

Why Emotional Intelligence Matters More Than Digital Intelligence in Online Education?

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Abstract— The growth of digital/hybrid education has increased the need to comprehend the inner capacities that shape students' online learning prospects. This study discovers how Emotional Intelligence (EI) and Digital Intelligence (DI) contribute to learners' ability to instigate and navigate in the online learning environments. The combined influence of Emotional Intelligence (EI) and Digital Intelligence (DI) on Online Learning Readiness (OLR) among higher education learners is studied. Using Structural Equation Modeling (AMOS), the proposed model demonstrated strong fit, confirming that both EI and DI have significant positive effects on OLR. EI is working as the soundest predictor of OLR and EI also indirectly predicts OLR through DI, indicating a complementary partial mediation. Further moderated mediation analysis using 'Process Macro in SPSS' explored the role of demographic factors. Results showed that the model remained consistent across gender and academic departments, while location significantly moderated the EI → DI → OLR pathway, highlighting contextual differences in digital readiness. In general, the findings underscore the critical role of emotional maturity and digital capability in strengthening students' online learning outcomes. The study contributes to digital pedagogy literature by recognizing EI and DI as key competencies for effective online learning and by offering insights for policy designers and institutions aiming to build a more resilient and future-ready learner community.

Keywords— Emotional Intelligence (EI), Digital Intelligence (DI), Education 5.0, Online Learning Readiness (OLR), Human-Centric Digital Learning, Future-Ready Learners

I. INTRODUCTION

Technology adoption and adaptation initiated from the early phase of industrial revolution (Industry 1.0) has become disruptive in the recent phase (Industry 5.0) with digital transformative tools that are human centric with digital technology at the core and defines a sustainable and resilient future workplace. The education sector has also evolved parallel from a more passive, teacher centered model, technology integration & collaborative learning model to a more active learner centered learning model driven by AI and enhanced technology. So, Education 5.0 is the subsequent evolution of a learner-centered ecosystem that thrives on human skills, collaboration, values and mindset that needs to be pruned for the subsistence of Industry 5.0 and cannot be refuted. Modern digital technology use at workplaces amplifies the performance of the workers and fosters employee well-being, Education 5.0 tools like AI tutors, Generative AI tools, AR/VR and learner analytics has helped in hyper localization of learning, leveraging on a learner's learning pace and strength. The evolution of education is very critical and serves as the backbone of Industry 5.0 by providing relevant human skills but contributes to the broader SDG goals of the nation and United Nations by building a Society 5.0 that is resilient, sustainable and innovation oriented. Also, they provide a learner based flexible, synchronous and an immersive environment rather than digitizing the learning environment that automation dictates.

Education tools like Learner Management Systems (LMS), cloud-based productivity tools like Google workspace, Microsoft 365, Office 365 have augmented collaborative learner environments that are fully online/blended in mode. It is therefore evident that Education 5.0 needs an emotionally intelligent human manpower that shows self-awareness, empathy, self-regulation, motivation and social skills on the same level as digital intelligence as it affects mental well-being, mindfulness and behavior regulated by ethics. It is therefore seen that the preparedness of the workforce for Industry 5.0 is dependent on creating empathetic and highly skilled human beings who can contribute through team work, values, adaptability and leadership that all depend on emotional intelligence (EI). Recent reports are quoted to note that our Indian education system is struggling with structural weakness in terms of "education to employment pipeline". This can hinder the aspiring goal of the country to reach the status of developed India by 2047 (Report from member of the Economic Advisory Board to Government of India, 2025). This is the imminent need of our country if higher education should develop culturally grounded leaders and contribute to the economic goals of our nation. This means empathy, cultural sensitivity, active listening, continuous learning mindset, motivation and self-direction are very important. This paper would hence explore the antecedent role of emotional intelligence in the current digital learning environments that have become permanent.

II. LITERATURE REVIEW

In this era (present and future of 21st century) of human machine collaboration, we see a dual role of technology advancement on one side and human centric values on the other side defining the need for a framework that aligns education with employment. Digital transformation is the common ground among them and hence exploring the role of emotional intelligence and interpersonal capability of the learners/users are critical for Education 5.0 to groom talent for Industry 5.0 else the growing job crisis will only widen. The study underscores the basic concepts to develop a conceptual model that can be tested for arriving at suitable implications that can cascade the effect of Industry 5.0.

A. Evolution of Education 5.0: From Chalk-board to Smart Board

The evolution of Education from 1.0 to 5.0 underscores the need to equip learners with the competencies required to navigate and influence new social, economic, and technological developments – (I) **Education 1.0** – Traditional classroom learning where teachers play a central role and students play a passive role. Memorization of concepts was emphasized which will not be useful to cultivate creative thinking competencies, (II) **Education 2.0** – It offered more access to learning contents and also facilitated collaborative learning opportunities, though classroom education was predominant. Analytical and problem-solving skills were introduced in this phase, (III) **Education 3.0** – This phase made a drastic shift from teacher process to learner centric education. Blended learning approach introduced where students were introduced with Self-directed learning along with traditional classroom learning, (IV) **Education 4.0** – Personalized and project-based learning were introduced. Students can use adaptive systems to customize their study process based on individual preferences and strengths. Learners were encouraged to work on real life projects to gain the integrated knowledge of theory and practice and (V) **Education 5.0** – Realization of the need for integrating human skills with digital skills resulted in incorporating emotional intelligence, ethics, sustainability etc. in the modern education system and the prominence of Artificial Intelligence is also growing.

B. Human side of Digital Learning: Integrating Emotional Intelligence in Education 5.0

Empirical evidence emphasizes the significance of emotional intelligence (EI) in digital learning contexts. A recent study demonstrated a significant positive relationship between EI and e-learning success, highlighting that emotional competencies support motivation, stress management, social skills, and overall performance. These findings suggest that EI and digital learning are deeply intertwined, and emotional skills are essential for maximizing the effectiveness of digital education (Shokrpour, Soleymani, & Farahmandi, 2024). Building on this, the researcher proposed a concept of “digital emotional intelligence”, which means integrating traditional EI with digital competence. This model displays that emotional intelligence shapes outlooks toward digital tools. It emphasizes that EI is deeply implanted in digital literacy, shaping how learners interact with technology-enhanced education (Audrin & Audrin, 2023). Digital intelligence (DI) is the fundamental prerequisite for pursuing technology-mediated learning, but this alone is inadequate for adopting insightful learning experiences. Education 5.0 underscores a human-centric approach, where digital tools can help the people in the learning process, but they cannot substitute the cognitive and emotional capacities. Digital learning pedagogy must be deep-rooted in psycho-social intelligence, to ensure that the technology is enhancing and not disrupting the learners’ growth (Chigbu & Makapela, 2025).

These insights highlight the intense need for emotional competencies together with digital competencies in Education 5.0. While technological proficiency enables learners to navigate and utilize advanced digital tools, it is their emotional resilience, and social awareness that allow them to apply these tools meaningfully. By integrating EI into digital learning environments, students can better manage stress, stay motivated, engage effectively in online and blended learning contexts, and adapt to rapid changes in technology and the workplace. In essence, Education 5.0 is not just about teaching technology, it is about fostering versatile learners who combine digital expertise with psycho-social intelligence, contributing to a sustainable and innovative organization.

Digital intelligence is a core competency for Education 5.0, which includes skills such as digital familiarity, online communication, cybersecurity awareness, and responsible digital citizenship. EI is becoming indispensable in the digital era, enabling learners to adjust, control emotions, and interact effectively in this virtual atmosphere. EI not only supports individual welfare but also strengthens the progress of DI.

Research studies suggest that individuals with higher EI tend to develop stronger digital skills and competencies. By managing stress and emotional responses, emotionally intelligent learners are better positioned to engage with digital tools, collaborate online, and leverage technology for meaningful outcomes (Kurniawan & Hidayat, 2024; Audrin & Nguyen, 2023). Education 5.0 is a paradigm shift toward human-centric, technology-enhanced learning, integrating innovations such as artificial intelligence, virtual and augmented reality, Internet of Things (IoT), and data analytics. This approach fosters personalized, collaborative, and well-being-oriented educational experiences while promoting 21st-century skills such as creativity, critical thinking, and problem-solving. The successful adoption of Education 5.0 depends on both learners and educators embracing these digital innovations, a process in which emotional intelligence plays a foundational role (Chigbu, 2025). Individuals with high EI exhibit greater adaptability, reduced resistance to technological change, and sustained motivation, which supports more effective engagement with AI-driven and digitally immersive learning environments.

Integrating EI into AI learning platforms can create more empathetic and responsive educational systems. By recognizing and responding to learners’ emotional states, these systems enhance commitment, promote continued attention, and improve learning outcomes (Keshishi & Hack, (2023). But Emotion AI can only be trained to recognize patterns and lacks true empathy. The interplay between emotional intelligence and digital adaptability therefore becomes a critical enabler for the successful implementation of Education 5.0 initiatives.

In summary, the literature emphasizes that emotional intelligence acts as a key driver of digital intelligence, facilitating keenness and passion for embracing Education 5.0 technologies and methodologies. This interdependent relationship highlights the necessity of developing both emotional and digital competencies to create transformative, human-centric educational experiences in the digital age.

III. RESEARCH METHODOLOGY

A. Research Objectives

- To study the role of emotional intelligence on online learning readiness.
- To study the mediating role of technology adoption factor in the relationship between emotional intelligence and online learning readiness
- To evaluate the moderating effect of demographic variables on online learning readiness

B. Conceptual Model for the Study

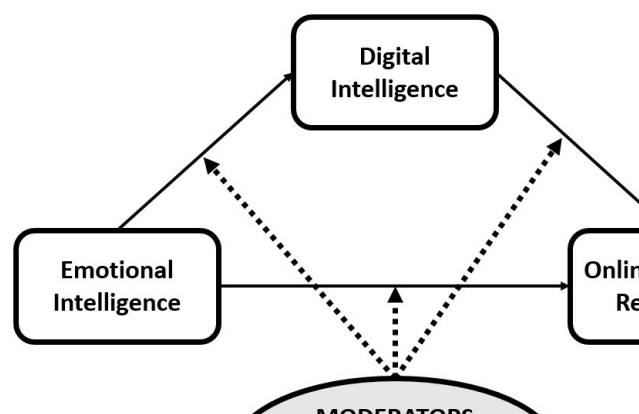


Fig. 1 Conceptual Model

C. Research Process

Relevant research databases Google Scholar, Scopus, Web of Science, JSTOR, Emerald, Francis & Taylor etc., were referred and key search terms like online education, online learning readiness, online efficacy, emotional intelligence etc., were used to develop the conceptual framework. A quantitative research method was used to collect responses using structured questionnaires and the sample participants recorded through self-reporting methods. The questionnaire was designed with the intention to establish the relationship among the constructs and also explored the impact of demographic and socio-technographic factors on these variables. The study uses students from Community colleges (Pondicherry & Mahe) functioning as constituent college of a Central University in Pondicherry. This population has been chosen keeping in mind the growing need for education interventions to be more inclusive in nature rather than focusing on Institutions that admit students from the well to do segments/geographic regions of the society.

A thorough exploration of the literature helped in narrowing down the scales to be considered for measuring the constructs identified. The scales identified can be listed as follows:

TABLE I

Sl. No	INSTRUMENT SELECTION		
	Constructs	Scale adapted for Study	References
1	Emotional Intelligence	WLEIS scale Source Wong & Law 2002	Traymbak et al. (2022) Rathore & Chadha (2021) Taliadorou & Pashiardis (2015) Carvalho et al. (2016)
2	Digital Intelligence	UTAUT scale Source Venkatesh et al. (2003)	McIntyre et al. (2023) Pham & Dau (2022) Efiloglu Kurt & Tingoy (2017) Volery & Lord (2000) Tan (2013)
3	Online Learning Readiness	OLRS scale Source Hung et al. (2010)	Celik & Cagiltay (2023) Pham & Dau (2022) Buzdar et al. (2016) Demir Kaymak & Horzum (2013)

Considering the Krejcie and Morgan (1970) formula for finite population, the minimum sample size for the study was estimated as 297 respondents. Purposive sampling and stratified sampling technique was used. The study also proposed CB-SEM using AMOS for analysis of data. Hair et al, 2018 has reported that while using minimum observations to variables rule, the required sample size should be in the ratio of 5:1 but more preferably 15:1 or 20:1. This sample size selected for the study is strongly recommended by the methodology review studies. This study thus proposes to include a minimum of 297 respondents and a maximum of up to 700 respondents. The questionnaire developed was checked for content validity with experts. The reliability and validity of the data was confirmed through pilot study before moving to the major study data collection.

IV. ANALYSIS & DISCUSSION

I) Descriptive Analysis of the Sample Characteristics: Most of the respondents were male students doing healthcare courses followed by management and commerce courses. Over and above 37% of the respondents were working part-time to support their education and families.

Most of the respondents belong to the 17 to 20 years' age group. This is representative of KPMG India's Research and Analysis Report 2017 that depicts that 17-30 years is the age where online education is experienced through formal education. Although a majority (85.5%) had a mobile phone (owned by them) to access the internet, the ownership of laptop/desktop to access the internet for learning was very low and this is different from other studies that are conducted in Community Colleges in western nations (Grenier, D. P. 2018; Harris Poll, 2015). Also 8.3% were using family members' devices and 2% were using friends' devices for online learning. Further some studies show learners access to 2 devices also (Grenier, D. P. 2018). It is evident that access to online learning among these students is limited to mobile phones only.

II) Path Analysis of the Conceptual Model: The causal relationships projected in this study were observed through path analysis using Structural Equation Modeling (AMOS). We assumed that Emotional Intelligence (EI) and Digital Intelligence (DI) would positively affect learners' Online learning Readiness (OLR). The model established strong fit, and the results confirmed that both EI and DI exert significant positive effects on OLR. Enhancements in students' emotional skills and their inclination to involve with technology directly improve their aptitude to learn successfully in online environments.

Unstandardized Estimate Values: The outcomes point out that EI is a strong predictor of both DI and OLR. DI partially mediates the relationship between EI and OLR. Learners with higher emotional intelligence tend to become digitally intelligent, which in turn enhances their online learning effectiveness. The model demonstrates a theoretically consistent and statistically meaningful pattern of relationships.

- EI & DI – The partial effect of EI on DI is + 0.640 (t-value = 7.284 & p-value = 0.000). DI would increase by 0.640-unit with every 1-unit increase in EI.
- DI & OLR – Partial effect of DI on OLR is + 0.391 (t-value = 3.984 & p-value = 0.000). OLR would increase by 0.391-unit with every 1-unit increase in DI.
- EI & OLR – Partial effect of EI on OLR is + 0.640 (t-value = 4.908 & p-value = 0.000). OLR would increase by 0.505-unit with every 1-unit increase

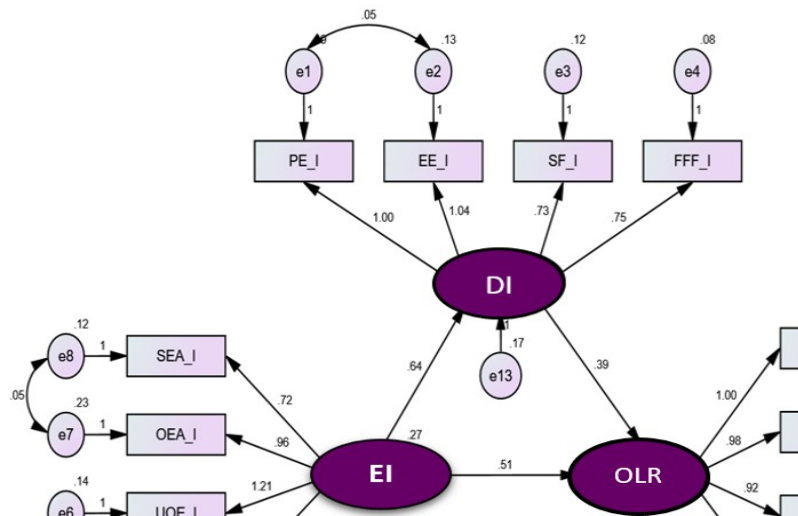


Fig. 1 Unstandardized Estimate Values

Standardized Estimate Values

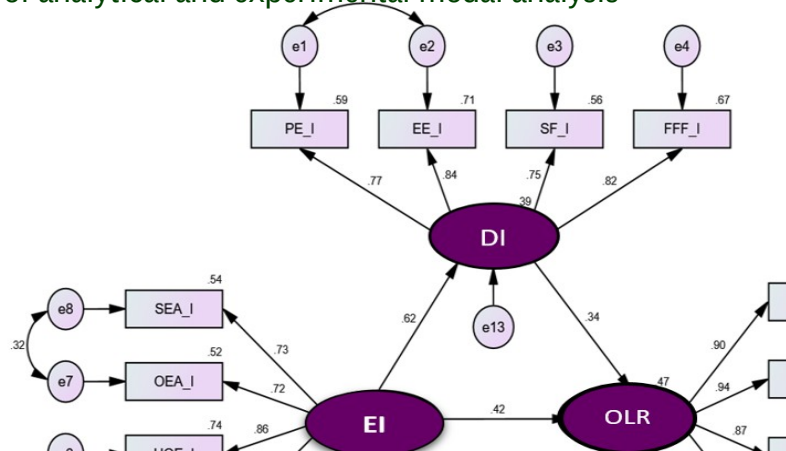


Fig. 2 Standardized Estimate Values

Overall, the standardized model suggests that EI is the most influential foundational trait driving both digital readiness and learning success. DI acts as a meaningful pathway, translating EI into effective online learning experiences. Together, EI and DI explain a significant proportion of variance in OLR, demonstrating that psychological and digital competencies jointly shape learners' effectiveness in digital learning environments. Ranking the order of influencing power – The influence of EI on DI (0.54) is the strongest in this structural model, followed by influence of EI on OLR (0.51) and finally the influence of DI on OLR (0.39). The outcomes already exposed that there was a 'complementary partial mediation' in the presented path model

- Direct model EI → OLR is significant
- Indirect paths EI → DI & DI → OLR is also noteworthy

III) Moderated Mediation Analysis – Process Macro in SPSS

We also pursued to confirm the mediation effect of DI along with the moderation effect of demographic variables like gender, location and department. 'Conditional process model 59' (Hayes, 2013) was used to verify the validity of our proposed hypotheses.

Gender Moderated Mediation Analysis: Mediation effect was ascertained since both direct and indirect effects were significant for both male and female samples. Interaction effects of gender on both the relationships EI → OLR & DI → OLR were insignificant and hence it was proved that gender had no moderating effect on the proposed model.

Location Moderated Mediation Analysis: Mediation effect was ascertained since both direct and indirect effects were significant for both Pondicherry and Mahe student samples. Interaction effects of location on both the relationships EI → OLR & DI → OLR were significant and hence it was proved that location had a moderating effect on the proposed model. This signifies that location-based technology resources, socio-economic factors and educational resources available significantly moderates online learning readiness.

Department – Moderated Mediation Analysis: Mediation effect was ascertained since both direct and indirect effects were significant for three categories of department (Management & Commerce, Bio-science & Healthcare and other arts and skill based courses). Interaction effects of the department on both the relationships EI → OLR & DI → OLR were insignificant and hence it was proved that the department had no moderating effect on the proposed model.

V. IMPLICATIONS

This study shows that improving students' emotional and digital skills is not just desirable but is essential for strengthening the future of online learning that is permanent. Further the regional disparities in terms of availability of technology infrastructure (internet infrastructure in urban/rural areas, network stability), socio-economic background, educational resources significantly influence online learner readiness.

The power of online learning has to be leveraged for strengthening the structural weakness in our education to employment pipeline. For governing bodies that comprise policymakers and education providers, this means designing well-structured online courses on employability skills and ensuring that government institutions have the digital infrastructure to support them. Regular surveys of industry needs should guide the creation of these courses. Initiating collaboration with the industry to offer industry-based certifications to enhance the employability and to compliment practical training. In line with the National Education Policy (NEP), 2020, hybrid learning must become a standard practice, especially for skill enhancement and ability enhancement subjects, since many colleges currently depend on temporary instructors who cannot always deliver the depth these courses require. High-quality e-content in regional languages, supported by expert contributors and integrated with national online platforms (e.g., SWAYAM, Nan Mudhalvan), can help restore the purpose of the NEP - greater access, engagement and quality.

The findings also highlight Emotional Intelligence (EI) and Digital Intelligence (DI) as two major “sweet spots” that can make online learning more effective. Introducing EI as a foundational course in schools and colleges can help students understand and use their emotions better, learn independently, build healthy social interactions, and seek support when required. In the same way, making DI a compulsory early skill is crucial because many students—especially those outside technical courses—enter higher education with limited digital exposure. Early training in blended learning can help young learners see technology as a tool for growth, not just entertainment. For educational institutions, a shift in pedagogy is necessary as learning gradually becomes more student-driven. Course content needs to be structured to reduce cognitive overload, include real-world applications, and use elements like gamification to keep learners engaged. Institutions must also assess their digital readiness and decide whether to build or adopt LMS platforms such as Moodle or Blackboard. Flexibility in course completion can help learners who face challenges related to device quality, internet speed or emotional stress. In addition, professional EI trainers can support both teachers and students in managing the emotional demands of e-learning. Finally, training programs using participatory tools, virtual simulations and skill-based online modules can equip educators and learners to engage meaningfully in a blended and digital learning ecosystem. Finally, society needs to enable an environment that fosters emotionally strong individuals who can show active listening, empathy, resilience, and cultural sensitivity and bring about inclusion. Social support through family and community can equip individuals to be less aggressive/discriminatory in their behaviour and be mindful in conflict resolution. These can help students not only in their academic achievements but be a responsible citizen.

VI. SCOPE FOR FUTURE RESEARCH

Future studies can explore how Emotional Intelligence and Digital Intelligence work together across different disciplines and how early training in these areas shapes students’ digital habits, confidence and employability over time. Researchers can also compare how hybrid learning performs in institutions with varying levels of digital readiness and faculty support. Short experimental studies may test what types of e-content—such as gamified modules, balanced cognitive-load designs or regional-language resources—create better engagement. Larger cross-state or cross-country studies could help understand which policies and platforms, including SWAYAM or Nan Mudhalvan, scale well in diverse learning environments. With rapid advances in technology, there is also scope to study how AI-driven tools, adaptive assessments and virtual simulations can personalise learning. Examining digital gaps linked to gender, socio-economic background and rural–urban settings will help design more inclusive interventions. Together, these directions can guide a stronger and more equitable digital learning ecosystem in the future.

VII. CONCLUSIONS

This study clearly demonstrates that Emotional Intelligence (EI) and Digital Intelligence (DI) are powerful drivers of Online learning Readiness (OLR). The structural model tested through AMOS showed strong validity, confirming that both EI and DI have significant positive effects on learners’ online learning outcomes. EI emerged as the strongest predictor in the model—directly enhancing OLR and also strengthening it indirectly through DI. The presence of complementary partial mediation further shows that DI acts as an important mechanism through which EI translates into better online learning performance. Moderated mediation analysis (PROCESS Macro) revealed that these relationships remain consistent across gender and academic departments, indicating that the model holds stable across diverse learner groups. However, location was found to be a significant moderator, suggesting that regional context and access conditions influence how EI and DI shape online learning success. Overall, the findings highlight that learners with higher emotional awareness and stronger digital capabilities are more confident, adaptable and effective in online learning environments. Literature also strongly shows that technology-based EI tools like Emotion EI depend only on patterns and lacks true empathy. Hence, investing in EI inclusion in pedagogy outperforms mere DI training to build a more prepared, resilient and future-ready student community capable of navigating digital learning with greater ease and purpose.

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