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## AI-Supported Higher Education and Students' Psychological Well-Being: Examining The Roles of Academic Resilience and Learning Autonomy

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### ABSTRACT

This study examined the relationship between AI-supported higher education, academic resilience, learning autonomy, and students' psychological well-being. A quantitative, cross-sectional research design was employed to investigate how technology-supported educational experiences and students' personal academic resources were associated with psychological well-being in contemporary higher education. Data were collected from 321 university students enrolled in higher education institutions in Pakistan through a structured, adapted questionnaire administered online using Google Forms. The questionnaire assessed AI-supported higher education, academic resilience, learning autonomy, and psychological well-being using established measures, including the Academic Resilience Scale (ARS-30), the Psychological Well-Being Scale based on Ryff's multidimensional model, and a Learner Autonomy scale. The collected data were organized in Microsoft Excel and analyzed using IBM SPSS Statistics. Descriptive statistics, Cronbach's alpha, Pearson product-moment correlation, multiple linear regression, independent-samples t-test, one-way analysis of variance (ANOVA), and Tukey HSD post-hoc analysis were employed according to the research objectives. The findings showed that AI-supported higher education, academic resilience, and learning autonomy were positively associated with psychological well-being. The regression findings further indicated that all three variables significantly contributed to students' psychological well-being, while demographic analysis showed significant differences across selected age groups and frequency of AI use. The findings suggest that students' psychological resources may play an important role in shaping their experiences within increasingly technology-supported learning environments. The study highlights the importance of integrating technological and psychological perspectives when examining contemporary higher education and provides useful evidence for understanding how AI-supported learning and students' personal academic resources are associated with positive psychological functioning. The study may provide a useful foundation for educators and researchers seeking to develop supportive higher education environments that consider both technological advancement and students' psychological needs.

## **Introduction**

### **AI-Supported Higher Education**

AI-supported higher education involves the use of AI in teaching, learning, academic assistance and feedback, assessment, and the creation of personalized learning paths. AI can provide students with instant access to information and explanation, learning resources and feedback, and can assist students with academic tasks, changing the ways students can engage with higher education (Nasr et al., 2025). These technologies can also help promote flexibility in learning by allowing students to learn at their own pace and guide themselves in learning. The increasing use of AI has therefore created new ways to learn in a flexible, technology-supported and student-centered way (Zawacki-Richter, 2026).

The use of AI in education may change students' psychological experiences by changing academic difficulties. Constant and instant feedback and academic assistance may aid students in learning to better control and manage learning in a way that strengthens students' confidence in dealing with academic challenges. However, how students engage with and adapt to technology-based learning is key in understanding the benefits of AI (Lo & Chan, 2025). This therefore suggests that students who have a high level of psychological resources such as academic resilience and learning autonomy are able to experience, interpret and engage positively with AI in higher education in a variety of ways.

### **Academic Resilience**

Academic resilience is the ability of a student to cope with obstacles and challenges that academic life poses, recover from setbacks, and continue working towards academic goals, despite various difficulties. Academic resilience assists students to withstand pressure, academic failure, heavy workload and changing conditions of the learning environment, while keeping their academic functioning intact (Cassidy, 2016). Resilient students are typically more effective in managing academic problems without allowing those problems to interfere with their long-term academic goals. There is research that connects academic resilience with students' academic adjustment and persistence as well as positive psychological functioning (Radhamani & Kalaivani, 2021).

As the use of technology in higher education increases and becomes more AI-integrated, we expect students' ability to academically adapt and psychologically adjust will be challenged more. Academic problems pose demands on students to respond and adjust, and academic resilience helps psychologically prepare students for academic problems and stress (Gong et al., 2026). As such, academic resilience is a personality resource that links students' academic experiences with their psychological well-being.

### **Learning Autonomy**

Autonomous learning refers to students' ability to self-regulate their academic behaviors, make independent academic decisions and choices, and engage effectively in the learning process by employing deliberate strategies (Fujii, 2024). Self-regulated learners are able to integrate their autonomous learning ability to engage in self-directed learning activities and make decisions about their study activities. It is important in higher education because students are required to independently manage numerous aspects of their learning.

The use of AI in education will give students opportunities to organize their learning activities and study materials based on their learning goals and preferences. When students use AI while keeping the power to make academic choices, it fosters the learned ability to make choices, and strengthens students' self-agency (Khasawneh et al., 2024). Learning autonomy may also strengthen students' sense of academic confidence and independence. Therefore, the analysis of students' psychological experiences with AI in higher education should consider the autonomy factor.

### **Psychological Well-Being**

The term psychological well-being refers to how well an individual functions both mentally and emotionally. This includes feelings of happiness and other positive feelings, personal growth, purpose and direction in life, effective functioning in different domains of life, positive relationships, and healthy functioning in everyday life. Positive psychological functioning helps people engage in their studies, be motivated to learn and access their concentration for studies. Students' psychological well-being plays an important role in successful academic and personal adjustment to university. The absence of psychological well-being poses barriers to academic engagement (Brett et al., 2025).

In the context of AI-supported higher education, there may be academic and psychological barriers that prevent students from benefitting from different educational opportunities and becoming academically autonomous. Some barriers may be related to the

students' inability to cope psychologically with the academic demands and academic failure as well as the inability to use the educational opportunities (Ryff & Singer, 2013). Therefore, supporting students psychologically to cope with academic barriers, in addition to developing their academic resilience and learning autonomy, may help increase their psychological well-being in higher education.

### **Research Objectives**

- To examine the relationship between AI-supported higher education and students' psychological well-being.
- To examine the relationship between academic resilience and students' psychological well-being.
- To examine the relationship between learning autonomy and students' psychological well-being.

### **Problem Statement**

Artificial Intelligence (AI) is rapidly transforming higher education and provides opportunities to personalize support and provide instant feedback and educational materials to students on their terms. Still, the potential effects of AI in higher education on students' psychological well-being has not been sufficiently studied. According to available research, most studies in AI-supported higher education have focused on students' engagement and academic performance as well as benefits of using AI in the context of self-regulated learning and technology. In contrast, the effects of AI in higher education on students' psychological well-being have been insufficiently considered. Still, it seems that AI may affect both psychological resources, that is, students' sense of autonomy and resilience (Yang et al., 2026). However, psychological resources have predominantly been studied in isolation rather than in an integrative framework. Research focusing on AI in higher education and student autonomy is fragmented, as is research that explores the role of psychological resources (especially academic resilience) in maintaining students' psychological well-being in AI in education. Thus, there is a clear research gap regarding the relationships between AI and higher education and students' psychological well-being by considering psychological resources and academic autonomy (Shomotova, 2026).

### **Significance of the Study**

This study is significant because it provides a focused understanding of students' psychological well-being within the rapidly developing context of AI-supported higher education. By examining AI-supported higher education alongside academic resilience and learning autonomy, the study provides insight into how students' technological learning experiences and personal academic resources are connected with their psychological well-being. The findings may help higher education institutions understand the importance of supporting students not only academically but also psychologically as AI-based technologies become increasingly integrated into learning. The study may also provide useful information for teachers and educational practitioners in developing learning environments that encourage responsible use of AI, independent learning, and students' ability to cope with academic challenges. Furthermore, the study can contribute to the existing academic literature by bringing AI-supported education, academic resilience, learning autonomy, and psychological well-being together within a single research framework.

### **Literature Review**

#### **Artificial Intelligence, Learning Experiences, and Psychological Well-Being in Higher Education**

The ways that students can use AI to access information, receive feedback, complete academic tasks, and control their learning are changing. Educational environments using AI can offer students learning resources, personalized help, and immediate feedback, and learning aid resources can be available any time, any place. (Klimova & Pikhart, 2025) underlined the potential role that AI can play in personalized learning. (Shahzad et al., 2024) pointed out that AI-supported learning improved student autonomy via self-efficacy, metacognitive strategies, and self-monitoring. When considering the emotional aspects of students, the present and future transformations that AI will bring to educational environments imply that it is important to review the emotional aspects of students along with its role in educational scenarios. This will help provide a holistic picture of how technology-mediated learning environments affect students.

The increase in the use of AI by students has caused concern regarding psychological well-being of students. In educational contexts, the fear of missing out (FoMo) syndrome can develop when students feel they need to use AI to assist their learning in the same way their peers do to keep up academically. The use of AI to assist student learning can result in students experiencing technological stress, cognitive overload, and digital fatigue. For educational environments incorporating AI, the emotional aspects of students

cannot be ignored. Thus, the focus should be on educating students on technology-mediated learning to promote students' emotional well-being (Velasategui et al., 2023).

### **Academic Resilience, Learning Autonomy, and Students' Psychological Functioning**

Academic resilience refers to the ability of university students to cope with academic stress and various challenges, bounce back from setbacks and continue to work towards their educational goals. In the 21st century university, students are exposed to many academic challenges including constant and high levels of academic stress, demanding and challenging curriculum, rapid and changing learning conditions, and various academic, social and psychological pressures (Bagdžiūnienė et al., 2025). For many university students, managing, surviving and thriving in this type of academic environment requires a great deal of resilience. In addition, advancing and integrating the use of various technologies in education requires even greater resilience because students need to be flexible and adaptable to changing digital practices (Wong, 2008).

In the 21st century university, students are required to be independent managers of their own learning. They need to be able to take responsibility for and make informed choices about their learning. (Effendy et al., 2025) showed the need for greater support for learning autonomy, and connected AI-supported learning and student autonomy. In addition, students who use AI as a supportive learning tool can be more confident about their ability to make informed choices and be in greater control of their psychological functioning.

### **AI-Supported Education, Academic Resilience, Learning Autonomy, and Psychological Well-Being**

AI-supported education, academic resilience and learning autonomy, are constructs that can possibly be related to the psychological well-being of students. The use of AI in education can provide more tailored academic assistance. Academic resilience can help students deal with academic and technological barriers. Academic autonomy can help students to have more control over learning. Dou and Sun (2025) analyzed autonomy, academic buoyancy, psychological well-being and academic success in an AI-assisted assessment. Li (2025) however, supported the positive relationship of student autonomy and psychological well-being in AI-assisted learning.

There is also evidence to support the relationship between academic resilience and psychological well-being. Students with higher academic resilience have more resources for dealing with academic and psychological problems. With the support of AI, a learning environment can become more unpredictable and challenging. It is possible that academic resilience will help students to manage the unpredictability of learning in a more effective way. Also, learning autonomy can help students to have better control and independence. Even though different studies investigated these variables in various educational contexts, research that addressed AI-supported higher education, academic resilience, learning autonomy and psychological well-being in a same research frame is lacking (Hashmi et al., 2026).

### **Integrated Research Perspective**

Research in the field of higher education shows that the utilization of AI impacts students' learning behaviors and psyche in different ways. Another line of research has found that AI-supported learning influences students' autonomy, resilience and psychological functioning and well-being. Most of the recent studies in higher education have focused on special areas like AI-based language learning, online learning, or AI-based assessment. Keeping this in mind, it could be useful to study how these aspects are related in other sections of higher education as well (Flick, 2016).

This study focuses on the aspects of AI in higher education, academic resilience, learning autonomy, and students' psychological well-being, in a single framework. These aspects influence psychological functioning of students in different ways. Analyzing these aspects in combination may widen the scope of current studies, and offer insights into the field beyond technology of educational learning environments (Cronin & George, 2023).

### **Research Gap**

While recent studies on the psychological effects of AI on higher education have increased, the connection of AI-assisted learning to students' psychological well-being is still poorly understood. Schilhabel et al. (2026) examines AI and learner autonomy, (Kane, 2026) explore AI and students' resilience and students' adaptive responses, and investigates the relationship of AI, learning autonomy and well-being. Most of the evidence is focused on certain areas such as language learning or AI-assisted assessment, and self-regulated learning. It is less focused on the domain of higher education in general. The absence of research on psychological consequences of AI-integrated education has been noted, particularly on the connection between students' personal resources and

psychological well-being (Drozdz, 2025). Therefore, there is a need to investigate AI-integrated higher education, academic resilience, learning autonomy, and students' psychological well-being in the same study, which is the focus of the current research.

### Hypotheses

- **H1:** There is a significant relationship between AI-supported higher education, academic resilience, learning autonomy, and students' psychological well-being.
- **H2:** AI-supported higher education, academic resilience, and learning autonomy significantly predict students' psychological well-being.
- **H3:** Students' psychological well-being differs significantly across relevant demographic groups.

### Conceptual Framework

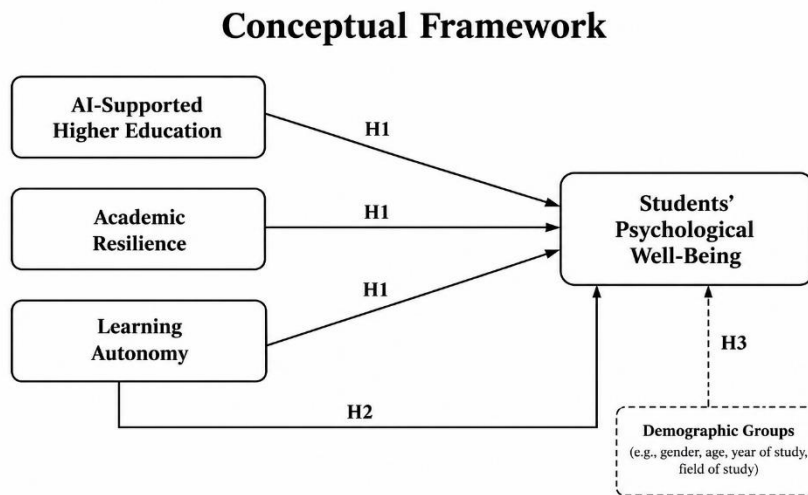


**Fig 1: Conceptual Framework**

### Methodology

#### Research Design

The relationships among AI-supported higher education, academic resilience, learning autonomy, and students' psychological well-being were analyzed by means of quantitative research. A cross-sectional design was used and data was collected with a structured, previously designed questionnaire. The questionnaire was given to university students to get quantifiable information about the study variables.

#### Population

The study population consisted of university students enrolled in higher education institutions in Pakistan. Students from the University of the Punjab, Bahauddin Zakariya University, Government College University Faisalabad, University of Sindh, University of Karachi, Shah Abdul Latif University, University of Peshawar, Abdul Wali Khan University, University of Balochistan, and Balochistan University of Information Technology, Engineering and Management Sciences (BUIEMS), were approached. Participants from these higher education institutions were accessed to get university students who have first-hand experience of recently introduced technology-based and AI-supported learning environments.

#### Sampling Technique

Participants were selected by means of a non-probability convenience sampling technique. Students who were conveniently accessible through online contact and satisfied the criteria for participation were invited to take part in the study. The reason for

using this technique was that the questionnaire was available in an online format and students' participation was largely dependent on their accessibility to the online version and their willingness to respond to the questionnaire.

### Sample Size

A total of 321 participants were accessed. Data was collected using an online questionnaire. The purpose of the study was explained to respondents before they filled in the questionnaire.

### Data Collection

Data were collected using a structured, adapted questionnaire, via Google Forms. The questionnaire was shared on online forums used by university students for educational and communication purposes. Participants filled in the questionnaire online, and their responses were automatically recorded using Google Forms. The main study variables were assessed using established measures. AI-supported higher education was assessed using an adopted measure to assess students' experiences and perceptions of AI-supported educational activities. Academic resilience was assessed using the Academic Resilience Scale (ARS-30). Psychological well-being was assessed using the Psychological Well-Being Scale based on the multidimensional model by Ryff, which assesses factors including autonomy, environmental mastery, positive relations, and purpose in Life, among others. Learner autonomy was assessed using the Learner Autonomy scale. After collection, the questionnaires were organized structurally, and data were exported for statistical analysis.

### Data Analysis

The collected data were first organized in Microsoft Excel, and then analyzed in IBM SPSS Statistics. Descriptive statistics were employed to determine the characteristics of the study sample and to summarize the study variables using means, standard deviations, percentages and frequencies. Cronbach's alpha was used to analyze the internal consistency of the used scales. Relationships among AI-supported higher education, academic resilience, learning autonomy and psychological well-being were analyzed by Pearson Product-Moment Correlation. The predictive effect of AI-supported higher education, academic resilience and learning autonomy on students' psychological well-being was analyzed by Multiple Linear Regression. Independent Samples t-test was used to compare the two demographic groups, and One-Way Analysis of Variance (ANOVA) was used to compare three or more groups of the same demographic variable. When a significant result of One-Way ANOVA was obtained, the Tukey HSD post-hoc test was performed to determine differences among particular groups.

**Table 1: Demographic Characteristics of the Respondents (N = 321)**

| Demographic Variables            | Categories         | Frequency (n) | Percentage (%) |
|----------------------------------|--------------------|---------------|----------------|
| Gender                           | Male               | 174           | 54.2           |
|                                  | Female             | 147           | 45.8           |
| Age                              | 18–22 years        | 128           | 39.9           |
|                                  | 23–27 years        | 112           | 34.9           |
|                                  | 28–32 years        | 53            | 16.5           |
|                                  | 33 years and above | 28            | 8.7            |
|                                  |                    |               |                |
| Academic Level                   | Undergraduate      | 186           | 57.9           |
|                                  | Master's           | 91            | 28.3           |
|                                  | M.Phil./PhD        | 44            | 13.7           |
| AI Use in Educational Activities | Rarely             | 38            | 11.8           |
|                                  | Sometimes          | 91            | 28.3           |
|                                  | Often              | 121           | 37.7           |

|                   |            |     |       |
|-------------------|------------|-----|-------|
|                   | Very Often | 71  | 22.1  |
| Total Respondents | N          | 321 | 100.0 |

Table 1 shows the demographic characteristics of the 321 respondents of the study. The distribution by sex showed that 174 (54.2%) respondents were male, while 147 (45.8%) were female. Concerning age, 128 (39.9%) respondents were 18-22 years, 112 (34.9%) were 23-27 years, 53 (16.5%) were 28-32 years, and 28 (8.7%) were 33 years and above. With regard to academic level, 186 (57.9%) respondents were undergraduates, 91 (28.3%) were masters, and 44 (13.7%) were M.Phil./PhD students. In regard to using AI in education, 121 (37.7%) respondents said they often used AI tools, 91 (28.3%) respondents said they used AI tools sometimes, 71 (22.1%) said they very often used AI tools, and 38 (11.8%) said they rarely used AI tools. The table, therefore, provides demographic information of the study respondents.

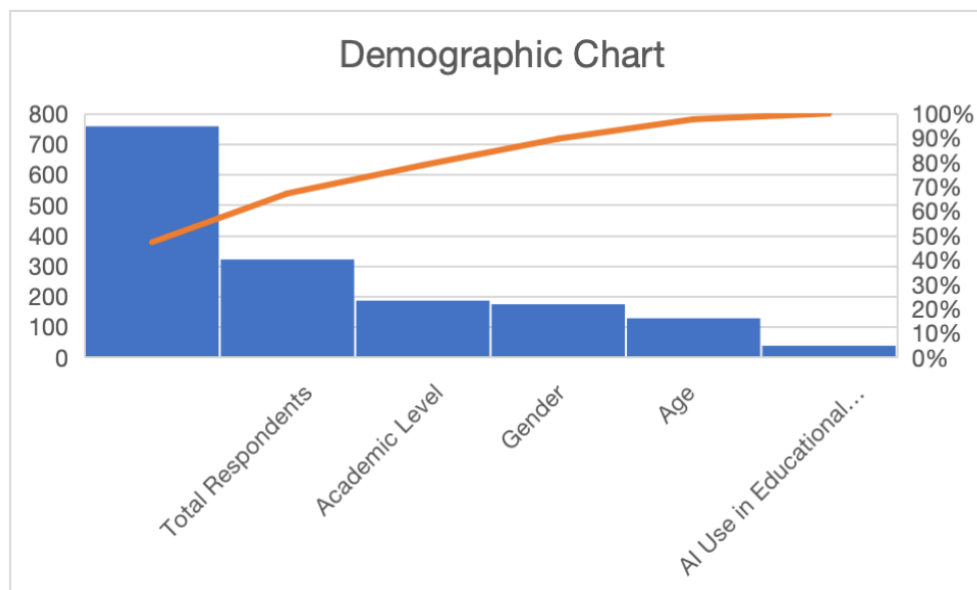


**Fig. 2: Demographic characteristics of respondents (N= 321)**

**Table 2: Reliability Statistics, Means, and Standard Deviations of Study Variables (N = 321)**

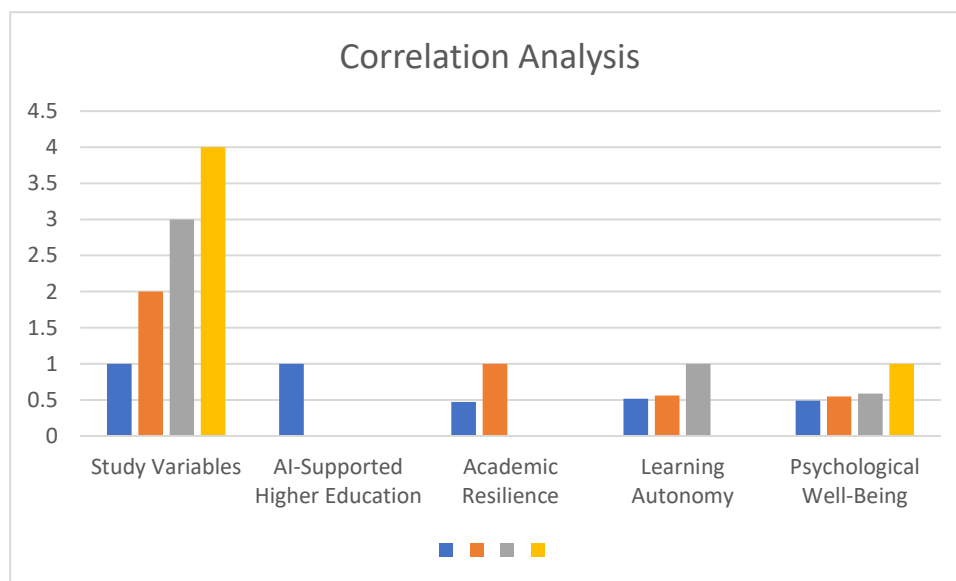
| Study Variables               | Number of Items | Cronbach's Alpha ( $\alpha$ ) | Mean (M) | Standard Deviation (SD) |
|-------------------------------|-----------------|-------------------------------|----------|-------------------------|
| AI-Supported Higher Education | 10              | 0.884                         | 3.71     | 0.68                    |
| Academic Resilience           | 30              | 0.912                         | 3.64     | 0.59                    |
| Learning Autonomy             | 12              | 0.876                         | 3.69     | 0.61                    |
| Psychological Well-Being      | 18              | 0.901                         | 3.76     | 0.57                    |

Reliability statistics, means, and standard deviations of major study variables for 321 respondents are presented in Table 2. Cronbach's alpha was between 0.876 and 0.912, suggesting good to high consistency among the measurement items. Among the study variables, internal consistency of academic resilience was the highest ( $\alpha = 0.912$ ), followed by psychological well-being ( $\alpha = 0.901$ ), AI-supported higher education ( $\alpha = 0.884$ ), and learning autonomy ( $\alpha = 0.876$ ). The mean scores ranged between 3.64 and 3.76. Standard deviations ranged from 0.57 to 0.68. Variability among respondents was, therefore, moderate for the study variables. It can, therefore, be concluded that the study scales had good internal consistency for the study at hand.

**Table 3: Pearson Product-Moment Correlation Among Study Variables (N = 321)**

| Study Variables               | 1     | 2     | 3     | 4 |
|-------------------------------|-------|-------|-------|---|
| AI-Supported Higher Education | 1     |       |       |   |
| Academic Resilience           | 0.472 | 1     |       |   |
| Learning Autonomy             | 0.518 | 0.563 | 1     |   |
| Psychological Well-Being      | 0.491 | 0.548 | 0.587 | 1 |

Pearson Product-Moment correlation of AI-supported Higher Education, Academic Resilience, Learning Autonomy and Psychological Well-being is shown in Table 3. AI-supported Higher Education was positively related to Psychological Well-being ( $r = .491$ ,  $p < .01$ ), which means participants who had higher levels of AI-supported Higher Education experiences were psychologically well-being more than the others. Positive relations were also found between Psychological Well-being and Academic Resilience ( $r = .548$ ,  $p < .01$ ) and between Psychological Well-being and Learning Autonomy ( $r = .587$ ,  $p < .01$ ). Positive relations were found among AI-supported Higher Education, Academic Resilience, and Learning Autonomy. All study variables were interrelated in a significant and positive way.

**Fig 3: Correlation Analysis****Table 4: Multiple Linear Regression Analysis of Study Variables Predicting Psychological Well-Being (N = 321)**

| Predictor Variables           | B     | SE    | $\beta$ | t    | p    |
|-------------------------------|-------|-------|---------|------|------|
| AI-Supported Higher Education | 0.214 | 0.052 | 0.219   | 4.12 | .001 |
| Academic Resilience           | 0.287 | 0.061 | 0.276   | 4.70 | .001 |
| Learning Autonomy             | 0.331 | 0.058 | 0.352   | 5.71 | .001 |
| Model Statistics              | Value |       |         |      |      |
| R                             | 0.681 |       |         |      |      |

| Model Statistics        | Value  |
|-------------------------|--------|
| R <sup>2</sup>          | 0.464  |
| Adjusted R <sup>2</sup> | 0.459  |
| F                       | 91.54  |
| p                       | < .001 |

Table 4 presents the results of a multiple linear regression analysis to assess the predictive contribution of AI-supported higher education, academic resilience, and learning autonomy to psychological well-being of the 321 respondents. The overall regression model was significant, indicating the predictor variables, in general, were significant in explaining psychological well-being ( $R^2 = .464$ , adjusted  $R^2 = .459$ ,  $p < .001$ ). AI-supported higher education was a significant and positive predictor of psychological well-being ( $\beta = .219$ ,  $p < .001$ ). Academic resilience was a significant and positive predictor of psychological well-being ( $\beta = .276$ ,  $p < .001$ ). Learning autonomy was a significant and positive predictor of psychological well-being ( $\beta = .352$ ,  $p < .001$ ). Therefore, all the three predictors were significant and positive in their contributions to psychological well-being.

**Table 5: Independent-Samples t-Test and One-Way ANOVA for Differences in Psychological Well-Being Across Demographic Groups (N = 321)**

| Demographic Variable | Group/Category     | Mean | SD   | Test                       | Test Statistic | p    |
|----------------------|--------------------|------|------|----------------------------|----------------|------|
| Gender               | Male               | 3.72 | 0.56 | Independent-Samples t-test | 1.42           | .157 |
|                      | Female             | 3.79 | 0.58 |                            |                |      |
| Age                  | 18–22 years        | 3.81 | 0.54 | One-Way ANOVA              | 3.18           | .024 |
|                      | 23–27 years        | 3.77 | 0.56 |                            |                |      |
|                      | 28–32 years        | 3.66 | 0.59 |                            |                |      |
|                      | 33 years and above | 3.61 | 0.63 |                            |                |      |
| Academic Level       | Undergraduate      | 3.81 | 0.54 | One-Way ANOVA              | 2.76           | .065 |
|                      | Master's           | 3.69 | 0.58 |                            |                |      |
|                      | M.Phil./PhD        | 3.68 | 0.61 |                            |                |      |
| Frequency of AI Use  | Rarely             | 3.51 | 0.63 | One-Way ANOVA              | 5.42           | .001 |
|                      | Sometimes          | 3.68 | 0.57 |                            |                |      |
|                      | Often              | 3.79 | 0.54 |                            |                |      |
|                      | Very Often         | 3.91 | 0.49 |                            |                |      |

The results of group difference tests on demographic variables and psychological well-being are shown in Table 5. Results of an Independent-Samples t-test showed that the difference in psychological well-being between males and females was not statistically significant ( $t = 1.42$ ,  $p = .157$ ). Likewise, no statistically significant difference was found at various academic levels ( $F = 2.76$ ,  $p = .065$ ). A statistically significant difference was found at various age groups ( $F = 3.18$ ,  $p = .024$ ). Likewise, results of an ANOVA on the difference in psychological well-being and frequency of AI use ( $F = 5.42$ ,  $p = .001$ ) also showed statistically significant results. Hence, a Tukey HSD post-hoc test was conducted to identify the difference in psychological well-being of the different age groups, and AI use groups that showed statistically significant results.

## Discussion

This study examined how AI-assisted higher education, academic resilience, and learning autonomy are connected with students' psychological well-being. The findings showed that all the main study variables had a positive association with students' psychological well-being. This suggests that supportive use of AI in higher education, along with students' ability to handle academic challenges and manage their own learning, may contribute to better psychological well-being. Students using AI-assisted higher education showed a positive relationship with psychological well-being, and the results indicated that students using AI-assisted higher education show higher levels of psychological well-being. These results support the studies that demonstrate positive relationships with AI in higher education in terms of personalized learning, increased access to academic resources, and efficient learning, as well as the overall management of students' academic and educational demands. However, research also indicates that the relationship of AI with well-being is complicated, as relying too much on AI may lead to technostress, a reduction in social interaction, and other psychological issues (Tang & Liao, 2025).

Academic resilience also showed a positive relationship with psychological well-being and was a significant predictor of the same. The results also supported the other studies that indicated resilience as a major resource for university students in coping with academic challenges, behavioral adjustment and functioning. For example, the study of (Burlakova, 2026) also showed a positive and significant relationship between academic resilience and academic well-being of university students, especially during the COVID-19 online learning situation. Also, positive relationships of resilience and well-being were also shown in other studies that dealt with students' academic challenges and adjustments in different educational environments.

The strongest positive association with psychological well-being in the present study was demonstrated by the learning autonomy variable, and it contributed considerably to the regression model. These findings indicate that the ability of students to manage their learning, and to make and regulate academic-related decisions and activities is related to psychological well-being. Likewise, recent research focused on AI-supported self-regulated learning, pointed out that one possible way AI impacts learning is by enabling students to engage in self-regulatory practices (Olatunbosun et al., 2026). Therefore, in light of the results presented here, educational systems that incorporate AI may be beneficial to learners only if they engage critically and actively with the systems, as opposed to becoming passive recipients. Such systems, if afforded to learners, may help strengthen learners' psychological resources such as resilience, autonomy and self-regulation, and motivation.

The results of the multiple regression analysis showed that psychological well-being is explainable by AI in higher education and learning autonomy, and to a lesser extent, academic resilience. The result of the analyses shows that the three variables in the present study continued to explain a considerable part of psychological well-being in higher education when considered simultaneously. A recent study on students' learning adapted by AI concurred that for students to engage with AI in an educational context, psychological resources such as resilience, autonomy, motivation, and self-regulation are critical (Fatima et al., 2026). The present study, however, affords only interpretations in terms of relationships and statistical prediction as opposed to causal effects, due to its cross-sectional design.

The frequency with which students use AI may reflect differences in their level of experience and familiarity with AI tools. Imam et al. (2026) found that students may differ psychologically based on their demographic characteristics and patterns of AI use. Therefore, future research should consider these individual differences when examining the effects of AI-supported education on students. Findings of this study indicated that psychological well-being of students in AI-supported higher education is associated not only with the technology, but also with the students' autonomy and self-regulation capacity. The findings suggest that, when analyzing psychological well-being of students in AI-supported higher education, it would be valuable to take into account students' psychological resources (e.g. self-regulation, resilience) in combination with technological resources offered by AI.

## General Conclusion

The present study found a significant association between the use of AI in higher education, psychological well-being, academic resilience, and learning autonomy. The regression results showed that AI-supported higher education, academic resilience, and learning autonomy were positively associated with students' psychological well-being. These findings suggest that the use of technology in higher education may support students' psychological well-being when it is used effectively in the learning process. In addition, students' personal academic resources, particularly their ability to cope with challenges and manage their own learning, may also contribute positively to their overall well-being.

The study demonstrates that in the current climate of higher education, which is becoming increasingly technological and integrates AI, we must address the psychological aspects of teaching and learning as well. From a more general perspective, AI-supported learning may provide students with additional academic resources, and autonomy and resilience may allow students to better manage academic demands. Findings also showed age and frequency of use of AI significantly influenced psychological well-being. Although the study provides relationships and valuable evidence concerning the study variables, the nature of the study allows for speculative conclusions only.

### **Future Implications**

Future studies can further explore how AI-supported higher education is linked with academic resilience, learning autonomy, and psychological well-being among students from different educational settings and backgrounds. Long-term studies may also provide a clearer understanding of how students' psychological well-being changes as their use of AI-supported learning develops over time. Researchers can also examine other factors, such as digital literacy, academic self-efficacy, learning engagement, technology-related stress, and the responsible use of AI in education. Using mixed-method and experimental research designs may provide deeper and more detailed findings about these issues.

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