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Perceived usefulness of GenAI and academic engagement among multilingual learners: The mediating role of resilience as a character strength

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Abstract: Generative Artificial Intelligence (GenAI) is reshaping language learning, yet research often overlooks how AI-related beliefs foster character strengths. This study investigated the relationship between the perceived usefulness of GenAI and academic engagement, and the mediating role of resilience. Study participants comprised multilingual Mongolian university students (N = 421, female = 57.7%, male = 42.3%; freshmen = 26.1%, sophomores = 21.1%, juniors = 29.9%, seniors = 22.8%; mean age = 20.49, SD = 1.11). Structural equation modeling and bootstrapping procedure results indicated that the perceived usefulness of GenAI was directly associated with higher academic engagement. Furthermore, resilience mediated the relationship between the technology perceptions and sustained learning effort, making the association stronger. These findings support the theoretical integration of the Technology Acceptance Model and Control-Value Theory within a positive psychology framework, demonstrating how perceived utility and emotional control are transformed into sustained involvement through the cultivation of internal character strengths. By implication, educators should therefore integrate GenAI in ways that prioritize the cultivation of resilience as a character strength to improve academic flourishing in AI-mediated language learning.

Keywords: Generative Artificial Intelligence (GenAI); multilingual learners; positive psychology; students' character strengths

Introduction

Generative Artificial Intelligence (GenAI) is reshaping language learning, with tools such as Gemini becoming increasingly common in educational contexts (Derakhshan & Park, 2026a; Wu et al., 2025). Recent research has begun to move beyond technological adoption itself and has paid growing attention to psychological factors, particularly how positive psychology (PP) perspectives and learners' internal strengths support technology-mediated learning (Derakhshan & Li, 2026; Tram et al., 2024). Although the perceived usefulness of GenAI has been widely recognized (Wang & Gao, 2026), how this perception is translated into meaningful academic engagement, a key indicator of flourishing, still requires further investigation (Wang & Guo, 2026).

GenAI-enhanced learning environments may create new cognitive demands for students, especially for multilingual learners who need to coordinate multiple linguistic resources at the same time. When studying in GenAI supported environments, multilingual learners frequently encounter not only academic difficulties but also cognitive challenges. This issue is especially relevant to Mongolian multilingual learners, whose learning requires them to work with several linguistic resources while also completing technology-mediated tasks (Ai et al., 2024). In this situation, resilience may play an important role. It is a character strength that helps students deal with difficulties and adjust to the challenges that appear when GenAI is used for learning (Derakhshan & Park, 2026b). However, the internal psychological process linking learners' perceptions of GenAI to their academic engagement has not yet been clearly explained.

Accordingly, this study considers resilience as a key psychological pathway linking perceived usefulness of GenAI to academic engagement. It explores whether resilience can explain how multilingual learners' positive views of GenAI are translated into stronger engagement in academic learning. By doing so, it aims to clarify how character strengths can support learning in technology-enhanced educational environments.

The perceived usefulness of GenAI and academic engagement

Academic engagement refers to the multidimensional effort that students devote to learning (Hiver et al., 2024). One important factor that may shape this engagement is perceived usefulness, which refers to learners' belief that a technology can improve their performance (Davis, 1989). From the perspective of the Technology Acceptance Model (TAM), when students regard GenAI as useful, they are more likely to become actively involved in learning activities (Derakhshan & Park, 2026b; Thues et al., 2024). Previous empirical studies have also shown that students tend to use tools such as ChatGPT and Gemini when they believe these tools can support their learning effectively (Al-Okaily, 2025; Li et al., 2024). In addition, Derakhshan (2025) reported that GenAI tools may help reduce anxiety, which can further support students' long-term engagement.

However, this relationship may be more complicated for multilingual learners. Although GenAI can assist translanguaging practices and promote linguistic integration (Derakhshan & Li, 2026; Yang & Yang, 2025), multilingual students may also experience greater

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cognitive load and linguistic confusion when using these tools. According to Control-Value Theory (CVT), students' engagement depends not only on whether they perceive a learning tool as valuable, but also on whether they feel able to control the learning process. Therefore, the perceived usefulness of GenAI may not automatically lead to sustained engagement, especially in linguistically demanding contexts.

Existing studies have mainly examined the direct association between technology-related perceptions and learning engagement, while paying less attention to the internal psychological processes that explain how such perceptions are transformed into continued learning involvement (Li et al., 2024; Hu & Wang, 2023; Naidoo, 2023). To address this gap, the present study introduces resilience as a key mediating variable. From a PP perspective, resilience is a character strength that helps learners adapt to academic difficulties and technological challenges in GenAI-enhanced learning environments. Therefore, this study proposes that resilience may serve as an important psychological pathway through which the perceived usefulness of GenAI promotes academic engagement among Mongolian multilingual learners.

Resilience as a mediator

Within the framework of PP, resilience refers to learners' ability to adapt to difficulties while continuing to pursue learning goals. Previous studies have shown that resilience plays an important role in emotion regulation (Polat, 2024; Zhi & Derakhshan, 2024), helps learners remain involved in stressful learning situations (Theron et al., 2022), and contributes to academic achievement (Chen et al., 2025; Wang & Zhang, 2024). As GenAI becomes more widely used in learning, students face a less predictable environment where challenges may come from academic demands, technological instability, system failures, and imperfect GenAI-generated responses. In this context, resilience becomes an important psychological capacity that helps learners adapt to uncertainty, recover from difficulties, and remain engaged despite disruptions. This role of resilience is closely connected with digital adaptability, which describes learners' ability to respond flexibly to changing technology-mediated learning conditions (Liu et al., 2022; Zhang, 2025). From the viewpoint of CVT, resilient learners may be better able to maintain a sense of control when they encounter technical problems in GenAI-supported learning. Instead of reducing their effort or disengaging when GenAI tools generate errors or unsatisfactory answers, they are more likely to continue working through these challenges. This mechanism is particularly relevant for multilingual learners, who frequently need to manage heavy cognitive demands and interference across languages (Ai et al., 2024). In GenAI-enhanced classrooms, learners with stronger resilience may interpret technological or linguistic difficulties as chances to improve their learning, rather than as evidence of failure. This interpretation is also consistent with longitudinal evidence showing that such learners are more likely to maintain higher engagement in GenAI-supported learning environments (Derakhshan & Li, 2026).

Although existing research has provided useful insights into GenAI-supported learning, it has tended to emphasize students' final academic outcomes rather than their psychological experiences while using GenAI tools (Chen et al., 2025). Related studies have considered some parts of this process. For example, emotional and motivational factors have been discussed in existing research (Wang et al., 2024). GenAI literacy has also been viewed as an important ability that shapes how learners interact with and use AI tools (Dao & Sato, 2021; Wu & Yang, 2025). However, the specific role of resilience in this interaction process remains insufficiently explored. This gap is particularly important in multilingual learning contexts. Learners in such settings must deal with both linguistic complexity and the uncertainty of technology-mediated learning. Resilience may therefore function as a central character strength that helps them remain adaptive when they face language-related difficulties or unpredictable GenAI outputs. By investigating this mechanism, the present study aims to clarify how learners' internal strengths contribute to flourishing in the process of digital transformation.

Perceived usefulness of GenAI and resilience

In technology-enhanced learning contexts, multilingual learners are often required to deal with demanding and complex learning conditions. They need to manage cross-linguistic interference, cognitive demands, and the pressure of working across different language systems (Derakhshan & Park, 2026b; Kirkpatrick et al., 2025; Wei, 2025). In this context, resilience becomes an important character strength because it helps learners remain adaptive when they encounter academic, linguistic, or technological difficulties.

The perceived usefulness of GenAI may play an important role in strengthening this resilience. When students believe that GenAI tools are helpful, they tend to feel better prepared for learning tasks and more capable of managing academic demands (Al-Okaily, 2025; Yang & Derakhshan, 2026). This is especially important for multilingual learners, because useful GenAI tools may provide them with a stronger sense of control when dealing with complex linguistic tasks, which is a core element of resilience (Ma, 2021; Yang et al., 2024; Zhang, 2025).

This relationship can also be explained through CVT. According to this theory, students are more likely to sustain effort when they perceive a learning tool as valuable and feel that they can control the learning process. In GenAI-supported learning, positive value and control appraisals may therefore help learners persist despite academic challenges.

This interpretation can also be supported by existing empirical findings. Derakhshan and Li (2026), for example, reported that multilingual learners who understood GenAI as a tool for linking their three languages tended to show a higher level of "digital adaptability." Rather than treating technological problems or language-related inaccuracies as evidence of failure, these learners were more likely to regard such difficulties as part of the learning process and as chances for further development. This pattern is not limited to multilingual learners, as

comparable tendencies have also been observed among learners more generally. Derakhshan (2025) employed latent growth curve modeling and observed that learners reported lower anxiety when they perceived tools such as Gemini as more useful. This reduction in anxiety may then make it easier for learners to recover from mistakes during the learning process.

Much of the existing research on GenAI assisted learning continues to focus on visible learning outcomes, such as achievement, performance, and task completion, even though these studies have provided useful evidence (Li et al., 2024). As a result, less is known about whether students' positive views of GenAI can support deeper psychological development, especially the growth of character strengths. Some related factors have been discussed in previous studies. Wu and Yang (2025), for instance, regard GenAI literacy as an independent ability that affects how learners interact with AI tools. Wang et al. (2024) also point out that emotional experiences play an important role in technology-mediated learning. Even so, the way in which perceived GenAI usefulness may lead to stronger resilience has not been clearly explained. For this reason, the present study shifts attention to Mongolian multilingual learners and explores whether perceiving GenAI as useful can help develop resilience as an important character strength.

Theoretical basis

To explain academic engagement in GenAI-enhanced learning, it is necessary to consider more than students' use of digital tools. Engagement is also shaped by students' beliefs about these tools, their sense of control during learning, and their ability to cope with difficulties. Therefore, this study brings together three theoretical perspectives: the TAM, CVT, and PP.

The TAM helps explain why students are willing to use GenAI tools. From this view, perceived usefulness is a key factor because learners are more likely to accept and use a technology when they believe it can support their learning (Al-Okaily, 2025; Wang & Gao, 2026). CVT helps clarify the link between this belief and students' engagement. If students regard GenAI as useful and believe they can handle the learning process, they are more likely to remain active in academic tasks (Zhao & Yang, 2026). In GenAI-supported learning environments, perceived usefulness can therefore enhance students' sense of value, while positive experiences with GenAI can make them feel more in control of their learning.

PP adds to this discussion by drawing attention to learners' inner strengths. From this view, resilience is an important character strength because it helps students adjust to difficulties and continue positive academic development (Balaskas et al., 2025; Sadoughi et al., 2023). This is particularly relevant for Mongolian multilingual learners, who frequently shift between different linguistic systems and therefore face increased cognitive load and language-related challenges (Ai et al., 2024; Yao et al., 2025). In GenAI-supported learning contexts, resilience can therefore be understood as a form of "digital adaptability," helping learners respond to both technological uncertainty and multilingual learning demands.

Learners who perceive GenAI as beneficial may develop stronger resilience in facing academic difficulties, which in turn supports their sustained participation in learning activities (Wang & Guo, 2026). From this perspective, resilience can be seen as an important psychological mechanism through which perceived usefulness of GenAI is translated into stronger academic engagement. Therefore, this study argues that resilience mediates the relationship between perceived usefulness of GenAI and academic engagement. This mediating role is especially relevant in GenAI-supported learning environments, where learners need psychological resources not only to handle technical disruptions but also to overcome language-related challenges (Derakhshan & Park, 2026b; Zhi & Derakhshan, 2024).

The Mongolian multilingual context

For ethnic Mongolian students in China, learning takes place in a distinctive trilingual environment where Mongolian, Chinese, and English serve different communicative, academic, and cultural functions. Moving across these languages may expose learners to cross-linguistic interference, shifting academic expectations, and identity-related pressures, thereby creating considerable cognitive and emotional demands (Yao et al., 2025). In technology-enhanced learning environments, these challenges may become more complex, as students must also adapt to technology-mediated learning processes. Therefore, resilience becomes an essential psychological resource that helps Mongolian multilingual learners cope with overlapping pressures and sustain academic engagement over time.

Goals of the study

Building on the above theoretical and empirical considerations, the present study focuses on the role of GenAI in multilingual learners' academic engagement. It first considers whether learners' perceived usefulness of GenAI for academic learning (Al-Okaily, 2025) is associated with their willingness to participate more actively in learning activities (Hiver et al., 2024). Yet, the study does not assume that perceived usefulness influences engagement only in a direct manner. Rather, it proposes that this relationship may also be explained through learners' resilience. In this framework, resilience is viewed as an important psychological resource that helps learners respond to learning challenges and maintain their academic involvement. When multilingual learners hold positive beliefs about the usefulness of GenAI, they may be better able to develop resilience, which in turn supports more sustained engagement in academic learning (Wang et al., 2021). Therefore, this study examines both the direct association between perceived usefulness and academic engagement and the indirect pathway through resilience. Accordingly, the following hypotheses were formulated, as shown in Figure 1:

H1: Perceived usefulness of GenAI positively predicts resilience.

H2: Resilience positively predicts academic engagement.

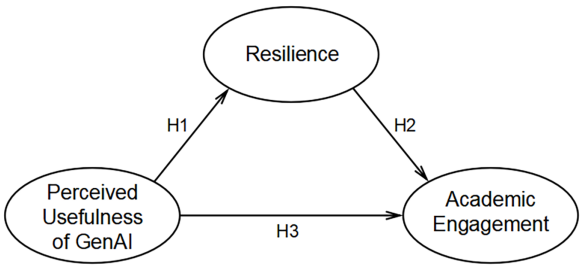

Figure 1. Hypothetical model

H3: Perceived usefulness of GenAI positively predicts academic engagement.

H4: Resilience mediates the relationship between perceived usefulness and academic engagement.

Methods

Participants and setting

The study was conducted at Inner Mongolia University, located in the Inner Mongolia Autonomous Region of China. The participants were university students with multilingual learning backgrounds, reflecting the trilingual educational context described above.

A total of 447 questionnaires were collected through classroom-based invitations and online survey links, of which 421 valid responses remained for final analysis after 26 incomplete or invalid questionnaires were excluded. The participants also had a similar multilingual learning background. Mongolian was their first language, Chinese served as the main language of instruction, and English was studied as the target language at university. Although some participants were enrolled in majors not directly related to English, they still needed to complete College English courses as part of the national university curriculum. Moreover, all participants had passed the College English Test Band 4 (CET-4), which indicated that their English proficiency was relatively comparable across the sample.

In addition to their multilingual background, the participants had all used GenAI tools before. Their previous uses included translation, writing assistance, and support for language learning, with tools such as ChatGPT. Because of this experience, they were able to judge the usefulness of GenAI in relation to their own academic learning. The participants' demographic details are reported in Table 1.

Table 1. Participants' background information (N = 421)

Item		Frequency	%
Gender	Male	178	42.3
	Female	243	57.7
Grade	Freshmen	110	26.1
	Sophomores	89	21.1
	Juniors	126	29.9
	Seniors	96	22.8
Major	English-related majors	334	79.3
	Non-English-related majors	87	20.7

Measures

Perceived usefulness scale (PUS)

Students' perceived usefulness of GenAI was measured with an updated Perceived Usefulness Scale (PUS) originally developed by Venkatesh et al. (2003). In the present study, the six-item scale was adapted to the GenAI-supported English learning context, with one sample item being "Using the GenAI system would improve my English learning performance." Items were rated on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating stronger perceived usefulness of GenAI for academic learning; the scale showed excellent internal consistency, with a Cronbach's alpha of 0.903.

Resilience scale (RS)

Learners' resilience was assessed with the 15-item Foreign Language Learning Resilience Scale (Foreign Language Learning RS) developed by Guo and Li (2022), which includes three dimensions: Ego Resilience, Metacognitive Resilience, and Social Resilience. A sample item is: "I would adjust my language learning plans based on the progress and data provided by AI tools." Responses were rated on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). Higher scores represented higher levels of resilience. In the present study, the three subscales demonstrated strong internal consistency, with Cronbach's alpha values of 0.884 for Ego Resilience, 0.886 for Metacognitive Resilience, and 0.898 for Social Resilience.

Academic engagement scale (AES)

The AES (Schaufeli et al., 2002; Zhang et al., 2007) comprises 12 items on three areas of academic work: Vigor (4 items, e.g., "When I use GenAI tools for my language learning, I feel mentally strong."), Dedication (4 items, e.g., "I am enthusiastic about using GenAI tools to support my language learning"), and Absorption (4 items, e.g., "When I use GenAI tools for language learning, I forget everything else around me."). In this study, the three parts reached high reliability: Vigor (Cronbach's alpha = 0.890), Dedication (Cronbach's alpha = 0.897), and Absorption (Cronbach's alpha = 0.883).

Procedure

The Ethics Committee of Inner Mongolia University approved the study. The participants individually consented to the study (No. IMUFLC20250715). We assured all participants of the voluntary and anonymous nature of the study. The survey, comprising demographic items and psychological scales, required 10–15 min to complete.

Data analysis

Data were analyzed using SPSS 26.0 and AMOS 24.0. SPSS 26.0 was used to calculate Cronbach's alpha, descriptive statistics, and Pearson correlations, while AMOS 24.0 was used to conduct confirmatory factor analysis (CFA) and structural equation modeling (SEM). The indirect effect of resilience was tested through bootstrapping with 5000 resamples and a 95% confidence interval. Mediation was supported when the confidence interval for the indirect effect did not include zero.

Results

Descriptive statistics and correlations

Table 2 presents the descriptive statistics and correlation results for the three main variables. The results show that the mean scores of perceived usefulness of GenAI, resilience, and academic engagement were 3.33, 3.34, and 3.18, respectively, indicating that students generally reported moderately high levels on these variables. The correlation analysis revealed that perceived usefulness of GenAI was significantly and positively correlated with resilience (r = 0.607, $p < 0.01$) and academic engagement (r = 0.603, $p < 0.01$). In addition, resilience was also significantly and positively correlated with academic engagement (r = 0.471, $p < 0.01$).

Model-fit test

The model parameters were estimated using the maximum likelihood estimation method. The fit indices obtained from this model testing are reported in Table 3. Overall, the fit indices indicated that the proposed model showed a good fit to the data. Specifically, the value of χ^2/df was 1.444, which was below the recommended cut-off of 2.0. The RMSEA value was 0.033, lower than the threshold of 0.06. In addition, the values of GFI, AGFI, NFI, and CFI were 0.971, 0.956, 0.969, and 0.990, respectively, all exceeding the recommended standard of 0.90. Since all fit indices satisfied the suggested criteria (Hu & Bentler, 1999), the proposed model showed a good fit to the observed data.

Path relationship test: Perceived usefulness of GenAI

Following the correlation analysis, SEM was conducted to test the hypothesized relationships among the variables. As shown in Table 4, the perceived usefulness of GenAI had a significant positive effect on resilience ($\beta = 0.732$, $t = 11.483$, $p < 0.001$), supporting H1. Resilience also showed a significant positive effect on academic engagement ($\beta = 0.201$, $t = 2.521$, $p < 0.01$), supporting H2. In addition, the perceived usefulness of GenAI significantly predicted academic engagement ($\beta = 0.711$, $t = 5.893$, $p < 0.001$), supporting H3.

To further examine H4, the mediating role of resilience in the relationship between perceived usefulness of GenAI and academic engagement was tested using bootstrap procedures with 5000 resamples.

Table 2. Descriptive statistics and correlations (N = 421)

Variables	Correlations		
	1	2	3
1. Perceived Usefulness of GenAI	1		
2. Resilience	0.607**	1	
3. Academic Engagement	0.603**	0.471**	1
Mean	3.33	3.34	3.18
SD	0.96	0.81	0.71

Note. **$p < 0.01$

Table 3. Fit indices of the model-fit test for hypothetical model in Figure 1

	χ^2/df	RMSEA	GFI	AGFI	NFI	CFI
Standard values	<2.0	<0.06	>0.90	>0.90	>0.90	>0.90
Revised model	1.444	0.033	0.971	0.956	0.969	0.990

Resilience as a mediator

The bootstrapping analysis results are presented in Table 5. As shown, the indirect effect of the perceived usefulness of GenAI on academic engagement through resilience was significant (Estimate = 0.223, $p = 0.006$, 95% CI [0.067, 0.429]), indicating that resilience played a mediating role. The mediation results indicated that resilience partially mediated the relationship between perceived usefulness of GenAI and academic engagement. After resilience was included in the model, the direct effect of perceived usefulness of GenAI on academic engagement remained significant (Estimate = 1.078, $p < 0.001$, 95% CI [0.775, 1.429]). This suggests that perceived usefulness of GenAI may promote academic engagement in both direct and indirect ways. On the one hand, students who perceive GenAI as useful may become more engaged in academic activities directly. On the other hand, such positive perceptions may also strengthen learners' resilience, which in turn supports their academic engagement. Therefore, resilience did not fully account for the relationship between perceived usefulness of GenAI and academic engagement. Rather, it served as a partial mediator, providing support for H4.

Discussion

The findings provide support for H1 by showing that students with stronger perceptions of GenAI usefulness tended to report higher resilience. This suggests that GenAI may not only help learners improve efficiency or complete academic tasks, but may also provide a form of psychological support when they encounter learning challenges (Davis, 1989). In this sense, the result extends existing discussions of technology acceptance. Previous studies have mainly understood perceived usefulness in relation to learners' willingness to adopt digital tools in general educational settings (Al-Okaily, 2025; Balaskas et al., 2025). By focusing on Mongolian trilingual learners, the present study shows that perceived GenAI usefulness may also help students respond to academic stress and language-related challenges. For these learners, GenAI can support complex linguistic tasks and translanguaging practices. When students feel that GenAI helps them manage these tasks, they may develop a stronger sense of control over their learning. This sense of control can further strengthen their academic hardiness and help them cope with the pressures of linguistic assimilation. Therefore, the result suggests that technology acceptance may be an important factor in the development of psychological resilience in minority education contexts (Zhang, 2025).

The findings further support H2 by showing that resilience has a significant positive effect on academic

Table 4. Test results for path relationships

Hypothetical path			β	B	S.E.	t	p
Resilience	→	Academic engagement	0.201	0.083	0.033	2.521	**
Perceived usefulness of GenAI	→	Resilience	0.732	2.671	0.233	11.483	***
Perceived usefulness of GenAI	→	Academic engagement	0.711	1.078	0.183	5.893	***

Note. ** represents $p < 0.01$; *** represents $p < 0.001$.

Table 5. Bootstrapping results for the mediation analysis

Parameter	Estimate	95% CI		p	Percent
		Lower	Upper		
Total	1.301	0.972	1.666	0.000	–
Direct	1.078	0.775	1.429	0.000	82.9%
Indirect	0.223	0.067	0.429	0.006	17.1%

engagement. This result is consistent with the PP perspective, which views internal character strengths as important resources for academic flourishing. In second language learning, resilience can help students manage stress, maintain well-being, and stay involved when they face difficulties. Previous studies have shown that resilience benefits learners in majority student groups (Liu et al., 2022). However, the present study extends this understanding to Mongolian trilingual learners, who often face more complex cultural and linguistic pressures. For these students, resilience may help them maintain psychological stability while continuing to participate actively in learning. From this perspective, resilience can be seen as an inner source of support for learners. The results further suggest that resilience plays an important role in sustaining students' academic engagement. Learners who demonstrate stronger resilience tend to sustain their involvement in academic learning more effectively. Even when they are faced with the pressures of multilingual learning and the need to respond to different cultural expectations, they are better able to participate consistently in learning activities and engage with academic tasks in a more meaningful way. This finding highlights the particular importance of resilience in supporting learners' continued effort in complex multilingual learning environments (Chen et al., 2025).

The findings provide further support for H3, indicating that perceived usefulness of GenAI has a significant positive effect on academic engagement. From the perspective of CVT, this relationship can be understood in terms of students' value appraisals. When learners view GenAI as a useful tool that can help them complete academic tasks more effectively, they are more likely to recognize its academic value and become more willing to participate in learning activities. In this way, positive perceptions of GenAI may enhance learners' autonomous motivation and encourage deeper involvement in their academic work. This finding is also consistent with previous studies on value appraisals in AI-mediated learning environments (Yang, 2026; Zhao & Yang, 2026). However, the present study offers a more specific explanation by considering the socio-cultural context of Inner Mongolia. In this context, GenAI may not only serve as a practical learning tool, but also help minority students manage and affirm their multilingual identities. Compared with studies conducted in more general educational settings (Wang & Guo, 2026), the present findings show that the perceived usefulness of GenAI may have special meaning for Mongolian multilingual learners. When students feel that GenAI helps them move across different languages more effectively, they may become more emotionally involved and more interested in their learning (Derakhshan & Li, 2026).

The results support H4 by showing that resilience partially mediates the relationship between perceived usefulness and academic engagement. On the one hand, students who regard GenAI as helpful for learning may become more willing to take part in academic activities. On the other hand, this positive perception may first strengthen their resilience, which then helps them maintain engagement over time. According to the TAM, perceived usefulness indicates that learners accept GenAI as a valuable tool for supporting their learning. From the perspective of CVT, such acceptance may promote engagement because students are more likely to view learning tasks as worthwhile and feel more capable of managing them. Although earlier research has examined resilience as a mediating factor in areas such as peer relationships (Shao & Kang, 2022), the present study applies this mediating mechanism to the context of GenAI-enhanced minority education. These findings highlight the need to support resilience development in GenAI-enhanced learning environments.

Implications for theory, research and practice

The findings of this study provide a clearer understanding of how Mongolian multilingual learners' perceptions of GenAI may support their academic flourishing. In this process, resilience plays a central role as a character strength that helps explain how technology-related beliefs are translated into sustained academic participation (Chen et al., 2021; Kirkpatrick et al., 2025; Martinez et al., 2023). This finding broadens the explanatory scope of the TAM beyond learners' acceptance and intention to use

technology. When students perceive tools such as Gemini as useful for academic learning, they may approach learning difficulties with greater confidence and reduced anxiety. Such a psychological state may create conditions that support the development of "ego resilience," which is consistent with recent research linking GenAI acceptance to learners' psychological readiness (Derakhshan, 2025; Manuel Morales-Rodriguez et al., 2021; Wang & Gao, 2026).

This mechanism is especially relevant for Mongolian multilingual learners, who often move across Mongolian, Chinese, and English in academic and daily communication. Such movement may create emotional pressure because learners need to manage language competition, shifting identity positions, and different academic expectations (Ai et al., 2024; Du & Yang, 2025; Tormon et al., 2023). From the perspective of CVT, when students regard GenAI tools as useful and feel able to use them effectively, they may develop a stronger sense of control over both multilingual learning challenges and technology-related uncertainty (Zhao & Yang, 2026). Resilience further helps learners interpret difficulties in using GenAI as opportunities for improvement rather than as evidence of personal inadequacy, enabling them to maintain cognitive and emotional engagement under heavy cognitive demands (Kirkpatrick et al., 2025; Yao et al., 2025; Lin et al., 2025; Wang & Guo, 2026).

The results also suggest several implications for language teaching in GenAI-enhanced contexts. For example, classroom activities involving GenAI can guide students to manage cross-language interference, reduce the cognitive burden of translation, and critically examine errors or limitations in GenAI-generated responses. In this way, GenAI can serve not only as a source of learning assistance, but also as a means of helping learners develop greater adaptability in multilingual learning environments. With appropriate guidance, students can learn to examine these errors, revise their learning strategies, and develop more flexible responses to learning difficulties. In this way, technical problems in GenAI use can be transformed into meaningful opportunities for building resilience. In addition, classroom practices should help students feel both value and control in their interactions with GenAI. Following CVT, such learning environments may reduce emotional pressure and technical frustration in high-stakes multilingual learning. The integration of translanguaging strategies can further support learners by allowing them to draw on their full linguistic repertoire as a resource for engagement. At the institutional level, GenAI training should therefore go beyond operational skills and include support for students' long-term emotional and cognitive resilience. In this sense, technology may support more than learning itself; it can also create conditions for students' overall character growth and academic development.

Limitations and future directions

Several limitations should be considered when interpreting the findings of this study. The first limitation concerns the research design. Since this study adopted a cross-sectional design, it cannot confirm causal relationships among perceived usefulness of GenAI, resilience, and academic engagement. Future longitudinal research is needed to explore how resilience changes and develops over time in GenAI-enhanced learning environments. Another limitation is related to the research context. This study examined Mongolian learners within a specific multilingual setting. Therefore, future studies could test the same model in other multilingual contexts, including those in the Global South, to determine whether the psychological mechanism identified in this study can be applied across cultures. A third limitation lies in the study's reliance on self-report instruments. Although questionnaires can capture learners' perceptions and subjective experiences, they may not fully reflect how students actually sustain effort or participate in academic activities in real learning contexts. Future research could address this limitation by incorporating behavioral evidence, such as task completion records, learning logs, or longitudinal patterns of GenAI tool use.

Conclusion

In conclusion, the present study shows that Mongolian multilingual learners' perceived usefulness of GenAI is positively related to their academic engagement, and that this relationship is partly mediated by resilience. By integrating the TAM, CVT, and PP, this study further suggests that GenAI-related perceptions should be understood not only as indicators of tool acceptance, but also as factors that shape learners' psychological resources. For students learning Mongolian, Chinese, and English simultaneously, GenAI may therefore support not only learning efficiency, but also resilience, character development, and long-term academic growth.

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Availability of Data and Materials: The data sets generated and analysed during the current study are available from the corresponding author upon reasonable request.

Ethics Approval: All procedures performed in this study involving human participants were following the ethical standards of the Ethics Committee of Inner Mongolia University (No. IMUFLC20250715). Informed consent was individually obtained from all participants, who were assured of the voluntary and anonymous nature of the study.

Conflicts of Interest: The authors declare no conflicts of interest.

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