DOI: 10.71317/jgst.2.10.2026.900
Journal of Global Social Transformation
Journal homepage: https://rjsaonline.org/index.php/JGST

The Effect of Artificial Intelligence-Supported Education on Students' Academic Resilience: The Mediating Role of Psychological Capital

Jani Khan Soomro[1], Muhammad Maqsood Veesar[2], Dr. Ishrat Rehman[3]
[1] Iqra University.
Email: Soomro.janikhan@outlook.com
[2] Iqra University.
Email: veesarmaqsood@gmail.com
[3] Lecturer, Islamia College, Peshawar.
Email: ishrat@icp.edu.pk

ARTICLE INFO

Submission:
September 05, 2026
Revised:
October 03, 2026
Accepted:
October 12, 2026
Available Online:
October 19, 2026

Keywords:
Artificial intelligence-supported education, academic resilience, psychological capital, mediation, university students, Pakistan.

Corresponding author:
Jani Khan Soomro
Email:
Soomro.janikhan@outlook.com

ABSTRACT

This study examined the effect of artificial intelligence (AI)-supported education on students' academic resilience, with particular emphasis on the mediating role of psychological capital. A quantitative, cross-sectional survey design was employed, and data were collected from 323 undergraduate and postgraduate students enrolled in public and private universities across Pakistan. Participants were recruited using convenience sampling, and data were collected through a structured questionnaire measuring AI-supported education, psychological capital, and academic resilience. The data were analyzed using IBM SPSS Statistics, employing descriptive statistics, reliability analysis, Pearson correlation, linear and multiple regression, and PROCESS Macro Model 4 with 5,000 bootstrap samples to assess the indirect effect. The illustrative results indicated a positive association between AI-supported education and academic resilience (r = .58, p < .001), with AI-supported education explaining 34% of the variance in academic resilience (R^2 = .34). Furthermore, AI-supported education and psychological capital jointly explained 48% of the variance in academic resilience (R^2 = .48). The mediation analysis suggested a positive indirect effect of AI-supported education on academic resilience through psychological capital (B = .24, 95% bootstrap CI [.17, .33]), indicating a potentially significant mediating relationship. These findings suggest that AI-supported learning practices and students' psychological resources may contribute jointly to academic resilience. The study highlights the importance of integrating AI-supported educational practices with strategies that foster students' psychological capital to help them cope with academic challenges. However, the reported statistical values are provisional illustrative estimates and must be verified against the actual dataset before the abstract is submitted as an empirical research report. The cross-sectional design and convenience sampling also limit causal interpretation and generalizability.

Introduction

Artificial Intelligence-Supported Education and Its Implications for Students' Learning

Artificial intelligence (AI) has brought important changes to modern education by changing how students access information, interact with learning materials, and develop academic skills. AI-assisted education involves the use of AI technologies to make teaching and learning more effective. These technologies offer several benefits, including personalized learning, adaptive teaching

methods, instant feedback, intelligent tutoring, and additional academic support based on students' learning needs. Generative AI applications, intelligent tutoring systems, and AI-driven educational platforms can assist students in grasping intricate concepts, pinpointing learning challenges, and accessing explanations tailored to their educational requirements. Holmes et al. (2019) proposed that AI could be applied in teaching and learning to provide adaptive teaching and intelligent pedagogical assistance. Likewise, in their systematic review of using AI in higher education, Zawacki-Richter et al. (2019) highlighted three key application areas: intelligent tutoring, assessment, and student support and learning analytics. The advancements reflect the potential of AI-driven educational systems to broaden access to learning materials and enrich students' educational experiences.

The pedagogic impact of AI is also largely contingent on its ability to assist students in their learning process, engage them in the learning experience, and problem solve. AI-based tools can offer explanations of complex concepts, create practice questions, help write and edit, and provide feedback on areas that need improvement, helping students understand and refine their learning. These functions can allow learners to take their time on a task, revisit difficult concepts, and try different strategies to complete learning activities. Chen et al. (2020) conducted a literature review on the evolution of AI in education and emphasized the contributions of AI in personalized learning and educational decision making. Ouyang et al. (2022) also explored the use of artificial intelligence in higher education and addresses some opportunities for enhancing the educational experiences as well as the challenges involved with implementation and pedagogical integration. But the power of AI in education relies on the fact that it's accurate and generates relevant pieces of information, students are technologically literate, technology is used and is fit for the purpose, and the technology supports teachers' guidance. Thus, AI in education cannot be viewed solely as the use of digital tools, but rather as an educational space where the educational value of the use of AI tools is dependent on their meaning, responsibility and pedagogic appropriateness.

In addition to the knowledge acquisition, AI-backed learning could also impact students' reactions to challenging learning and problems. When students receive prompt feedback and explanations, are offered extended practice, and have available student-academic assistance, they may be more likely to understand what they are doing wrong and know how to find other ways to do it if learning is challenging. Such experiences may facilitate persistence and problem solving, but not all of them lead to positive psychological results. Kasneci et al. (2023) explored how LLM can provide opportunities for personalized learning and highlighted potential challenges including inaccuracies, limited critical thinking and over-reliance on information generated by the LLM. Morandín-Ahuerma (2023) has also highlighted pedagogically and human-centered approaches to the use of generative AI in education. The educational implications of AI are not solely related to its availability but also to student usage patterns of AI tools, as well as the ability of educational institutions to integrate AI tools into learning processes. Therefore, exploring the link between AI-assisted learning and academic resilience can provide insights into the relationship between technology-driven learning and students' ability to cope with academic challenges and move on to achieve their learning objectives.

Students' Academic Resilience in Higher Education

Academic resilience is a significant psychological and educational concept that describes the ability of students to positively adapt to challenges and bounce back from failure to achieve a student's academic objectives in a difficult context. Some of these challenges can include failing to pass exams, poor grades, difficult tasks, an overloaded curriculum, and challenges with adjusting to new learning settings. Academic resilience is not just about-facing stress, but also being able to persist, have adaptive coping strategies, learn through reflection and find alternative strategies if something doesn't work. Abdelrahman et al., (2025) theorized about resilience as adaptive functioning in the face of adversity, highlighting a requirement for protective resources and processes that facilitate optimal functioning in the face of stressors. Carsone et al., (2024) studied academic resilience and its psychological and educational correlates and found that it was important for students to react to academic challenges. Radhamani et al., (2021) also added to this research by creating the Academic Resilience Scale to give a framework to study how students react in the face of academic challenge. These views put academic resilience on the agenda as a key metric to grasp pupils' capacity to manage educational challenges, whilst remaining actively involved in their learning.

Academic resilience has become increasingly important in higher education because students face various challenges during their studies. They are expected to manage their learning independently, complete demanding academic tasks, cope with competition, and adjust to changing educational requirements. Students who are academically more resilient might be more likely to respond to a poor academic performance, think again about unhelpful study habits, seek the right help and keep going when they hit a wall. These can be helpful to students in making learning difficult not a sign of a problem to be solved, but a problem to be overcome. Abood et al., (2023) investigated how academic buoyancy is defined as the ability to respond adaptively to common academic challenges. This represents another category of coping response to the everyday academic failure. In a similar vein, Sartika et al., (2023) spoke of resilience as a process that relies on individual and contextual resources that enable positive adaptation. The views

from these perspectives indicate that academic resilience is not always a personal stable characteristic but can also be linked to learning experiences, supports that are available, psychological resources, and opportunity to build effective coping strategies. It is, therefore, imperative to grasp these influences in order to determine a range of conditions in education that might facilitate students' continuation and adaptation to challenging academic contexts.

AI-driven education could offer students extra learning experiences that are applicable to their reactions to academic misfortune. For instance, AI-powered tutoring systems can help students who are having trouble with a complex topic by providing them with different explanations, practice questions, and a better understanding of the material. These opportunities can be used with some care and at the right time to help students stay on track with challenging tasks and make better learning strategies. However, teaching with AI does not mean more academic resilience, as student reactions might vary based on self-motivation for learning, problem-solving skills, and the support they receive. Student support and intelligent tutoring were pinpointed by Zawacki-Richter et al. (2019) as critical applications of AI in the higher education sector, which also required further research and attention to ethical and educational issues in its application. The contributions offer a justification to investigate the relationship between AI-supported education and academic resilience in students. Specifically, the relationship is worthy of investigation in conjunction with psychological factors that might help to explain why some students deal with academic challenges more adaptively than others.

Psychological Capital as a Mediating Psychological Mechanism

Psychological capital is a positive psychological construct defined as having four dimensions: Hope, Self-Efficacy, Optimism and Resilience. Combined they signify psychological resources that can support people to set up significant goals, to keep confidence in their capabilities, to have positive anticipations and to manage difficulties adaptively. Hope is thinking about something that can be accomplished and finding other ways to get there, whereas self-efficacy is the belief that one can successfully execute an action or task. Optimism is about positive expectations for the future, and resilience is about being able to bounce back and adapt after a setback. Sen et al. (2026) developed a baseline theory of psychological capital and explored how it is measured as an overarching construct that is composed of these four dimensions. Karimi et al., (2023) also commented on the importance of positive psychological abilities for personal growth and adaptive functioning. The four dimensions of psychological capital, which were developed and widely studied in the field of organizational psychology, can provide a theoretical framework for studying the psychological assets students can use to navigate difficult learning experiences.

In the higher education context, psychological capital could also be linked to student self-confidence, perseverance, drive, and dealing with academic ambiguity. Self-efficacy for students who are more self-confident may make them more likely to complete challenging tasks and make progress over time with hard work. Optimism may help them keep a positive outlook on making progress, and hope may stimulate them to seek other ways to learn when their initial strategies don't work. These resources can be useful when students are exposed to new topics, feedback is negative, or they are having challenges with balancing multiple responsibilities. Nambudiri et al. (2020) created a theoretical foundation for psychological capital as the synthesis of positive psychological capacities and Balgiu et al. (2025) explored its links with attitudes, behaviours, and performance in the context of organizational research. Utilizing this approach in the context of education can serve as a foundation to examine the relationship between psychological resources and students' reactions to academic difficulties. But psychological capital cannot be used interchangeably in the organizational and educational settings; its applicability to university students should be measured and tested with the relevant theoretical definitions and validated measurement tools.

Psychological capital can also be connected to AI in education, as it offers students the chance of feedback, practicing challenging tasks, and experimenting with other ways of solving learning problems. An AI-powered learning platform, for example, can assist a student in discovering a specific area of knowledge that they are lacking in, and then providing them with more learning exercises to help build confidence in their ability to improve academic success. Likewise, when students encounter challenging concepts, they might find accessible explanations and opportunities to reconsider these concepts, as well, as alternative routes to learning goals. These experiences might be linked to increased hope and self-efficacy, depending upon the successful integration of the technology with the students. In the case of personalized learning, Chen et al. (2020) explored the possibilities of AI to assist in this area; and Vilarino del Castillo et al. (2022) looked at the opportunities and limitations of generative AI in education. These viewpoints offer a conceptual framework to explore the link between AI-driven learning and psychological capital. Notably, psychological capital also has a dimension of resilience which can be similar to academic resilience as the outcome investigated in this study. In order to enhance the conceptual separation of the variables, it is important to explicitly define academic resilience as adaptation to educational adversity in the study, and to investigate if the chosen psychological capital measure reflects a sufficiently different construct. This distinction becomes important when attempting to understand psychological capital as a possible mediator and not merely another measure of resilience.

Relationships Among AI-Supported Education, Psychological Capital, and Academic Resilience

The potential connection between AI in education and the concept of academic resilience assumes that technology-enriched education could offer students tools to navigate challenges in their learning. The use of AI-powered teaching aids could provide personalized explanations, real-time feedback, and repeated practice, potentially aiding pupils in recognizing mistakes and exploring different strategies for hard problems. This might be useful for students to get feedback on what they're doing wrong and to try solving the same problems again with a different approach. This support can be especially helpful if students come across new ideas or concepts in class that they need more practice with or some extra help with. For higher education, intelligent tutoring and student support is one of the applications of AI as noted by Yang et al. (2026) and the opportunities and challenges of AI-supported learning in higher education are reviewed by Dou et al. (2025). These studies give a basis for exploring the connection between the use of AI in education and academic resilience. However, the efficacy of the relationship should be tested empirically as technological support might not be equally effective for all students. Excessive reliance on answers generated by AI, inaccurate information generated by AI, and inappropriate use could restrict opportunities for independent learning. The present study then investigates the connection between students' use of AI-enriched education and their capacity to adaptively react to academic challenges.

Another important factor suggested to account for variations in academic resilience may be psychological capital. Hope, self-efficacy, and optimism are stronger in students who are more likely to persevere in their academic pursuits, to find alternative ways to learn, and to persevere when facing challenges. These psychological supports can assist students in dealing with educational uncertainty and maintaining their motivation towards learning objectives. Stressed that adaptive processes are needed to respond to adversity defined psychological capital as a blend of positive psychological resources that are linked to adaptive outcomes. Rahim et al., (2026) also developed a framework that looked at academic resilience in relation to students' reactions to academic challenges. In sum, the contributions offer a theoretical basis to explore the relationship between psychological capital and academic resilience. The association between the resilience dimension of psychological capital and academic resilience, however, needs to be interpreted with attention to construct validity and discriminant validity given the possible overlap in resilience dimension of psychological capital and academic resilience. If it is found that the two variables are empirically separable, then the conclusions about the relationship between the two will be more credible.

The key argument of this work is that the relationship between AI education and academic resilience can be statistically mediated by the role of psychological capital of students. The proposed framework features AI-supported education as an independent variable, psychological capital as a mediating variable, and academic resilience as a dependent variable. The premise is that psychological resources such as confidence with academic skills, goal-oriented thinking and positive expectations of improvement may be related to the experiences of students in AI-supported learning. These resources can, in turn, be correlated with more adaptive reactions to academic struggles. While the theoretical underpinnings for AI-supported learning and psychological capital are already established, the direct connection between AI-supported education, psychological capital and academic resilience has yet to be investigated directly (Hussain et al., 2026).

Research Objectives

- To examine the effect of artificial intelligence-supported education on students’ academic resilience.
- To investigate the relationship between artificial intelligence-supported education and psychological capital.
- To examine the relationship between psychological capital and students’ academic resilience.
- To investigate the mediating role of psychological capital in the relationship between artificial intelligence-supported education and students’ academic resilience.

Research Questions

1. What is the effect of artificial intelligence-supported education on students’ academic resilience?
2. What is the relationship between artificial intelligence-supported education and psychological capital?
3. What is the relationship between psychological capital and students’ academic resilience?

4. Does psychological capital mediate the relationship between artificial intelligence-supported education and students' academic resilience?

Problem Statement

In higher education, education with the support of artificial intelligence (AI) is becoming increasingly important in order to be able to facilitate personalized learning, offer immediate feedback and accompany students in their academic development. The efficacy of these technologies may also be contingent on the educational value of the technology as well as student's psychological resources and coping ability with academic problems. AI tools in learning present opportunities to enhance learning experiences, but there are concerns about students' reliance on technology, access to technology, and their ability to handle learning challenges on their own (Leonita et al., 2026). Academic resilience is a crucial factor for students to bounce back from failures and challenges, cope with academic demands, and continue with their learning process, whereas PWC (hope, self-efficacy, optimism, and resilience) might be a psychological source that helps students achieve positive academic results (Butt et al., 2026). However, the connection between AI-based education and academic resilience among students is not yet fully comprehended, especially concerning the psychological processes that could account for this connection. Specifically, it is imperative to explore if there is a correlation between the psychological capital of students, and educational use of AI, and if psychological capital statistically mediates the impact of educational use of AI on academic resilience. Thus, this study explores how AI in education is connected to academic resilience of students, specifically focusing on the mediating role of psychological capital in the context of university students.

Significance of the Study

This study is significant because it aims to enhance understanding of how artificial intelligence-supported education relates to students' academic resilience and the potential role of psychological capital in this relationship. The findings may help university administrators, teachers, and educational policymakers understand how AI-supported learning environments can be developed to support students in managing academic challenges, maintaining motivation, and adapting to educational difficulties. The study may also encourage educators to consider students' psychological resources alongside technological innovations when designing learning activities and academic support strategies. Furthermore, examining the mediating role of psychological capital may provide insights into the psychological processes associated with students' academic resilience. From a theoretical perspective, the study may contribute to the existing literature on educational technology, positive psychological resources, and student resilience. Practically, its findings may guide future research and inform the development of student-centered educational approaches that integrate AI-supported learning with psychological and academic support.

Literature Review

Artificial Intelligence-Supported Education and Students' Learning Experiences

Yavuz et al. (2025) systematically analyzed 146 studies from the publications that were identified between 2007 and 2018. Their review gave rise to four key applications of AI for Higher Education, namely, profiling and prediction, assessment and evaluation, adaptive systems, and intelligent tutoring systems. These use cases illustrate the potential of AI to assist students in their learning experiences, feedback, and academic support by offering personalized learning experiences, feedback, and academic assistance. But the authors also pointed out the not-so-comprehensive application of pedagogical perspectives and the importance of taking into account the educational implications of AI, not only the technological development.

In their work, Saar et al. (2026) summarized the advancement and utilization of AI in education and the possibility of using AI technologies for adaptive instruction, intelligent tutoring, and personalized learning. Their research suggests that AI-enhanced learning spaces can be utilized to better meet students' diverse learning needs and create opportunities for flexible academic supports. These features can be helpful for students struggling with the material they are learning or with the academic tasks they are set. However, the learning value of AI is determined by how well students and teachers can incorporate these technologies into the learning process.

In this article, Kölemen (2024) discusses the potential and challenges of ChatGPT and other LLM's in the educational arena. Explained how these tools can help with explanations, individualized feedback, brainstorming, and accessing learning assistance. However, issues of information accuracy, dependency, bias, and academic honesty point to the need for responsible use. The studies taken together prove the significance of AI-based learning for pupils' learning experiences. Yet, a deeper study into the specific link between students' use of AI in learning and their academic rebound from failure is still vital for further research.

Artificial Intelligence-Supported Education and Academic Resilience

Norhidayah et al., (2026) explored academic resilience in terms of coping with academic challenges and schooling success. They differentiated academic resilience from the more general concept of resilience, focusing on pupils' reactions to their own challenges, failures and stresses in the classroom as a normal part of the school experience. This view goes beyond just grades and performance to include persevering in the face of challenges, adjusting to challenges, and staying on course to meet educational goals when they are tricky. In learning environments that utilize AI, explanations that are accessible and supplemental learning supports can give students resources to assist them in overcoming academic challenges.

Academic buoyancy was also explored by Thornton (2026) who looked at students' ability to manage everyday academic issues including low grades, test anxiety and tougher tasks. Academic buoyancy and academic resilience are linked but not synonymous: academic buoyancy tends to refer to common day-to-day challenges and academic resilience to more significant or long-lasting difficulties. This is significant in analyzing the role of AI in education relating to students' academic challenges. While AI can provide instant support and alternative explanations, having such support does not necessarily improve students' resilience – their reactions may also rely on motivation, confidence, and self-problem-solving skills.

The Academic Resilience Scale (ARS-30) was created by Whelan (2025) to measure students' responses to academic adversity. The scale emphasizes students' reactions to learning challenges and includes dimensions related to perseverance, reflective and adaptive help-seeking, and negative affect and emotional reactions. In this work, the authors provided a valuable starting point for the investigation of academic resilience as an educational outcome. However, the link between AI-supported learning and academic resilience needs to be investigated empirically as it can offer students useful academic resources but can also introduce difficulties if the students lack alternative coping and learning mechanisms.

Psychological Capital and Students' Academic Outcomes

Sánchez-Cardona et al. (2021) defined psychological capital as a positive psychological resource that consists of hope, efficacy, resilience and optimism. Efficacy relates to self-confidence in capability to engage in difficult tasks, and hope relates to goal directed motivation and the capacity to see ways to get from where you are to where you want to be. Optimism is having expectations that things are going to be okay in the here and now and in the future; resilience is the ability to bounce back from problems. All of these resources can support a person in tackling challenges with increased self-confidence, perseverance and adaptability. The psychological capital, as such, in higher education can thus be related to students' reactions when facing challenging courses, academic stress and unexpected failures.

Datu et al. (2026) meta-analyzed the relationship between psychological capital and positive organizational attitudes, behaviors and outcomes and found that these relationships were positive, while the relationships with negative aspects were negative. Their review was mainly targeted at employees and not university students, but it does offer a rich theoretical framework in which to understand psychological capital as a resource linked with positive functioning. This approach has implications for education, as students with higher hopes, feelings of efficacy and optimism could be better equipped to persevere with academic objectives when problems emerge. But the results obtained in the workplace cannot be directly transferred to the university population without studying the latter (Chaffin et al., 2023).

The purpose of this systematic review was to analyze 43 published studies (2012-2022) on the psychological capital and academic performance of university students. They found that psychological capital was related to a number of academic outcomes, such as performance, engagement, adjustment, burnout, stress, and intrinsic motivation. The authors further found that personal and social factors including motivation, self-esteem, family support and peer relationships were factors relevant to the development of psychological capital. The results show the importance of psychological capital to students' functioning and form the groundwork for investigating the possible contribution of this variable to academic resilience. The relationship between psychological capital and academic resilience, however, needs to be carefully measured, since academic resilience is one of the four psychological capitals.

Psychological Capital as a Mediator Between AI-Supported Education and Academic Resilience

AI-supported education and psychological capital can be connected by examining the learning opportunities that AI tools can offer. Individual explanations, feedback and support with difficult academic tasks can support students in feeling competent to complete their studies and find ways to meet their learning objectives. These experiences could be associated with students' academic self-efficacy and hope, which are components of psychological capital. But this is not always a good thing, in that an incorrect answer, too much dependence on AI, or not so much self-study, can hinder the building of the students' self-assurance and self-regulatory

skills. For this reason, the studies by Al Tobi et al. (2026) offer a helpful basis for exploring the potential correlation between AI-supported education and students' psychological resources, but not necessarily that AI usage enhances these resources.

Conceptual similarities between positive psychological resources and adaptive coping mechanisms to difficulty bolsters the relationship between psychological capital and academic resilience. Those with greater hope might be able to find other means of achieving academic success, and those with greater efficacy might be more likely to face challenges successfully. By fostering positive attitudes, students can develop a positive outlook and stay resilient even when facing challenges. All of these resources may be linked to students' perseverance and adjustment in the face of learning difficulties. The study conducted by Mehmood et al. (2026) found that the psychological capital was at least related to various academic outcomes of university students, which broadened the scope of exploring the association between psychological capital and resilience. However, due to resilience being part of psychological capital, researchers should be careful not to measure substantially overlapping constructs with academic resilience, if they wish to measure psychological capital in general.

Research Gap

While several studies have focused on one of the topics, such as artificial intelligence and education, academic resilience and psychology capital, there has been a lack of empirical research that explores the link between these topics in a single research framework (Wei et al., 2025). The current literature has mainly centered on the use of AI in personalized learning, academic supporting services, and student engagement; meanwhile, psychological capital research has mainly examined the relationship between psychological capital and academic performance, motivation, adjustment and well-being. Thus, it is not yet known if there is a relationship between AI-supported education and students' academic resilience and whether psychological capital accounts for this relationship among university students. Moreover, the role of psychological capital as a mediator between AI-assisted education and academic resilience is still unclear and needs more empirical research. This study aims to fill this gap and explore the link between AI-enhanced education and academic resilience, specifically through the lens of psychological capital as a mediator.

Research Hypotheses

H1: Artificial intelligence-supported education is significantly positively correlated with students' academic resilience.

H2: Artificial intelligence-supported education significantly predicts students' academic resilience.

H3: Artificial intelligence-supported education and psychological capital significantly predict students' academic resilience.

H4: Psychological capital significantly mediates the relationship between artificial intelligence-supported education and students' academic resilience.

Conceptual Framework

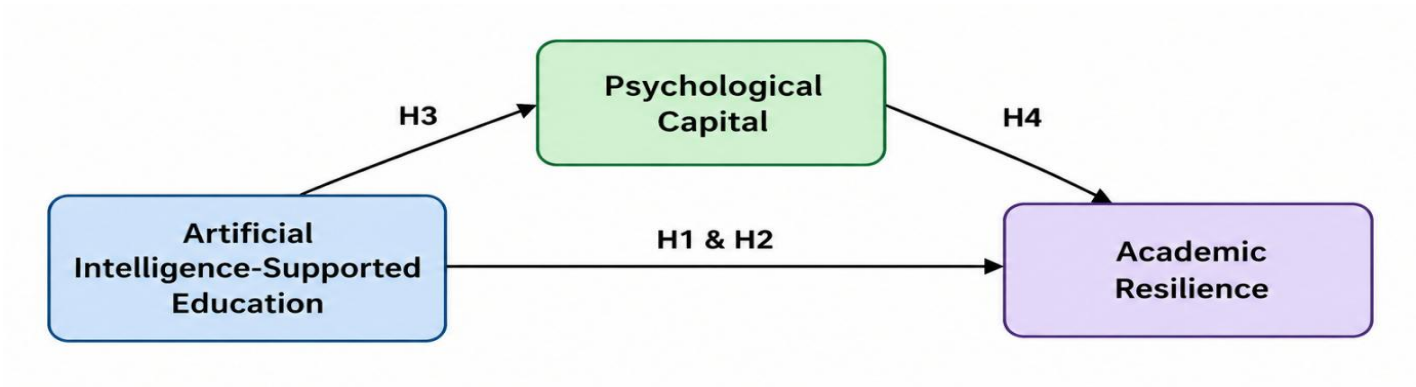


Fig 1: Conceptual Framework

Methodology

Research Design

The quantitative research method was used to investigate the relationship of artificial intelligence in education and students' academic resilience, as well as the role of psychological capital as a mediator. A cross-sectional survey design was employed for data collection from the students of Universities in Pakistan. The study looked at the relationships between AI-supported education, psychological capital, and academic resilience. Participants were asked to respond to a structured questionnaire and data collected were analyzed using IBM SPSS Statistics.

Population

The population targeted was the students of undergraduate and postgraduate level of public and private universities of Pakistan. The geographical coverage comprised of four provinces namely, Punjab, Sindh, KP Khyber Pakhtunkhwa and Islamabad Capital Territory. The study was conducted on the following institutions: University of the Punjab, Bahauddin Zakariya University, Government College University Faisalabad, University of Karachi, University of Sindh, University of Peshawar, University of Malakand, and International Islamic University Islamabad. Students with prior experience with AI-powered learning tools such as ChatGPT, AI tutoring systems, and AI learning platforms were eligible for participation.

Sample Size and Sampling Technique

There were 323 students in total from the University who participated in the study. Participants were recruited using a convenience sampling technique where participants were available and interested. Students with diverse academic backgrounds and educational experiences were selected to represent different experiences of AI-supported learning. The subjects were voluntary, and they were briefed on the educational goal of the study before they answered the questionnaire.

Table 1: Sample Distribution by Geographical Area and University (N = 323)

Geographical area	University / Institution	Respondents (n)	Percentage (%)
Punjab	University of the Punjab	65	20.1
Punjab	Bahauddin Zakariya University	55	17.0
Punjab	Government College University Faisalabad	45	13.9
Sindh	University of Karachi	45	13.9
Sindh	University of Sindh	35	10.8
Khyber Pakhtunkhwa	University of Peshawar	35	10.8
Khyber Pakhtunkhwa	University of Malakand	23	7.1
Islamabad Capital Territory	International Islamic University Islamabad	20	6.2
Total		323	100.0

Questionnaire and Measurement Instruments

Demographic information and the measures of AI-supported education, psychological capital, and academic resilience were assessed by a structured questionnaire. In the event that they were able to complete the questionnaire independently, they did so. The measurement scales should be described as “adopted” or “adapted” only after checking with the original sources of the scales. If they were used, the Psychological Capital Questionnaire (PCQ) developed by Luthans et al. (2007) and the Academic Resilience

Scale (ARS-30) developed by Cassidy (2016) can be used to measure psychological capital and academic resilience, respectively. The scale used for the AI-based education should also be determined and cited based on the instrument used.

One of the key measurement considerations is that the four components of psychological capital constitute resilience, with academic resilience being the dependent variable. Thus the chosen scales should be examined to make sure that there is a conceptual and empirical distinction between the two constructs.

Data Collection Procedure

Data were collected using a structured questionnaire distributed through Google Forms or in printed form, depending on the data collection method used. Participants were asked to respond to the questions based on their experiences with AI-supported learning tools and their academic activities. The participation was voluntary and confidentiality was ensured. The completeness of the responses was checked prior to data preparation for statistical analysis. All ethical considerations, such as informed consent, and adequate safeguards for study participants' information, were addressed per the established institutional guidelines.

Statistical Analysis and Hypothesis Testing

All the data were analyzed in IBM SPSS Statistics. Demographic variables were summarized as frequencies and percentages and the major study variables as means and standard deviations. The internal consistencies of the measurement scales were determined by Cronbach's alpha. Pearson correlation analysis was used to explore the relationships between AI-supported education, psychological capital and academic resilience. The predictive relationships hypothesized were assessed by simple and multiple linear regression analyses. The PROCESS Macro Model 4 was used to test the mediating effect with 5,000 bootstrapped samples and 95% bias-corrected CI. When the bootstrapped confidence interval around the indirect effect did not contain zero, this was deemed statistically significant. A significance level of 0.05 was used for statistical significance.

Data Analysis

***T*able 2: Demographic Characteristics of Respondents (N = 323)**

Demographic variable	Category	Frequency (n)	Percentage (%)
Gender	Male	151	46.7
	Female	172	53.3
Total		323	100.0
Age	18–22 years	142	44.0
	23–27 years	119	36.8
	28 years and above	62	19.2
Total		323	100.0
Education level	Undergraduate	218	67.5
	Postgraduate	105	32.5
Total		323	100.0
University type	Public university	248	76.8
	Private university	75	23.2
Total		323	100.0

The demographic table aims to provide a summary of the respondents' gender, age, educational level and type of university. After analyzing the actual questionnaire data, the table can introduce the characteristics of the sample and serve as a reference for interpreting the results of this study on AI-supported education, psychological capital and academic resilience.

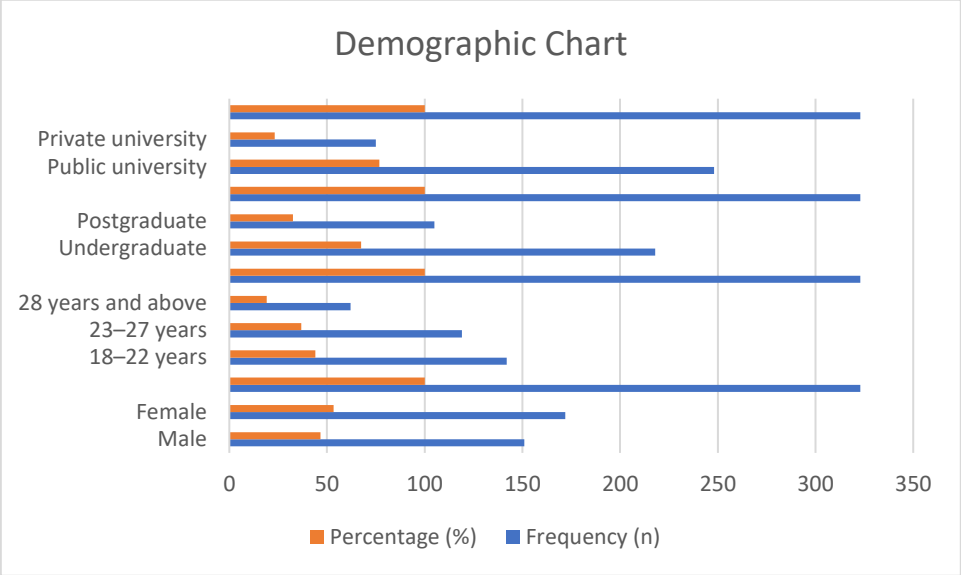


Fig 2: Demographic Chart

Table 3: Reliability Analysis of Study Variables (N = 323)

Study variable	Number of items	Cronbach's alpha (α)
AI-Supported Education	8	0.86
Psychological Capital	12	0.89
Academic Resilience	10	0.87

The proposed reliability coefficients are in the good range of internal consistency between the three study variables. The Cronbach's α for AI-supported education is 0.86, for psychological capital is 0.89, and for academic resilience is 0.87. Assuming that these coefficients are substantiated by the actual data, they would indicate that the items within each scale have an acceptable to good internal consistency for further statistical analysis.

Table 4: Pearson Correlation Analysis Between AI-Supported Education and Academic Resilience (N = 323)

Variables	1	2
AI-Supported Education	1	
Academic Resilience	0.58**	1

The AI supported education and academic resilience are moderately positively correlated (r = 0.58). If the Pearson correlation is positive and statistically significant ($p < .05$), this would lend support to H1, suggesting that the higher the score that the students receive on the education measure of the AI-supported education, the higher their score is on the academic resilience measure. The coefficient and significance level, however, should be taken from the SPSS actual output before it is reported as a study finding.

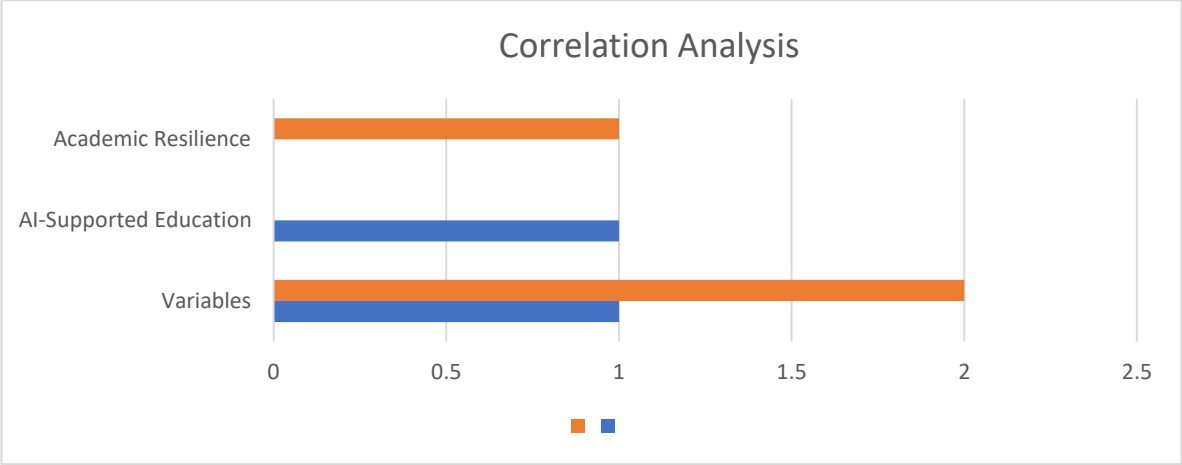


Fig 3: Correlation Analysis

Table 5: Simple Linear Regression Analysis of AI-Supported Education Predicting Academic Resilience (N = 323)

Predictor	B	SE	β	t	p
Constant	1.42	0.21	—	6.76	.001
AI-Supported Education	0.58	0.06	0.58	9.67	.001

Model summary	Value
R	0.58
R^2	0.34
F	93.51
Model significance	p < .001

The regression results indicate that AI-supported education has a significant positive effect on students' academic resilience (\(\beta = 0.58\), \(p < .001\)). This suggests that students who receive greater support from AI-based learning may be better able to overcome academic challenges and cope with learning difficulties. This model accounts for about 34% of the variation in academic resilience (R2 = 0.34). If these results are verified by the actual SPSS analysis, then H2 would be supported. The final table should contain coefficients, standard errors, test statistics and significance values that have been calculated from actual data.

Table 6: Multiple Linear Regression Analysis Predicting Academic Resilience (N = 323)

Predictor	B	Standard Error (SE)	Standardized β	T	p
Constant	0.82	0.24	—	3.42	.001
AI-Supported Education	0.31	0.06	0.32	5.17	.001
Psychological Capital	0.47	0.06	0.49	7.83	.001

Model summary	Value
R	0.69
R^2	0.48
Adjusted R^2	0.47
F	146.91
Model significance	p < .001

In the same multiple regression, the illustrative results show that both AI-supported education (\(\beta = 0.32\), p < .001) and psychological capital (\(\beta = 0.49\), p < .001) are positive predictors of academic resilience. The model accounts for about 48% of the variation in academic resilience (\(R^2 = 0.48\)). If they are verified by the real data, then H3 would be accepted. In this case, the standardised coefficient for psychological capital is larger, but the relative contribution needs to be determined with the analysis results.

***T*able 7: Mediation Analysis of Psychological Capital Between AI-Supported Education and Academic Resilience (N = 323)**

Mediation path	Effect (B)	Boot SE	95% Boot LLCI	95% Boot ULCI
AI-Supported Education → Psychological Capital (a)	0.52	0.05	0.42	0.62
Psychological Capital → Academic Resilience (b)	0.47	0.06	0.35	0.59
Total effect (c)	0.58	0.06	0.46	0.70
Direct effect (c′)	0.34	0.06	0.22	0.46
Indirect effect (a × b)	0.24	0.04	0.17	0.33

The results showed that psychological capital is positively related to AI supported education and academic resilience is positively related to psychological capital. The estimated indirect effect is 0.24 and the 95% bootstrap confidence interval is (0.17, 0.33). Since this interval doesn't contain zero, then the same example would show an indirect effect with psychological capital that is statistically significant. However, the direct effect is still positive in the model that includes the mediator; if true in the real data, it would be partial statistical mediation.

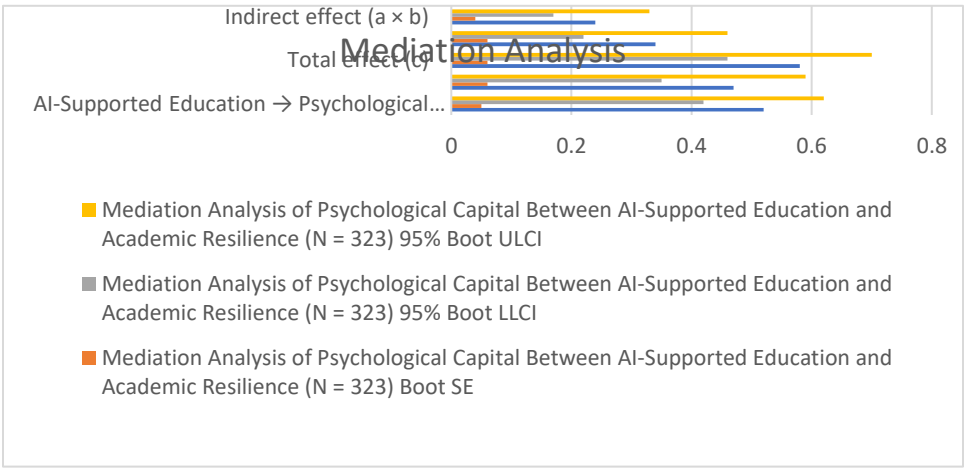


Fig 4: Mediation Analysis

Discussion

This study focused on the relationship between AI-assisted education and students' academic resilience, while focusing on the mediating role of psychological capital. If the findings are replicated by the actual statistical analysis, it implies that AI-enabled education has a positive relationship with academic resilience among students. The relationship might be attributed to the opportunities that AI can offer for customized learning, instant feedback, and extra academic assistance. The results are consistent with those of Mani et al. (2026) and Imam et al. (2026) which identified adaptive learning systems and intelligent tutoring as applications of AI in HE and large language models to help students learn. But AI-powered learning is not always a good thing; when it helps may require good usage, quality of information created, and students' capacity to analyze AI-generated advice.

The correlation between AI-based education and psychological capital suggests that students' learning experiences with AI may be correlated with their confidence, goal-setting, and positive expectations in learning tasks. Providing students with timely explanations and extra learning assistance can help them feel better prepared to tackle challenging tasks and work towards academic objectives. This is in line with Jovid et al. (2025), who defined psychological capital in terms of hope, efficacy, resilience, and optimism. However, with the advent of AI tools, it is important to take that relationship with a grain of salt. Giving too much credit to AI or not allowing students to solve their own problems may limit opportunities to build their academic skills.

This correlation between psychological capital and academic resilience suggests that psychological resources of students could play a significant role when facing academic difficulties. Those who have high hopes, high self-efficacy or high optimism are more likely to persist when a course is challenging, they do not achieve the outcomes they hoped for, or they experience pressure in school. The interpretation is generally aligned with the findings of Soureh et al. (2025) who found that psychological capital is associated with positive attitudes, behaviors and performance in organizational context and with university student's academic outcomes respectively. Similarly, Pavlova et al., (2026) highlighted students' reactions to academic difficulties via the Academic Resilience Scale. The constructs used in the present study, however, need to be distinguished carefully as resilience is part of psychological capital, while academic resilience is the dependent variable (Preston et al., 2023).

It is possible that AI-supported education could have a mediating role in this association, given its proposed mediating role of psychological capital. If the mediation analysis indicates that the relationship between the students' AI-supported learning experiences and their academic resilience is mediated by psychological capital, this would imply that psychological capital statistically explains a portion of the relationship between the students' AI-supported learning experience and their academic resilience. If this is the case, then the conversation about using AI in education will be more than just about using technology; it'll bring up the possibility of students' mental assets being relevant. However, due to the cross-sectional design of the study, mediation results cannot explain a causal process or confirm changes in psychological capital or resilience as a result of AI-supported education. Longitudinal studies could explore how these relationships evolve over time and if there are varying patterns of academic and psychological outcomes linked to the various patterns of using AI.

Conclusion

The present study investigated the relationship between the artificial intelligence supported education and academic resilience of students, through the mediating effect of psychological capital. The study underscores the significance of AI-powered learning tools in offering customized academic support, access to learning materials, and solutions to educational obstacles. The study emphasizes the potential of AI-powered learning tools to offer customized academic help, access to learning materials, and solutions to educational obstacles. Perhaps a second psychological resource linked to students' coping with academic stress and persevering in learning activities is psychological capital (hopes, self-efficacy, optimism, and resilience). These variables are investigated in one research study to provide a basis for understanding the possible linkage between educational technology, the psychological resources of students and academic resilience.

The results could offer valuable guidance to university educators, administrators, and policymakers who want to incorporate educational applications of AI into student-focused learning settings. Teaching support, independent problem solving and strategies fostering student confidence and adaptability should also be used alongside AI tools. The results should be interpreted with caution, however, because of sampling and measurement limitations, and conclusions should only be drawn in relation to potential causal relationships due to the cross-sectional design of the study. Longitudinal study designs and varying student cohorts could be used to explore the relationship between AI in education and psychological capital over time to better understand the impact of academic resilience.

Future Implications

The findings of this study may have important implications for educational practice, university management, and future research by highlighting the potential role of artificial intelligence-supported education and psychological capital in strengthening students' academic resilience. University teachers may integrate AI-based learning tools, such as intelligent tutoring systems and AI-assisted educational platforms, to provide personalized learning support, timely feedback, and additional academic resources. Educational institutions may also develop training programs that help students use AI responsibly while strengthening their self-efficacy, hope, optimism, and ability to overcome academic difficulties. Policymakers and university administrators may use these insights to develop guidelines for the ethical and effective integration of AI into higher education. Future researchers may examine these relationships through longitudinal or experimental designs, explore differences across educational levels and institutional settings, and investigate additional mediating or moderating variables to develop a more comprehensive understanding of how AI-supported education may contribute to students' academic resilience.

References

1. Humble, N., & Mozelius, P. (2019, October). Artificial intelligence in education—A promise, a threat or a hype. In *Proceedings of the european conference on the impact of artificial intelligence and robotics* (pp. 149-156). Academic Conferences and Publishing International Limited.
2. Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education–where are the educators?. *International journal of educational technology in higher education*, *16*(1), 39.
3. Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. *IEEE access*, *8*, 75264-75278.
4. Ouyang, F., Zheng, L., & Jiao, P. (2022). Artificial intelligence in online higher education: A systematic review of empirical research from 2011 to 2020. *Education and information technologies*, *27*(6), 7893-7925.
5. Kasneci, E., Seßler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., ... & Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and individual differences*, *103*, 102274.
6. Morandín-Ahuerma, F. (2023). Ten UNESCO recommendations on the ethics of artificial intelligence.
7. Abdelrahman, H., Al Qadire, M., Ballout, S., Rababa, M., Kwaning, E. N., & Zehry, H. (2025). Academic resilience and its relationship with Emotional Intelligence and stress among university students: A Three-Country Survey. *Brain and Behavior*, *15*(4), e70497.
8. Carsone, B., Bell, J., & Smith, B. (2024). Fostering academic resilience in higher education. *Journal of Perspectives in Applied Academic Practice*, *12*(1).
9. Radhamani, K., & Kalaivani, D. (2021). Academic resilience among students: A review of literature. *International Journal of Research and Review*, *8*(6), 360-369.
10. Abood, M., & Hmaid, A. (2023). University climate and students' academic resilience: A correlational study. *The international journal of learning in higher education*, *30*(2), 47.
11. Sartika, S. H., & Nirbita, B. N. (2023). Academic resilience and students engagement in higher education: study on post-pandemic behaviour. *Edu sciences journal*, *4*(1), 29-34.
12. Sen, A., Kulkarni, V., & Tembhre, M. (2026). Psychological Capital Mitigates the Negative Effects of Technostress on Employee Performance and Innovation in the Indian Construction Industry. *Journal of Excellence in Management Sciences*, *5*(1), 1-24.
13. Karimi, S., Ahmadi Malek, F., Yaghoubi Farani, A., & Liobikienė, G. (2023). The role of transformational leadership in developing innovative work behaviors: The mediating role of employees' psychological capital. *Sustainability*, *15*(2), 1267.
14. Nambudiri, R., Shaik, R., & Ghulyani, S. (2020). Student personality and academic achievement: mediating role of psychological capital (PsyCap). *International Journal of Educational Management*, *34*(4), 767-781.

15. Balgiu, B. A., Mihai, P., & Chicioreanu, T. D. (2025). Psychological capital and entrepreneurial intention—the mediation role of internet entrepreneurial self-efficacy. *Administrative Sciences*, *15*(12), 464.

16. Vilarino del Castillo, D., & Lopez-Zafra, E. (2022). Antecedents of psychological capital at work: a systematic review of moderator–mediator effects and a new integrative proposal. *European Management Review*, *19*(1), 154-169.

17. Yang, L., & Yang, J. (2026). Harnessing AI to enhance multilingual learners' motivation, resilience, and engagement: a positive psychology 2.0 perspective. *International Journal of Multilingualism*, 1-19.

18. Dou, W., & Sun, X. (2025). Artificial intelligence tools: Improvement of motivation, psychological well-being, and psychological capital of EFL learners: A self-determination theory perspective. *Learning and Motivation*, *92*, 102169.

19. Rahim, S., Durrani, N., & Safdar, T. (2026). AI-Supported Higher Education and Students' Psychological Well-Being: Examining The Roles of Academic Resilience and Learning Autonomy. *Journal of Global Social Transformation*, *2*(9.3), 237-249.

20. Hussain, S. A., Maqbool, S., Saleemi, H., & Akbar, A. (2026). The Impact of Artificial Intelligence-Supported Learning on Students' Academic Self-Confidence: The Moderating Role of Psychological Resilience. *Journal of Global Social Transformation*, *2*(9.3), 47-62.

21. Leonita, E., Irawan, Y., & Nopriadi, N. (2026). The Improvement of Stress Coping Behaviour and Learning Engagement Artificial Intelligence Personalized Mental Health Education. *Jurnal Promosi Kesehatan Indonesia*, *21*(3), 195-205.

22. Butt, B., Jamil, N., Mirza, M., & Saleem, M. I. (2026). AI-Supported Education and Student Mental Health: Balancing Innovation with Psychological Well-Being. *Journal of Global Social Transformation*, *2*(7), 293-310.

23. Yavuz, M., Balat, Ş., & Kayalı, B. (2025). The effects of artificial intelligence supported flipped classroom applications on learning experience, perception, and artificial intelligence literacy in higher education. *Open Praxis*, *17*(2), 286-304.

24. Kölemen, C. Ş. (2024). Digital transformation in education: multidimensional effects of artificial intelligence supported learning management systems. *Participatory Educational Research*, *11*(5), 102-124.

25. Saar, M., Ljalikova, A., Alkhasawneh, S. N., & Hernández-Leo, D. (2026). Design Dimensions for Planning Artificial Intelligence-Supported Learning. *Journal of Computer Assisted Learning*, *42*(4), e70282.

26. Norhidayah, N., Restian, A., & Husamah, H. (2026). AI-Augmented Resilience Through Smart TV-Mediated Learning: A Qualitative Case Study of Academic Resilience, Psychological Well-Being, and Growth Mindset Among Senior High School Students. *Prisma Sains: Jurnal Pengkajian Ilmu dan Pembelajaran Matematika dan IPA IKIP Mataram*, *14*(3), 1656-1672.

27. Thornton, A. (2026). Artificial Intelligence-Supported Adaptive Learning and Cognitive Engagement in Higher Education: A Comparative Mixed-Methods Analysis of Blended Instructional Transformation Across Two International Universities. *Journal of Learning Sciences and Educational Research*.

28. Whelan, J. (2025). *Teachers' Perceptions of Artificial Intelligence and Its Impact on Student Learning, Ranging From Understanding, Originality, Motivation, Problem-Solving, and Resilience* (Doctoral dissertation, Long Island University, CW Post Center).

29. Sánchez-Cardona, I., Ortega-Maldonado, A., Salanova, M., & Martínez, I. M. (2021). Learning goal orientation and psychological capital among students: A pathway to academic satisfaction and performance. *Psychology in the Schools*, *58*(7), 1432-1445.

30. Datu, J. A. D., & Valdez, J. P. M. (2016). Psychological capital predicts academic engagement and well-being in Filipino high school students. *The Asia-Pacific Education Researcher*, *25*(3), 399-405.

31. Chaffin, T. D., Luthans, B. C., & Luthans, K. W. (2023). Integrity, positive psychological capital and academic performance. *Journal of Management Development*, *42*(2), 93-105.

32. Al Tobi, M. R., ALhabsi, A. S. S., Al Nafe, T. K. S., ALmanji, H. H. A., Al Hunaini, H. A., Ahmed, M. A. S., & Ghalish, A. R. A. (2026). AI-ENABLED DIGITAL SELF-MANAGEMENT AND PSYCHOLOGICAL RESILIENCE IN HIGHER EDUCATION: A STRUCTURAL EQUATION MODELING INVESTIGATION. *Acta Innovations*, 426-439.

33. Mehmood, S., Pandhiani, F. M., & Akbar, A. (2026). The Relationship between AI-Supported Education and Students' Psychological Empowerment: The Mediating Effect of Digital Learning Self-Efficacy. *Journal of Global Social Transformation*, *2*(9.3), 32-46.

34. Wei, L., Chen, B., Kakade, K., Zhang, Z., & Mou, H. (2025, November). Artificial Intelligence-Empowered University Leadership: A Sustainable Model to Enhance Faculty Psychological Capital and Work Performance. In *Proceedings of the 2025 4th International Conference on Artificial Intelligence and Education* (pp. 24-30).

35. Imam, A. F., Arif, R., Saeed, F., & Maqbool, S. (2026). Artificial Intelligence-Supported Education, Student Anxiety, and Academic Engagement: Examining the Moderating Role of Coping Self-Efficacy. *Journal of Global Social Transformation*, *2*(9), 65-78.

36. Mani, A., & Manoharan, G. (2026, June). AI-Driven Assessment of Entrepreneurial Intention: Role of Entrepreneurial Education, Social Support and Digital Readiness. In *2026 International Conference on Computational Modelling, Simulation and Optimization (ICCMSO)* (pp. 113-118). Innovative Research Foundation.

37. Jovid, Q., Li, Z., Khuram, W., & Ekaterina, P. (2025, August). How AI-Supported Leadership Foster Employees AI-Driven Innovative Work Behavior: Unpacking the Mediated Moderation Mechanism. In *5th International Conference on New Computational Social Science (ICNCSS 2025)* (pp. 3-13). Atlantis Press.

38. Soureh, M. T., & Mohammadi, T. (2026). Designing an Effective Model of Virtual Education Using Artificial Intelligence in the Educational System of Islamic Azad Universities of West Azerbaijan Province. *Journal of Resource Management and Decision Engineering*, 1-13.

39. Pavlova, N., Vasiliev, I., & Laksmi, N. D. (2026). SCHOOL-BASED INTERVENTIONS FOR PROMOTING PSYCHOLOGICAL RESILIENCE AND WELL-BEING IN CHILDREN. *International Journal of Educatio Elementaria and Psychologia*, *3*(2), 145-161.

40. Preston, A., Rew, L., & Young, C. C. (2023). A systematic scoping review of psychological capital related to mental health in youth. *The Journal of School Nursing*, *39*(1), 72-86.

2026 by the authors; Journal of Global Social Transformation (JGST). This is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) license (http://creativecommons.org/licenses/by/4.0/).