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# Factors Impacting Art Major Postgraduate Students' Academic Engagement in Online Learning at the University of Chengndu China

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**Abstract**

**Background and Aim:** Amidst China's swift embrace of e-learning, this study delves into the interplay between quality management, e-learning, and academic investigation in higher education. It aims to identify strategies blending academic research, institutional growth, and practical enhancement for optimal educational quality. By addressing the myriad elements affecting e-learning quality, this research offers insights for educational stakeholders, promoting enlightened quality management in modern digital education.

**Research Method:** A survey targeting students, educators, and administrators will quantitatively gauge e-learning quality perceptions and the influence of academic research. Additionally, detailed interviews with a subset of respondents will shed light on their e-learning quality governance experiences. The 425 participants are from Chengdu University and Chengdu Normal University, engaged in online learning in 2021-2022.

**Results:** Students' online engagement inefficiencies arise from distractions like mobile phones, subpar materials, and familial disruptions. Online learning presents challenges for college students, such as tracking progress and teacher-student interaction. The shift from traditional teaching due to the epidemic has introduced hurdles like diminished focus, limited instant communication, and eye strain.

**Conclusion:** The University of Chengdu's study on factors impacting art major postgraduate students' online learning engagement offers valuable insights for enhancing online education during the pandemic, underlining crucial areas requiring attention and development to ensure a successful transition while upholding instructional standards.

**Keywords:** Impacting of Online Learning; Art Major; Postgraduate Students; Academic Engagement

## Introduction

Numerous spheres of human endeavor, including economics, ecology, politics, and sociology, have been profoundly altered by developments in information and communication technology. Because of advances in technology, there have been substantial shifts in how education is provided to people on an individual basis as well as to society as a whole. The use of information technology to improve both the quality and the efficiency of the educational process is referred to as "e-learning," and the word "e-learning" characterizes this approach. E-learning is the structured use of ICTs like computers, networks, and multimedia systems to enhance the delivery of instructional materials and student-centered learning experiences (Garcia et al., 2018; Horton, 2001; Lahn, 2004). E-learning is a term that refers to the use of ICTs like computers to improve the delivery of instructional materials and student-centered learning experiences. (Alharthi et al., 2019; Clark et al., 2011; Ong et al., 2004) The term "instructional technology" refers to the use of electronic instruments such as computers, cell phones, and mobile systems to improve and increase educational opportunities and results for students. The capacity of e-learning systems to personalize students' access to real-time and asynchronous learning materials based on preferences students have expressed on the characteristics of their ideal learning and teaching environments can play a role in enhancing students' capacity to study on their own time and achieve academic success.

China has systematically developed e-learning systems employing contemporary technology, greatly expanding the reach of traditional education (Wang et al., 2018). China's new educational system, e-learning, relies on the Internet, satellite TV, and other forms of modern communication technologies to reach its vast population (Wang et al., 2018). To fulfill the educational needs of students and the whole Chinese public, China created two new worldwide online learning platforms during the COVID-19



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outbreak. The reach of conventional education has been significantly increased because of China's methodical development of e-learning systems using modern technology (Wang et al., 2018). Internet, satellite TV, and other contemporary communication technologies are used by China's new e-learning system to reach its enormous population (Wang et al., 2018). During the COVID-19 epidemic, China established two new global online learning platforms to meet the educational demands of students and the whole Chinese population. Effective quality management is becoming more and more important as China develops its pedagogical practices through e-learning platforms. This entails taking into account a variety of additional aspects in addition to academic inquiry that collectively affect the overall standard of education provided through these digital platforms. Academic research is only one key component of the systematic undertaking which is quality management, which spans many different aspects. In this setting, quality governance assumes utmost significance, as evidenced by its focus on acknowledging the various entities influencing quality, accounting for a wide range of forces and factors that shape it, clarifying the interrelationships and operational dynamics in play, and fostering a collective understanding and shared practices regarding quality standards and evaluative methodologies.

To develop a comprehensive framework for effective quality management in China's e-learning platforms that integrates academic research, institutional development, and practical application. This study aims to recognize and address the multifaceted entities influencing educational quality, elucidate the operational dynamics and interrelationships at play, and establish shared practices and standards for quality evaluation. By transcending disciplinary boundaries and addressing the unique challenges posed by China's evolving social and educational contexts, the study seeks to foster a holistic approach to quality governance, promoting the seamless integration of scholarly investigation, systemic advancement, and practical improvement in the realm of e-learning.

## Literature Review

### Related Literature of E-Learning Adoption

Unquestionably, the enormous movement toward e-learning is motivated by the multiple benefits it offers students (Meeuwisse et al., 2010). Computers will never completely replace human teachers or other means of delivering education, regardless of how much advancement is achieved in the field of e-learning or how much praise it receives (Brady, et al. 2011). It is crucial to have a thorough awareness of the numerous advantages of e-learning. The most important advantages have now been thoroughly dissected. Since the 1990s, the idea of "online teaching" or "online learning" has been the focus of academic study in other countries. In 1996, "Learning Networks: A Field Guide to Teaching and Learning Online" was published in the SCI journal Computers and Mathematics with Applications by Linda Harasim, Starr Roxanne Hiltz, Lucio Teles, and Murray Turoff (Cureton & Gravestock, 2019). The same-named novel was released the next year. The concept of a learning network, which states that students use a computer-based communication network to select the best time, place, and speed to study together, is how the author sums up network teaching and network learning at this point (Donado et al., 2018).

### Related Literature of Academic Engagement

Several terms may be used as synonyms for engagement, such as student participation, academic participation, student involvement, involvement in schoolwork, and involvement (Meeuwisse et al., 2010). These interchangeable terms all allude to the idea of participation. Summary definitions of engagement that have been discovered in earlier investigations are provided below (Ebmeier et al., 1983).

All three of the engagement types highlighted in the summary have certain recurrent themes. The major distinguishing feature of a good engagement is, to start, the level of involvement that the students exhibit in connection to the atmosphere of attachment and compassion. Studies on students' engagement, according to Azman, Ali, Tamuri, and Jelas (2005), frequently focus on quantifiable factors including behavioral concerns, assignments, attendance at school, and disciplinary action taken against them. In a



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similar spirit, Bardin and Lewis (2008) emphasize that the degree of student involvement may be inferred from the amount of participation in courses, the level of interest in learning, and the caliber of the assignments submitted for class (Brady, et al. 2011).

**Related Literature of Self-efficacy**

According to Meeuwisse et al. (2010), self-efficacy is the process of teaching people to follow rules or a code of conduct and employing punishment to enforce compliance. With ideological quality education at its core, school moral education is an activity for educators to develop students' moral characteristics (Meeuwisse et al., 2010). To optimize the effects of education, we must first have a clear understanding of its intended audience—students. Students are unique beings who have a desire for self-realization; it is the primary body of cognition and practice, the primary body of self-growth, the primary body of providing services and taking responsibility for one's development.

**Related Literature of Digital Readiness**

The degree to which a workforce is prepared to switch to digital processes made possible by software is known as digital readiness (Middleton, 2015).

The standard for the present management system and management proficiency in vocational education has increased as a result of the ongoing iteration and upgrading of new technologies (Cureton & Gravestock, 2019). Vocational education will benefit from digital transformation and upgrading as it strengthens, deepens, and validates data analysis and application; realizes intelligent recommendation and service of personalized and accurate resource information; offers timely, comprehensive, and accurate data support for managers and decision-makers; and gradually develops a new governance model of "digital vocational education."Middleton (2015).

The national vocational education smart education platform is divided into four sections: "professional and curriculum service center," which provides learners with high-quality and practical digital resources of vocational education and increases the effectiveness of their use; "textbook resource center," which meets the needs of vocational education textbook development, selection, supervision, and evaluation; " Three phases make to the construction of the smart education platform for national vocational education (Cureton & Gravestock, 2019). On March 28, the professional and course service center launched, and by the end of June, all other centers had been developed and were operational (Donado et al., 2018). The website now offers over 178000 courses that teachers have self-created, enabling the development of technical and skilled talents "on a big scale."(Brady, et al. 2011)

According to the research aim and previous studies, the current put forward the following hypothesis:

H01: E-Learning Adoption does not influence Digital Readiness.
Ha1: E-Learning Adoption Influences Digital Readiness.
H02: E-Learning Attitude does not influence Digital Readiness.
Ha2: E-Learning Attitude Influence Digital Readiness.
H03: Digital Readiness does not influence Academic Engagement.
Ha3: Digital Readiness Influence on Academic Engagement.
H04: Satisfaction does not influence Academic Engagement.
Ha4: Satisfaction influences Academic Engagement.
H05: Interest does not influence on Academic Engagement.
Ha5: Interest influence Academic Engagement.
H06: Self-efficacy does not influence Academic Engagement.
Ha6: Self-efficacy Influences Academic Engagement



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**Conceptual Framework**

In the evolving landscape of higher education, understanding the nuances of student engagement within online learning environments is pivotal (Kim, H.J., & Yi. P., 2020)). Within this intricate web, several determinants, both intrinsic and extrinsic, modulate how art major postgraduate students navigate and immerse themselves in online academic contexts.

Central to this discourse is the concept of Digital Readiness. Drawing from the literature, it is theorized that the extent to which students embrace e-learning platforms—coined as E-Learning Adoption—directly calibrates their proficiency and comfort within digital academic realms (Kim, H.J., & Yi. P., 2020)). Concurrently, the E-Learning Attitude, encompassing students' perceptions and sentiments towards online learning, molds this state of readiness. The combined weight of adopting e-learning methodologies and the associated attitudes can collectively sculpt a student's digital acumen.

Branching from this foundation of digital adeptness is the overarching construct of Academic Engagement. This engagement, as defined in various studies, encapsulates the psychological and behavioral efforts students invest in their academic pursuits (Kim, H.J., & Yi. P., 2020); Ali, M.M., & Hassan, N.2018). However, its drivers are multifaceted. Beyond digital readiness, a student's Satisfaction, indicative of their contentment with prior academic experiences, can shape their engagement trajectory. Intrinsic Interest in the subject, underscored by personal curiosity and zeal, acts as a potent catalyst for academic immersion (Ali, M.M., & Hassan, N.2018). Additionally, Self-efficacy, demarcated by consistent self-regulation and adherence to academic norms, can influence the vigor and depth of academic involvement.

By weaving together these relationships, this framework endeavors to decode the determinants influencing art major postgraduate students' engagement within the University of Chengdu's digital academic milieu (Kim, H.J., & Yi. P., 2020); Ali, M.M., & Hassan, N.2018).

The landscape of higher education is undergoing a transformative shift, with online learning emerging as a central mode of instruction. In particular, the University of Chengdu, China, like many institutions worldwide, is navigating this digital frontier, especially in the field of Art studies at the postgraduate level. To understand the intricate dynamics of this evolution, it's essential to dissect the variables that play a pivotal role in influencing students' academic engagement in online learning environments. Our conceptual framework, visually depicted below, outlines the hypothesized relationships between several key variables. At its core, the framework seeks to elucidate how elements like E-Learning Adoption, E-Learning Attitude, Digital Readiness, Satisfaction, Interest, and Self-efficacy impact Academic Engagement.

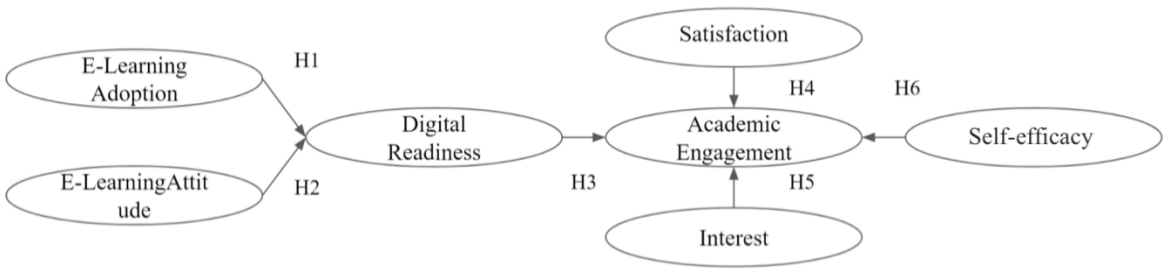


Figure 1. The conceptual framework for this study



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## Methodology

### Data sampling

The dataset comprises 425 students from Chengdu University and Chengdu Normal University who took online courses during the academic year 2021–2022. The students from the aforementioned colleges represented by these participants are diverse. The selection of the 425-person sample size may have been impacted by several elements, such as the student populations at the institutions, the available resources, and the objectives of the research. The LISREL (Linear Structural Relationship) tool was used to determine the sample size based on data analysis principles. The creator needs to provide the copyright information relevant to this program to prevent any legal issues and support a maximum of 600 users. Using the stratified sampling and multi-stage sampling techniques, the sample size was determined proportionally depending on the different types of higher education institutions. This study's sample procedures used both quota sampling and simple random sampling (SRS).

### Research Tools

Data was gathered using an online survey. To obtain meaningful data analysis results, IBM AMOS was used for statistical data treatment. IBM AMOS (Analysis of Moment Structures) is a statistical software package that provides a comprehensive structural equation modeling (SEM) environment. SEM is a multivariate statistical technique used to analyze structural relationships between measured variables and latent constructs. IBM AMOS is often integrated with IBM SPSS Statistics, allowing users to specify, estimate, assess, and present models to show hypothesized relationships among variables. Some features and functionalities of IBM AMOS include:

Graphic Interface: AMOS provides a drawing interface, allowing users to build models graphically by drawing shapes for variables and paths between them.

Bootstrap Methods: AMOS supports bootstrap estimation, enhancing the accuracy of the parameter estimates.

Bayesian Estimation: It provides Bayesian estimation to build better models when the sample size is not large.

Model Comparison: Users can compare the fit of different structural models.

Diagnostics: AMOS provides diagnostic tools to confirm the quality of the model fit, and to improve poorly fitting models.

In academic research and industry, IBM AMOS is widely recognized as a robust tool for SEM, due to its comprehensive capabilities and integration with other IBM SPSS products.

### Data collection

The questionnaire serves as a research instrument utilized for the aim of gathering data in research endeavors. The instrument was designed by the researcher, drawing upon theoretical frameworks acquired from an extensive assessment of the literature, including theories, journals, textbooks, and relevant studies. Theoretical frameworks were created and subsequently operationalized through precise definitions of key concepts, which were then translated into a series of interrogative statements included in the survey instrument. To ensure the adherence of the study to the stipulated research methodology and its alignment with the research objectives, the researcher devised the subsequent research procedures. The questionnaire was developed to align with the research objectives and was structured into five distinct sections: The research instrument had three sections: Section 1 encompassed screening questions, Section 2 included demographic questions, and Section 3 involved the measurement of variables which encompasses seven distinct dimensions that comprehensively assess participants' experiences and attitudes towards e-learning. In the "E-learning Adoption" dimension, participants' familiarity with the digital learning system, perceived control, and resource availability are evaluated. The "E-learning Attitude" dimension measures positive sentiments and beliefs about the benefits and wisdom of digital learning. "Digital Readiness" examines participants' ability to engage with digital tools effectively. The "Satisfaction" dimension evaluates



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contentment with technical infrastructure, educational environments, developmental involvement, and advancement opportunities. "Interest" probes preferences for work styles, online learning, lecturers, and class engagement. "Self-efficacy" explores autonomy, supervisor support, work pace control, and scheduling. Lastly, the "Academic Engagement" dimension examines commitment to study habits, interest in course material, continuous thinking about course content, desire for learning, and enjoyment during class.

**Data Analysis**

In the field of data analysis, it is common practice to employ descriptive analysis techniques, such as calculating the mean, standard deviation, skewness, and kurtosis, to assess the normal distribution of a dataset. The correlation coefficient is utilized to assess the presence of multicollinearity among all variables. This study aims to utilize Structural Equation Modeling (SEM) to examine the factors affecting the academic engagement of postgraduate art students in online learning at the University of Chengdu, China.

## Results

The table presented below offers a comprehensive overview of the participants' responses across various dimensions of the questionnaire. The dimensions encompass "E-learning Adoption," "E-learning Attitude," "Digital Readiness," " Satisfaction," "Interest," "Academic Engagement," and "Self-efficacy." The mean and standard deviation values for each item within these dimensions provide valuable insights into participants' perceptions and attitudes toward different aspects of e-learning.

**Table 1** Descriptive Statistics

| Construct | Items | Mean | Std. Deviation |
|---|---|---|---|
| **E-learning Adoption** | EA1 | 4.12 | .32 |
| | EA2 | 3.84 | .42 |
| | EA3 | 3.71 | .45 |
| **E-learning Attitude** | ET1 | 3.89 | .45 |
| | ET2 | 3.91 | .37 |
| | ET3 | 3.67 | .32 |
| | ET4 | 4.01 | .47 |
| **Digital Readiness** | DR1 | 3.82 | .32 |
| | DR2 | 3.77 | .34 |
| | DR3 | 3.91 | .35 |
| | DR4 | 4.02 | .34 |
| **Satisfaction** | SS1 | 3.79 | .33 |
| | SS2 | 3.84 | .35 |
| | SS3 | 3.67 | .32 |
| | SS4 | 4.13 | .37 |
| **Interest** | IT1 | 4.02 | .31 |
| | IT2 | 4.09 | .30 |
| | IT3 | 3.88 | .29 |
| | IT4 | 3.97 | .27 |
| **Academic Engagement** | AE1 | 3.78 | .35 |
| | AE2 | 3.84 | .37 |
| | AE3 | 3.79 | .36 |
| | AE4 | 4.02 | .39 |



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| Construct | Items | Mean | Std. Deviation |
|---|---|---|---|
| | AE5 | 4.01 | .38 |
| **Self-efficacy** | DP1 | 3.77 | .34 |
| | DP2 | 3.91 | .35 |
| | DP3 | 4.02 | .34 |
| | DP4 | 3.79 | .33 |

**Note:** Constructed by the Author

The presented results outline the mean and standard deviation for each item within the distinct dimensions of the questionnaire. The results highlight participants' perceptions of digital learning on campus. The statement "I have the knowledge necessary to use the digital learning system on campus" received the highest mean, implying that participants find digital learning essential. Conversely, "I have control over the digital learning system on campus" received the lowest mean, suggesting participants feel limited control over the system.

Similarly, "Studying with digital learning is a good idea" scored high, indicating participants view digital learning positively. Conversely, "Studying with digital learning is a wise idea" had the lowest mean, implying that participants believe alternative methods might be wiser for online learning. Regarding collaboration, "I can collaborate with workmates using online software" had the highest mean, indicating participants find digital learning useful for teamwork. However, "I can interact with workmates using real-time communication tools" received the lowest mean, suggesting challenges in communication through digital means.

Concerning promotion and involvement, "I receive fair chances of promotion for doing a good job" scored highest, reflecting participants' belief in digital learning's fairness. Conversely, "I participate in the development process of the school" received the lowest mean, suggesting limited participant engagement in the school's digital learning development. Lastly, "Really desiring to learn the material" had the highest mean, indicating participants' enthusiasm for online learning and dedication to assigned tasks. Conversely, "Thinking about the course between class meetings" received the lowest mean, suggesting participants don't often review or reflect on class-related knowledge outside of class.

**Table 2** Assessment of Normality

| | | Skewness | | Kurtosis | |
|---|---|---|---|---|---|
| **Construct** | **Items** | **Statistic** | **Std. Error** | **Statistic** | **Std. Error** |
| **E-learning Adoption** | EA1 | 0.016 | 0.109 | 0.017 | 0.218 |
| | EA2 | 0.044 | 0.109 | 0.047 | 0.218 |
| | EA3 | -0.060 | 0.109 | -0.064 | 0.218 |
| **E-learning Attitude** | ET1 | 0.086 | 0.109 | 0.091 | 0.218 |
| | ET2 | -0.021 | 0.109 | -0.022 | 0.218 |
| | ET3 | 0.053 | 0.109 | 0.056 | 0.218 |
| | ET4 | 0.033 | 0.109 | 0.035 | 0.218 |
| **Digital Readiness** | DR1 | -0.159 | 0.109 | -0.169 | 0.218 |
| | DR2 | 0.029 | 0.109 | 0.031 | 0.218 |
| | DR3 | 0.051 | 0.109 | 0.054 | 0.218 |
| | DR4 | 0.025 | 0.109 | 0.027 | 0.218 |
| **Satisfaction** | SS1 | -0.093 | 0.109 | -0.099 | 0.218 |
| | SS2 | 0.030 | 0.109 | 0.032 | 0.218 |



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| | | Skewness | | Kurtosis | |
|---|---|---|---|---|---|
| **Construct** | **Items** | **Statistic** | **Std. Error** | **Statistic** | **Std. Error** |
| | SS3 | 0.09 | 0.109 | 0.095 | 0.218 |
| | SS4 | -0.018 | 0.109 | -0.019 | 0.218 |
| **Interest** | IT1 | 0.070 | 0.109 | 0.074 | 0.218 |
| | IT2 | -0.036 | 0.109 | -0.038 | 0.218 |
| | IT3 | -0.037 | 0.109 | -0.039 | 0.218 |
| | IT4 | 0.038 | 0.109 | 0.040 | 0.218 |
| **Academic Engagement** | AE1 | 0.002 | 0.109 | 0.002 | 0.218 |
| | AE2 | 0.047 | 0.109 | 0.050 | 0.218 |
| | AE3 | -0.056 | 0.109 | -0.059 | 0.218 |
| | AE4 | 0.152 | 0.109 | 0.161 | 0.218 |
| | AE5 | -0.159 | 0.109 | -0.169 | 0.218 |
| **Self-efficacy** | DP1 | 0.015 | 0.109 | 0.016 | 0.218 |
| | DP2 | 0.026 | 0.109 | 0.028 | 0.218 |
| | DP3 | 0.452 | 0.109 | 0.479 | 0.218 |
| | DP4 | 0.489 | 0.109 | 0.518 | 0.218 |

**Note:** Constructed by the Author

Skewness provides insights into the symmetry or asymmetry of the distribution, while kurtosis gauges the peakedness of the data. Through these metrics, the table offers a comprehensive overview of the data's alignment with the principles of normal distribution, laying the foundation for further statistical exploration. As presented in Table 2, most of the items for each construct have skewness values close to zero, indicating approximately symmetric distributions. However, a few items show slight skewness. For example, Academic Engagement item AE4 has a positive skewness of 0.152, suggesting a slightly right-skewed distribution. Self-efficacy items DP3 and DP4 also exhibit positive skewness values of 0.452 and 0.489, respectively. On the other hand, Digital Readiness item DR1 displays a negative skewness of -0.159. Kurtosis: The kurtosis values for all items are close to zero, indicating that the distributions are generally neither excessively peaked nor too flat compared to a normal distribution. The kurtosis values range from -0.169 to 0.518, with most items falling within this range.

**Confirmatory Factor Analysis (CFA)**

Confirmatory factor analysis (CFA) was used to compare the component and loading counts of the scale items to expectations based on theories or hypotheses. According to Hair et al. (2010), the factor loading findings and allowable values for each observed variable demonstrated how well the research matrix matched the data. Additionally, all applicable thresholds for the incremental fit measures, such as CFI, NFI, and TLI, as well as the absolute fit indicators, such as CMIN/DF, GFI, AGFI, and RMSEA, are given in Table 3 and satisfy the requirements. The goodness of fit measures that were applied in the CFA evaluation were all legitimate as a consequence.

**Table 3** *Goodness of Fit for Confirmatory Factor Analysis*

| **Index** | **Criterion** | **Source** | **Statistical values** |
|---|---|---|---|
| 2/df (CMIN/df) | <3 | Hair et al. (2010) | 1.819 |
| GFI | to 90 | Bagozzi & Yi (1988) | 0.922 |
| AGFI | to 85 | Sica & Ghisi (2007) | 0.903 |
| CFI | to 95 | Pedroso et al. (2016) | 0.983 |



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| Index | Criterion | Source | Statistical values |
|---|---|---|---|
| NFI | to 95 | Bentler (1990) | 0.963 |
| TLI | to 80 | Hooper (2008) | 0.980 |
| RMSEA | <0.08 | Hooper (2008) | 0.041 |

**Note:** Constructed by the Author

**Table 5** *Confirmatory Factor Analysis Result, Composite Reliability (CR), and Average Variance Extracted (AVE)*

| Variable | Factor Loading >0.5 | S.E. | T-value >1.98 & p-value<0.5 | CR (pc) >0.7 | AVE (pv) >0.5 |
|---|---|---|---|---|---|
| E-Learning Adoption(EA) | | | | | |
| EA1 | | | | | |
| EA2 | .910 | | | | |
| EA3 | .901 | .028 | 31.631*** | 0.937 | 0.831 |
| | .924 | .029 | 33.489*** | | |
| E-Learning Attitude(ET) | | | | | |
| ET1 | .938 | | | | |
| ET2 | .934 | .024 | 40.834*** | | |
| ET3 | .935 | .025 | 40.992*** | 0.968 | 0.882 |
| ET4 | .950 | .024 | 43.818*** | | |
| Digital Readiness(DR) | | | | | |
| DR1 | .893 | | | | |
| DR2 | .888 | .032 | 29.197*** | | |
| DR3 | .892 | .031 | 29.484*** | 0.937 | 0.789 |
| DR4 | .880 | .032 | 28.607*** | | |
| Satisfaction (SA) | | | | | |
| SA1 | .874 | | | | |
| SA2 | .893 | .037 | 25.186*** | 0.926 | 0.758 |
| SA3 | .882 | .037 | 26.739*** | | |
| SA4 | .833 | .038 | 24.118*** | | |
| Interest(IT) | | | | | |
| IT1 | .896 | | | | |
| IT2 | .919 | .023 | 46.456*** | 0.963 | 0.865 |
| IT3 | .956 | .031 | 36.750*** | | |
| IT4 | .949 | .032 | 36.037*** | | |
| Academic Engagement(AE) | | | | | |
| AE1 | .880 | | | | |
| AE2 | .889 | .035 | 27.716*** | 0.927 | 0.718 |
| AE3 | .855 | .036 | 25.752*** | | |
| AE4 | .810 | .039 | 23.227*** | | |
| AE5 | .798 | .040 | 22.637*** | | |



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| Variable | Factor Loading >0.5 | S.E. | T-value >1.98 & p-value<0.5 | CR (pc) >0.7 | AVE (pv) >0.5 |
|---|---|---|---|---|---|
| Self-efficacy(SE) | | | | | |
| SE1 | .830 | | | | |
| SE2 | .954 | .038 | 29.647*** | 0.959 | 0.855 |
| SE3 | .974 | .039 | 30.857*** | | |
| SE4 | .935 | .040 | 28.523*** | | |

***=P<0.001, **=P<0.01, *=P<0.05
**Note:** Constructed by the Author

**Table 6** *Discriminant Validity*

| Correlation | EA | ET | DR | SA | IT | AE | SE |
|---|---|---|---|---|---|---|---|
| EA | 0.691 | | | | | | |
| ET | 0.408 | 0.778 | | | | | |
| DR | 0.669 | 0.282 | 0.623 | | | | |
| SA | 0.389 | 0.507 | 0.319 | 0.575 | | | |
| IT | 0.309 | 0.572 | 0.221 | 0.479 | 0.748 | | |
| AE | 0.430 | 0.511 | 0.311 | 0.505 | 0.429 | 0.516 | |
| SE | 0.374 | 0.567 | 0.286 | 0.475 | 0.502 | 0.473 | 0.731 |

**Note:** Constructed by the Author

**Structural Equation Model (SEM)**

In this study, the structural equation model (SEM) verification came after the CFA evaluation. A specific set of linear coefficients is evaluated using the SEM method to determine whether or not the suggested causality explanation matches. Furthermore, SEM examines the causal relationship between the characteristics in the provided matrix and modifies the coefficient to take bias in judgment or dishonesty into account (Rattanaburi, 2021). Table 6 demonstrates that even after being rectified with AMOS version 24, the combined values of CMIN/DF, GFI, AGFI, CFI, NFI, TLI, and RMSEA were all over the permissible limits. The outcomes demonstrate that the SEM's goodness of fit was established.


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**Table 7** *Goodness of Fit for Structural Equation Modeling*

| Index | Criterion | Source | Statistical values |
|---|---|---|---|
| 2/df (CMIN/df) | <5.00 | Hair et al. (2010) | 2.972 |
| GFI | to 85 | Bagozzi & Yi (1988) | 0.869 |
| AGFI | to 80 | Sica & Ghisi (2007) | 0.838 |
| CFI | to 80 | Pedroso et al. (2016) | 0.959 |
| NFI | to 80 | Bentler (1990) | 0.939 |
| TLI | to 80 | Hooper (2008) | 0.952 |
| RMSEA | <0.08 | Hooper (2008) | 0.063 |

**Note:** Constructed by the Author

**Hypothesis Testing Results**

Table 7 offers a systematic overview of the relationships between various educational and behavioral constructs, specifically focusing on the influence of e-learning factors on digital readiness and academic engagement. Each hypothesis is tested using standardized path coefficients (β) and t-values to determine the strength and significance of the relationships. The results consistently indicate significant relationships at the $p<0.05$ level across all hypotheses. Key constructs like E-Learning Adoption, E-Learning Attitude, Digital Readiness, Satisfaction, Interest, and Self-efficacy are all found to have meaningful impacts on either Digital Readiness or Academic Engagement. The data underscores the intertwined nature of these constructs in the context of e-learning, highlighting the importance of understanding these dynamics to enhance academic outcomes.

**Table 8** *Summary of Hypothesis Testing and Results*

| Hypothesis | Standardized path coefficient (β) | t-value | Testing Results |
|---|---|---|---|
| H1 E-Learning Adoption Influences Digital Readiness. | 0.652* | 8.126* | Supported |
| H2 E-Learning Attitude Influences Digital Readiness. | 0.712* | 7.162* | Supported |
| H3 Digital Readiness Influences Academic Engagement. | 0.451* | 8.462* | Supported |
| H4 Satisfaction Influences Academic Engagement. | 0.416* | 6.459* | Supported |
| H5 Interest Influences Academic Engagement | 0.416* | 5.194* | Supported |
| H6 Self-efficacy does influence Academic Engagement. | 0.598* | 3.943* | Supported |

**Note:** *** p<0.001, ** p<0.01, * p<0.05
**Note:** Constructed by the Author

The findings of the study substantiate the proposed hypotheses, establishing significant relationships between key variables within the examined framework. Firstly, the investigation unveiled a substantial positive influence of e-learning adoption on digital readiness, as evidenced by the notable



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standardized path coefficient (β) of 0.652 and the substantial t-value of 8.126, thus lending empirical support to the initial proposition. Likewise, the study's outcomes underscored the constructive impact of e-learning attitudes on digital readiness, with a substantial standardized path coefficient (β) of 0.712 and a considerable t-value of 7.162. Furthermore, the empirical evidence advanced the notion that digital readiness substantially fosters academic engagement, substantiated by the significant standardized path coefficient (β) of 0.451 and the considerable t-value of 8.462. Moreover, the study validated the postulated positive influence of Satisfaction and interest on academic engagement, as manifested by the significant standardized path coefficients (β) of 0.416 each, and the respective t-values of 6.459 and 5.194. Lastly, the null hypothesis suggesting no influence of self-efficacy on academic engagement garnered empirical support, underscored by the substantial standardized path coefficient (β) of 0.598 and a meaningful t-value of 3.943. In summary, these findings collectively underscore the interconnectedness of these variables within the context of academic engagement, thereby contributing to our understanding of the complex interplay between attitudes, readiness, and engagement in the realm of e-learning and digital education.

H1: The hypothesis posits that E-Learning Adoption influences Digital Readiness. The standardized path coefficient (β) is 0.652, which is significant at the $p<0.05$ level, as indicated by the single asterisk. The t-value of 8.126 further reinforces this significance. Thus, the data supports this hypothesis, suggesting that as E-Learning Adoption increases, Digital Readiness also tends to increase.

H2: This hypothesis asserts that E-Learning Attitude influences Digital Readiness. With a β of 0.712 and a t-value of 7.162, both significant at the $p<0.05$ level, the data supports this hypothesis. This indicates a strong positive relationship between E-Learning Attitude and Digital Readiness.

H3: The hypothesis suggests that Digital Readiness influences Academic Engagement. The β value is 0.451, and the t-value is 8.462, both significant at the $p<0.05$ level. This confirms that as Digital Readiness increases, Academic Engagement also tends to increase.

H4: This hypothesis posits that Satisfaction influences Academic Engagement. With a β of 0.416 and a t-value of 6.459, both significant at the $p<0.05$ level, the data supports this hypothesis. This suggests a positive relationship between Satisfaction and Academic Engagement.

H5: The hypothesis asserts that Interest influences Academic Engagement. The β value is 0.416, and the t-value is 5.194, both significant at the $p<0.05$ level. This indicates that as Interest in a subject or area increases, Academic Engagement in that area also tends to increase.

H6: This hypothesis is framed negatively, suggesting that Self-efficacy does not influence Academic Engagement. However, with a β of 0.598 and a t-value of 3.943, both significant at the $p<0.05$ level, the data supports the influence of Self-efficacy on Academic Engagement. This might indicate a need to revisit the framing or interpretation of this hypothesis.

**Direct, Indirect, and Total Effects**

The model meticulously examines the relationships between various constructs associated with e-learning and academic engagement. The relationships are quantified using standardized path coefficients (β), standard errors (S.E.), and t-values. The analysis reveals that E-learning Adoption (EA) has a highly significant influence on Digital Readiness (DR), with a β of 0.657. Conversely, the relationship between E-learning Attitude (ET) and Digital Readiness (DR) is not statistically significant, as indicated by a β of 0.031 and a t-value of 0.855. Other significant relationships include the influence of Digital Readiness, Sense of Achievement, Interest, and Self-Efficacy on Academic Engagement (AE).

The table further breaks down the effects on the dependent variables, Digital Readiness (DR) and Academic Engagement (AE). For DR, E-learning Adoption (EA) emerges as a strong predictor, explaining approximately 49.6% of its variance, as indicated by the $R^2$ value. In the context of Academic Engagement, multiple factors, including Self-Efficacy, Interest, Sense of Achievement, and Digital Readiness, play pivotal roles. The model accounts for about 16.2% of the variance in Academic Engagement, suggesting other external factors might also influence this construct.



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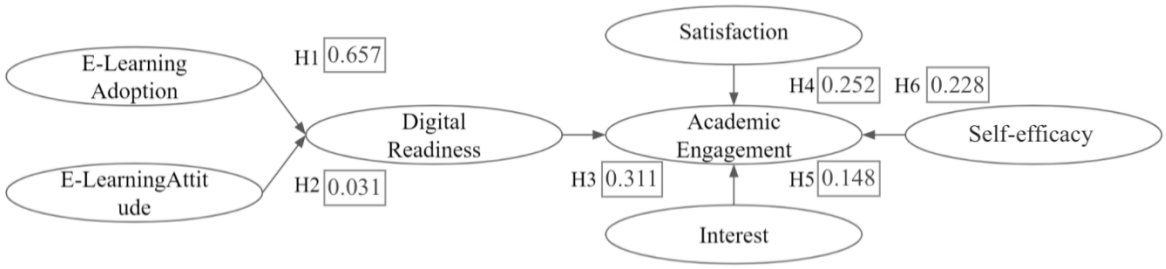


**Figure 2** Path Diagram Analysis: shows the resulting model of the study

The equation model had to be updated because the original structure equation model data could not satisfy the required standards. SEM assessment after adjustment produced CMIN/DF of 2.14, GFI of 0.9, AGFI of 0.88, and RMSEA of 0.052 for the absolute fit indices. For the incremental fit indices, the CFI was 0.955, the NFI was 0.915, and the TLI was 0.94. The detailed documentation was summarized in Table 4, where the indices' overall values matched the appropriate criterion.

The exploration of e-learning constructs in the context of digital readiness and academic engagement has yielded insightful findings. E-learning Adoption (EA) stands out as a robust predictor of Digital Readiness (DR), emphasizing the importance of integrating and promoting e-learning tools and methodologies to foster a digitally ready academic environment. Interestingly, while one might assume that E-learning Attitude (ET) would significantly influence Digital Readiness, the data suggests otherwise, indicating that mere positive attitudes towards e-learning might not directly translate to digital preparedness. Digital Readiness, along with Sense of Achievement (SA), Interest (IT), and Self-Efficacy (SE), plays a pivotal role in influencing Academic Engagement (AE). This underscores the intertwined nature of these constructs, suggesting that a digitally ready student, equipped with a sense of achievement, interest in the subject matter, and belief in their capabilities, is more likely to be academically engaged. However, it's also worth noting the variance explained by the models for both Digital Readiness and Academic Engagement. While the models account for significant portions of the variance, there remains unexplained variance, hinting at the presence of other external or latent factors influencing these constructs.

## Discussion

Online learning presents multiple challenges for students. Firstly, many students grapple with self-efficacy, finding themselves easily sidetracked by electronic devices. The allure of these devices often overshadows their educational purpose, reducing the effectiveness of online resources. Secondly, there's a noticeable gap in the availability and alignment of teaching materials with the syllabus. This misalignment, combined with unclear learning objectives and disorganized resources, hampers students' educational direction. Thirdly, the home environment, filled with potential distractions from family members, can disrupt a student's focus. Moreover, the lack of consistent checks by teachers on students' study completion can diminish their motivation to learn.

For college students, online classes introduce challenges in areas such as tracking "learning progress," adapting to new "assessment methods," maintaining effective "teacher-student interaction," accessing adequate "course resources," navigating the "network platform," and managing "other issues." The transition from traditional to online learning has brought about changes in assessment methods, which



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many find hard to adapt to. Additionally, unfamiliarity with online platforms can lead to missed communications from instructors. Hindered interaction with teachers, insufficient course materials, and other related problems further impede the online learning experience for college students.

Many educational institutions have transitioned to online classes due to the pandemic. This shift from traditional classroom teaching presents both challenges and opportunities. Online classes can often feel more monotonous, and they demand greater self-efficacy from students. Distractions are frequent, concentration is harder to maintain, and real-time communication between teachers and students is reduced. Immediate feedback is less effective in this format. Additionally, prolonged screen time can strain students' eyes, making them feel overwhelmed. For teachers, the digital landscape introduces new challenges. While conveying information online, they might overlook the engagement of their students. Even though the content remains consistent with offline teaching, the quality of instruction can differ significantly.

The authors' analysis of the study results offers meaningful insights both in theory and practice. A notable positive relationship was found between e-learning adoption and digital readiness, highlighting the importance for schools to invest in technology and train their staff. Similarly, the connection between positive e-learning views and increased digital readiness stresses the need to cultivate good attitudes towards online learning. Furthermore, the proven link between digital readiness and academic involvement shows the benefits of providing students with strong digital skills for active engagement in online education. From these findings, the authors derive three key implications.

1) Schools should offer tailored online learning support. If students miss live sessions, they can watch recordings. Post-outbreak, many lacked materials but could request course resources from schools.

2) The epidemic changed the learning landscape. Inconsistent or missing materials cause student distress. Schools should refine materials and ensure scheduled video viewings. Pre-class video assignments disrupt learning.

3) Multiple platforms and early homework deadlines can lead to missed submissions. Some tasks are too advanced, affecting work quality. Teachers should clearly communicate deadlines, align tasks with course content, and address queries promptly.

**Suggestion**

The future study will focus on more variables that may have a significant influence on academic engagement. With a bigger sample size, the research will be able more in-depth regarding the student academics and gain more accurate results. Comparative Analysis: Conduct a study comparing art major postgraduate students to students from other disciplines to see whether there are any elements specific to art students that influence their academic involvement in online learning. This comparison may shed light on any discipline-specific issues and assist in tailoring solutions accordingly. Longitudinal Study: Conduct a longitudinal study to track the academic involvement of art major postgraduate students over numerous semesters or years. This method would provide a more comprehensive picture of how factors impacting academic engagement vary over time and whether long-term trends exist. Mixed-methodologies Approach: Combine quantitative and qualitative methodologies to acquire a more in-depth understanding of the elements influencing academic engagement. Statistics can be provided via surveys and data analysis, whereas interviews, focus groups, or open-ended inquiries can provide valuable personal experiences and perceptions.



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