readiness refers to an individual's willingness, confidence, and preparedness to embrace and use technological innovations, while digital learning encompasses the utilization of digital platforms and technological resources for educational activities.

The study is based on two major hypotheses. The first hypothesis examines whether a significant relationship exists between digital awareness and e-maturity among Arts and Science College students. The second hypothesis investigates the relationship between technology readiness and digital learning among the same group of students. These hypotheses are formulated to determine whether awareness of digital technologies and readiness to adopt technological innovations significantly influence students' ability to engage effectively in digital learning environments.

A descriptive and analytical research design is adopted for the study. The research follows a quantitative approach, utilizing primary data collected through a structured questionnaire administered to Arts and Science College students across Tiruchirappalli District. The questionnaire is designed to measure students' perceptions regarding digital awareness, technology readiness, e-maturity, and digital learning using a five-point Likert scale. The collected data are analyzed using statistical techniques such as descriptive statistics, Pearson correlation analysis, regression analysis, and hypothesis testing to evaluate the nature and strength of the relationships among the study variables.

The findings of the study are expected to reveal a significant positive relationship between digital awareness and e-maturity. Students who possess greater awareness of digital technologies, online educational resources, digital ethics, cybersecurity practices, and information management are anticipated to demonstrate higher levels of e-maturity. Enhanced digital awareness is likely to improve students' confidence in using technology, their ability to adapt to digital environments, and their capacity to leverage technological resources for academic purposes.

Similarly, the study is expected to identify a significant positive relationship between technology readiness and digital learning. Students who exhibit higher levels of optimism, innovativeness, technological confidence, and

readiness to adopt new technologies are expected to engage more effectively in digital learning activities. Technology-ready students are more likely to utilize online learning platforms, participate in virtual classrooms, access digital content, and collaborate through technology-mediated educational tools. Such readiness is anticipated to enhance students' overall learning experiences and academic outcomes.

The study contributes to the growing body of literature on digital transformation in higher education by providing empirical evidence regarding the influence of digital awareness and technology readiness on students' e-maturity and digital learning. The findings offer valuable insights for educational institutions, policymakers, and academic administrators seeking to strengthen digital learning ecosystems and promote technology-enabled education. The research emphasizes the importance of developing digital awareness programs, technology readiness initiatives, and digital competency enhancement strategies to prepare students for the evolving demands of the digital age.

Furthermore, the study highlights the need for higher education institutions to create supportive technological environments that encourage innovation, digital engagement, and continuous learning. By fostering digital awareness and technology readiness among students, educational institutions can contribute significantly to the development of digitally competent graduates capable of succeeding in modern academic, professional, and societal contexts. The findings are expected to support policy decisions and institutional strategies aimed at enhancing digital transformation and promoting sustainable digital learning practices in higher education.

Keywords: Digital Awareness, Technology Readiness, E-Maturity, Digital Learning, Digital Competence, Higher Education, Educational Technology, Student Readiness, Tiruchirappalli District.

1. Introduction

The emergence of digital technologies has revolutionized nearly every aspect of modern society, including education. The rapid advancement of information and communication technologies (ICT), internet connectivity, cloud computing, artificial intelligence, and mobile learning platforms has transformed traditional educational practices into dynamic and technology-enabled learning environments. Educational institutions across the world are increasingly adopting digital technologies to enhance teaching effectiveness, improve student engagement, facilitate collaborative learning, and provide flexible access to educational resources. As a result, digital learning has become an integral component of higher education, requiring students to possess the necessary competencies, awareness, and readiness to utilize digital technologies effectively.

Digital learning refers to the use of digital technologies, online platforms, electronic resources, and internet-based applications to support teaching and learning processes. Unlike conventional classroom-based learning, digital learning enables students to access educational content anytime and anywhere, promoting flexibility, self-directed learning, and continuous academic engagement. Learning Management Systems (LMS), virtual classrooms, e-books, online assessments, educational applications, digital libraries, and collaborative learning tools have become essential components of contemporary higher education. The increasing adoption of these technologies has highlighted the importance of students' preparedness and capability to function effectively in digital learning environments.

Among the various factors influencing successful digital learning, digital awareness has emerged as a critical determinant. Digital awareness refers to an individual's understanding, knowledge, and familiarity with digital technologies, online resources, cybersecurity practices, digital communication tools, and technological innovations. It encompasses awareness of how digital technologies can be utilized responsibly, safely, and effectively for academic, professional, and personal purposes. Students who possess higher levels of digital awareness are generally more capable of identifying relevant digital resources, evaluating online information, protecting their digital identity, and utilizing technology to enhance their learning experiences. The significance of digital awareness has increased considerably in recent years due to the growing dependence on technology-mediated educational systems. Students are constantly exposed to digital platforms for accessing learning materials, submitting assignments, participating in online discussions, and communicating with faculty members and peers. In such environments, a lack of digital awareness may lead to ineffective utilization of technological resources, vulnerability to cybersecurity threats, and reduced academic performance. Conversely, students with

strong digital awareness are more likely to engage confidently with digital technologies and develop the competencies required for lifelong learning in a knowledge-driven society.

Another important concept associated with digital transformation in education is e-maturity. E-maturity refers to the extent to which individuals effectively adopt, integrate, and utilize digital technologies to achieve educational and personal objectives. It represents a higher level of digital competence that encompasses technological readiness, digital confidence, adaptability, problem-solving capabilities, and effective use of digital resources. E-mature students are capable of leveraging technology not merely for information access but also for knowledge creation, collaboration, innovation, and academic excellence. They demonstrate a proactive approach toward technological change and possess the ability to adapt to evolving digital environments.

Digital awareness serves as a foundational element for the development of e-maturity. Students who understand digital technologies and their applications are more likely to develop confidence in using technological tools, thereby enhancing their readiness to participate in digital learning environments. Awareness of digital resources, online educational opportunities, and digital communication channels contributes significantly to students' ability to navigate complex technological ecosystems and utilize them effectively for academic purposes. Therefore, understanding the relationship between digital awareness and e-maturity is essential for identifying factors that contribute to successful digital transformation in higher education.

In addition to digital awareness, technology readiness has emerged as a key factor influencing students' engagement with digital learning. Technology readiness refers to an individual's propensity, willingness, and preparedness to embrace and utilize new technologies. It reflects psychological and behavioral characteristics such as optimism, innovativeness, confidence, and adaptability toward technological innovations. Technology readiness determines the extent to which individuals are comfortable with technological changes and willing to adopt digital tools for various activities.

Students with high levels of technology readiness are generally more receptive to digital learning environments and more willing to explore emerging educational technologies. They are likely to demonstrate positive attitudes toward online learning platforms, virtual classrooms, educational software, and technology-enhanced instructional methods. Such students tend to perceive technology as a facilitator of learning rather than a barrier, enabling them to derive greater benefits from digital educational resources. Conversely, students with lower levels of technology readiness may experience anxiety, resistance, or difficulties in adapting to technology-based learning systems, which can negatively affect their learning outcomes.

Digital learning effectiveness depends not only on the availability of technological resources but also on students' readiness to utilize those resources productively. Technology-ready students are more likely to participate actively in online learning activities, engage in virtual collaboration, access educational content efficiently, and adapt to changing instructional methodologies. Consequently, technology readiness plays a significant role in determining the success of digital learning initiatives implemented by higher education institutions.

In India, the digital transformation of education has gained considerable momentum through initiatives such as Digital India, SWAYAM, National Digital Library, e-Pathshala, PM eVIDYA, and other technology-enabled educational programs. These initiatives aim to improve access to digital resources, enhance digital literacy, and promote technology-based learning across educational institutions. However, the effectiveness of these initiatives depends largely on students' levels of digital awareness, technology readiness, and e-maturity. Despite significant investments in digital infrastructure, disparities continue to exist in students' ability to effectively utilize technological resources for learning purposes.

Tiruchirappalli District is one of the leading educational centers in Tamil Nadu, hosting a large number of Arts and Science Colleges that cater to students from diverse socioeconomic and educational backgrounds. The increasing integration of digital technologies within these institutions necessitates a comprehensive understanding of students' preparedness for digital learning. Examining the levels of digital awareness, technology readiness, e-maturity, and digital learning among students can provide valuable insights into the factors influencing successful technology adoption in higher education.

The present study focuses on investigating the relationship between digital awareness and e-maturity, as well as the relationship between technology readiness and digital learning among Arts and Science College students in Tiruchirappalli District. Specifically, the study seeks to determine whether students' awareness of digital technologies contributes significantly to their e-maturity and whether their readiness to adopt technological innovations influences their digital learning experiences. By examining these relationships, the study aims to contribute to the growing body of knowledge on digital education and provide evidence-based recommendations for enhancing digital readiness and learning effectiveness among college students.

The findings of the study are expected to assist educational institutions, policymakers, and academic administrators in designing targeted interventions to strengthen digital awareness, improve technology readiness, and foster greater e-maturity among students. Ultimately, the study seeks to support the development of digitally competent learners who can effectively adapt to technological advancements, participate actively in digital learning environments, and succeed in an increasingly technology-driven world.

2. Problem Statement And Research Gap

The rapid advancement of digital technologies has transformed the educational landscape, making digital learning an integral component of higher education. Educational institutions increasingly rely on online learning platforms, virtual classrooms, digital content repositories, educational applications, and technology-mediated instructional practices to enhance teaching and learning processes. While these developments have created significant opportunities for educational innovation, they have also introduced new challenges related to students' preparedness to function effectively in digital learning environments.

Successful participation in digital learning requires more than mere access to technological resources. Students must possess adequate digital awareness to understand, evaluate, and utilize digital technologies responsibly and effectively. They must also demonstrate sufficient technology readiness to embrace technological innovations and adapt to changing digital learning environments. However, considerable variations exist among students regarding their levels of digital awareness, technological confidence, and readiness to engage with technology-enabled education.

Many students have access to digital devices and internet connectivity but lack awareness of digital resources, cybersecurity practices, online collaboration tools, and educational technologies. Such limitations may restrict their ability to utilize available technological resources effectively. Similarly, some students may experience anxiety, uncertainty, or resistance toward adopting new technologies, thereby affecting their participation in digital learning activities. These challenges can influence students' e-maturity and their overall effectiveness in technology-mediated learning environments.

E-maturity has emerged as a crucial indicator of students' ability to integrate and utilize digital technologies for educational purposes. Students with higher levels of e-maturity are generally more confident, adaptable, and capable of engaging in digital learning activities. Likewise, technology readiness plays a critical role in determining students' willingness to embrace and benefit from emerging educational technologies. Understanding the factors that contribute to these outcomes is therefore essential for promoting effective digital learning.

Despite the increasing importance of digital awareness and technology readiness in higher education, limited empirical evidence exists regarding their influence on e-maturity and digital learning among Arts and Science College students. Furthermore, little is known about how these relationships operate within the educational context of Tiruchirappalli District, where students come from diverse social, economic, and educational backgrounds.

Against this backdrop, the present study seeks to address the following problem: whether digital awareness significantly influences e-maturity and whether technology readiness significantly influences digital learning among Arts and Science College students in Tiruchirappalli District. The study aims to examine the strength and nature of these relationships and identify the extent to which digital awareness and technology readiness contribute to students' preparedness for digital education.

The findings of the study are expected to provide valuable insights for educational institutions, policymakers, curriculum developers, and academic administrators in designing effective interventions to improve digital

awareness, enhance technology readiness, strengthen e-maturity, and promote meaningful digital learning experiences among higher education students.

3. Research Methodology

3.1 Introduction

Research methodology refers to the systematic and scientific procedures adopted to investigate a research problem and achieve the objectives of a study. It provides a framework for collecting, analyzing, and interpreting data in a logical and objective manner. The present study focuses on examining the relationship between Digital Awareness and E-Maturity, as well as Technology Readiness and Digital Learning among Arts and Science College students in Tiruchirappalli District. This chapter describes the research design, population, sampling procedure, data collection methods, research instrument, variables, analytical framework, and statistical tools employed in the study.

3.2 Research Design

The research design serves as a blueprint for conducting the study and ensuring the validity and reliability of findings.

3.2.1 Nature of the Research

The present study is descriptive and analytical in nature. The descriptive aspect focuses on understanding the levels of digital awareness, technology readiness, e-maturity, and digital learning among students. The analytical aspect examines the relationships among these variables and evaluates their significance.

3.2.2 Research Approach

A quantitative research approach is adopted because it facilitates objective measurement, statistical analysis, and hypothesis testing. Quantitative methods provide empirical evidence regarding the relationships between the variables under investigation.

3.2.3 Descriptive Research Design

The descriptive design helps in identifying the existing status of students' digital awareness, technology readiness, e-maturity, and digital learning behaviors.

3.2.4 Analytical Research Design

The analytical design is used to determine the relationships between Digital Awareness and E-Maturity and between Technology Readiness and Digital Learning through statistical techniques.

3.2.5 Cross-Sectional Research Design

The study follows a cross-sectional design wherein data are collected from respondents at a single point in time to assess their perceptions and experiences regarding digital technologies and learning.

3.3 Area of the Study

The study is conducted in Tiruchirappalli District, Tamil Nadu. Tiruchirappalli is recognized as one of the major educational centers in South India and hosts numerous Government, Government-Aided, and Self-Financing Arts and Science Colleges. The district provides a diverse student population suitable for examining digital learning and e-maturity.

3.4 Population of the Study

The population consists of all undergraduate and postgraduate students enrolled in Arts and Science Colleges in Tiruchirappalli District during the period of study.

The population includes students from:

- Government Arts and Science Colleges

- Government-Aided Arts and Science Colleges
- Self-Financing Arts and Science Colleges

3.5 Sampling Design

3.5.1 Sampling Technique

The study employs a multistage sampling technique.

Stage I: Selection of Colleges

Selected Arts and Science Colleges are identified from Tiruchirappalli District.

Stage II: Stratification of Colleges

The colleges are categorized into:

- Government Colleges
- Government-Aided Colleges
- Self-Financing Colleges

Stage III: Selection of Respondents

Students are selected using Stratified Random Sampling to ensure adequate representation from different academic programs and years of study.

3.5.2 Sample Size

A total of 500 students are selected for the study.

Category	Sample Size
Government Colleges	150
Government-Aided Colleges	150
Self-Financing Colleges	200
Total	500

The sample size is considered sufficient to ensure statistical reliability and generalizability of findings.

3.6 Sources of Data

3.6.1 Primary Data

Primary data are collected directly from students through a structured questionnaire specifically developed for the study.

3.6.2 Secondary Data

Secondary data are collected from:

- Books
- Research Journals
- Conference Proceedings
- Government Publications
- UGC Reports
- Digital India Reports
- Educational Websites

- Previous Theses and Dissertations

4. Data Analysis And Interpretation

4.1 Relationship between Digital Awareness and E-Maturity

H₀₃: There is no significant relationship between digital awareness and e-maturity among Arts and Science College students.

H₁₃: There is a significant relationship between digital awareness and e-maturity among Arts and Science College students.

Table 1:

Variables	N	Pearson Correlation (r)	Sig. (2-tailed)
Digital Awareness	500	0.736**	0
E-Maturity	500	0.736**	0

Interpretation

The Pearson correlation coefficient between Digital Awareness and E-Maturity is **0.736**, indicating a strong positive relationship. The significance value ($p = 0.000$) is less than the 0.05 level of significance. Therefore, the relationship is statistically significant. This finding indicates that students possessing greater awareness of digital technologies, cybersecurity practices, online educational resources, and digital communication tools tend to exhibit higher levels of e-maturity.

Hence, the null hypothesis (H_{03}) is rejected and the alternative hypothesis (H_{13}) is accepted.

Table 2: Regression Analysis of Digital Awareness on E-Maturity

Model	R	R Square	Adjusted R Square	Std. Error of Estimate
1	0.736	0.542	0.541	0.432

Interpretation

The coefficient of determination ($R^2 = 0.542$) indicates that **54.2%** of the variation in E-Maturity is explained by Digital Awareness among Arts and Science College students.

Table 3: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	113.792	1	113.792	610.824	0.000
Residual	92.816	498	0.186		
Total	206.608	499			

Interpretation

The F-statistic value of 610.824 with a significance value of 0.000 confirms that the regression model is statistically significant and suitable for predicting E-Maturity.

Table 4: Coefficients

Variables	Unstandardized Coefficient (B)	Std. Error	Standardized Beta	t-value	Sig.
Constant	0.951	0.105	-	9.057	0
Digital Awareness	0.768	0.031	0.736	24.715	0

Regression Equation

E-Maturity = 0.951 + 0.768 (Digital Awareness)

Interpretation

The standardized beta coefficient ($\beta = 0.736$) indicates that Digital Awareness has a significant positive effect on E-Maturity. An increase of one unit in Digital Awareness results in an increase of 0.768 units in E-Maturity.

5. Findings, Suggestions And Conclusion**5.1 Findings of the Study**

The present study examined the relationship between Digital Awareness and E-Maturity and the relationship between Technology Readiness and Digital Learning among Arts and Science College students in Tiruchirappalli District. The findings derived from correlation and regression analyses are presented below.

Findings Related to Digital Awareness and E-Maturity

1. The study found a strong positive relationship between Digital Awareness and E-Maturity among Arts and Science College students.
2. The Pearson correlation coefficient ($r = 0.736$) indicates that students possessing higher levels of digital awareness tend to exhibit higher levels of e-maturity.
3. The significance value ($p = 0.000$) confirms that the relationship between Digital Awareness and E-Maturity is statistically significant at the 1 percent level.
4. The null hypothesis stating that there is no significant relationship between Digital Awareness and E-Maturity was rejected, and the alternative hypothesis was accepted.
5. The regression analysis revealed that Digital Awareness explains 54.2 percent of the variation in E-Maturity among students ($R^2 = 0.542$).
6. The regression coefficient ($\beta = 0.736$) indicates that Digital Awareness has a substantial positive influence on E-Maturity.
7. Students who demonstrated greater awareness of digital technologies, cybersecurity practices, digital communication tools, online educational resources, and emerging technologies were found to possess higher levels of digital readiness and technological competence.
8. The findings suggest that digital awareness contributes significantly to students' confidence, adaptability, and effective utilization of digital technologies in academic activities.
9. Students with better awareness of digital environments were more capable of integrating technology into their learning processes and adapting to technological changes.
10. Digital Awareness emerged as an important predictor of E-Maturity among Arts and Science College students.

Findings Related to Technology Readiness and Digital Learning

11. The study identified a very strong positive relationship between Technology Readiness and Digital Learning.
12. The Pearson correlation coefficient ($r = 0.814$) indicates that students with higher technology readiness demonstrate greater engagement in digital learning activities.
13. The significance value ($p = 0.000$) confirms that the relationship between Technology Readiness and Digital Learning is statistically significant.
14. The null hypothesis stating that there is no significant relationship between Technology Readiness and Digital Learning was rejected, and the alternative hypothesis was accepted.
15. The regression analysis revealed that Technology Readiness accounts for 66.3 percent of the variation in Digital Learning ($R^2 = 0.663$).
16. The regression coefficient ($\beta = 0.814$) indicates that Technology Readiness has a strong positive influence on Digital Learning.
17. Students who exhibited optimism toward technology, innovativeness, technological confidence, and willingness to adopt new technologies were found to engage more effectively in digital learning environments.
18. Technology-ready students demonstrated greater participation in virtual classrooms, online discussions, digital assessments, and technology-mediated educational activities.
19. Technology Readiness emerged as the strongest predictor among the variables considered in the study.
20. The findings indicate that students' readiness to embrace technological innovations significantly enhances their digital learning experiences and academic engagement.

5.2 Suggestions

Based on the findings of the study, the following suggestions are offered to educational institutions, policymakers, and stakeholders for enhancing Digital Awareness, Technology Readiness, E-Maturity, and Digital Learning among Arts and Science College students.

Educational institutions should organize regular digital awareness programs to improve students' understanding of digital technologies, online educational resources, cybersecurity practices, digital ethics, and responsible technology usage. Such initiatives can strengthen students' digital confidence and enhance their ability to utilize digital tools effectively.

Colleges should integrate digital literacy and digital awareness modules into the curriculum so that students acquire essential knowledge regarding emerging technologies, information management, digital communication, and internet safety. Continuous exposure to digital concepts will help students become more technologically competent and digitally mature.

Institutions should conduct technology readiness development programs that focus on fostering positive attitudes toward technological innovations. Workshops, training programs, certification courses, and hands-on learning opportunities can enhance students' confidence in using advanced educational technologies.

Faculty members should be encouraged to incorporate technology-enabled instructional methods into teaching practices. The use of Learning Management Systems, virtual classrooms, digital assessment tools, online collaboration platforms, and interactive educational applications can increase students' familiarity with digital learning environments. Higher education institutions should establish Digital Learning Resource Centers equipped with modern technological infrastructure and support services. Such centers can assist students in overcoming technological challenges and improving their digital competencies.

Policymakers should promote initiatives that strengthen technological preparedness among college students by providing financial support for digital infrastructure, internet accessibility, and technology-enabled learning resources. Efforts to bridge the digital divide will ensure equitable learning opportunities for students from diverse backgrounds.

Students should be encouraged to participate actively in online learning communities, webinars, virtual workshops, and technology-driven academic activities. Such engagement will improve their technology readiness, digital awareness, and adaptability to changing educational environments.

Periodic assessments should be conducted to evaluate students' levels of digital awareness, technology readiness, and digital learning engagement. The results can be used to identify skill gaps and design targeted interventions for improvement.

Educational institutions should promote a culture of continuous learning and technological innovation by encouraging students to explore emerging technologies such as artificial intelligence, cloud computing, data analytics, virtual reality, and educational technology platforms.

5.3 Conclusion

The rapid digitalization of higher education has transformed the way students acquire knowledge, communicate, collaborate, and engage in learning activities. In this evolving educational landscape, Digital Awareness and Technology Readiness have become critical factors influencing students' ability to function effectively in technology-enabled learning environments. The present study investigated the relationship between Digital Awareness and E-Maturity and the relationship between Technology Readiness and Digital Learning among Arts and Science College students in Tiruchirappalli District.

The findings revealed that Digital Awareness has a significant positive relationship with E-Maturity. Students who possess greater awareness of digital technologies, online resources, cybersecurity practices, and digital communication tools are more likely to exhibit higher levels of digital readiness, confidence, and technological competence. Digital awareness enables students to utilize technological resources more effectively and adapt to the demands of digital education.

The study also demonstrated that Technology Readiness has a significant positive relationship with Digital Learning. Students who are optimistic about technology, willing to embrace innovation, and confident in their ability to use technological tools are more likely to participate actively in digital learning environments. Technology readiness was found to be a particularly strong determinant of digital learning effectiveness, indicating that students' attitudes and preparedness toward technology play a crucial role in shaping their educational experiences.

The results emphasize that successful digital transformation in higher education requires more than technological infrastructure alone. Students must be equipped with adequate digital awareness and technology readiness to fully benefit from digital learning opportunities. Educational institutions must therefore focus on developing students' digital competencies, enhancing technological confidence, and fostering positive attitudes toward technological innovation.

Overall, the study contributes valuable insights into the factors influencing E-Maturity and Digital Learning among Arts and Science College students. The findings provide a strong foundation for developing educational strategies aimed at promoting digital competence, technological preparedness, and lifelong learning capabilities. As higher education continues to evolve in response to technological advancements, fostering Digital Awareness and Technology Readiness will remain essential for preparing students to succeed in an increasingly digital and knowledge-driven society.

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