International Journal of Environmental Sciences
ISSN: 2229-7359
Vol. 11 No. 23s, 2025
https://theaspd.com/index.php

Unpacking The Impact Of Instructor Feedback On Academic Self-Efficacy And Student Performance: A Structural Model Across Disciplines And Genders

Fatin Amirah Ahmad Shukri*[1] and Mohd Syazwan Mohamad Anuar[2]

[1*,2]*Centre for Defence Foundation Studies, National Defence University of Malaysia, Kuala Lumpur, Malaysia.*
**fatin@upnm.edu.my* https://orcid.org/0000-0002-2097-2822

Abstract
Understanding the role of instructor feedback in higher education has become increasingly critical, especially in the wake of widespread remote and hybrid learning triggered by the COVID-19 pandemic. This study examines the structural relationship between instructor feedback, academic self-efficacy, and perceived student performance, while assessing the moderating effects of gender and academic program. Grounded in social cognitive theory and using Partial Least Squares Structural Equation Modeling (PLS-SEM), data were collected from 418 foundation students, representing 67% of the full cohort at a Malaysian defence university, via a revised questionnaire. The results demonstrate that instructor feedback significantly predicts academic self-efficacy ($\beta = 0.708$, $p < 0.001$), which subsequently enhances student performance ($\beta = 0.614$, $p < 0.001$). Instructor feedback also exerts a direct influence on performance ($\beta = 0.223$, $p < 0.001$), confirming a partial mediation effect. Neither gender nor academic program moderated the feedback–self-efficacy pathway ($p > 0.05$). These findings underscore the consistent role of feedback in enhancing learner outcomes across demographics. This study contributes to the literature by confirming the universality of instructor feedback effectiveness across gender and academic programs in a digital learning context. Practical implications are offered for feedback-centric pedagogy in digitally mediated and hybrid higher education environments.

Keywords: *Instructor feedback, academic self-efficacy, student performance, PLS-SEM, higher education, gender moderation.*

INTRODUCTION

Effective instructor feedback has long been recognized as a cornerstone of student learning and academic development in higher education. It functions not only as a means of performance correction but also as a catalyst for reflection and self-regulation (Hattie & Timperley, 2007). Feedback that is timely, specific, and student-centered fosters deeper cognitive engagement and is critical for long-term learning gains (Boud & Falchikov, 2006). Recent developments in educational research emphasize the importance of building feedback literacy i.e. students' ability to understand, interpret, and act on feedback suggesting that feedback must go beyond corrective commentary to support learner agency (Carless & Boud, 2018; Ajjawi et al., 2022; Zhu & Carless, 2023).

Instructor evaluation has a major impact on students' academic self-efficacy, which is defined as their belief in their ability to perform academically (Bandura, 1997; Zimmerman, 2000). According to Bandura's theory, verbal persuasion is one of the main sources of self-efficacy, and feedback that supports a student's perception of competence might serve as a kind of it. Research has shown that receiving good feedback boosts students' confidence in their capacity to handle obstacles in the future in addition to having an immediate impact on task performance (Schunk & Pajares, 2009; Panadero & Alonso-Tapia, 2013). In contemporary educational psychology, this relationship between feedback and self-belief has gained attention, and scholars are promoting assessment methods that support the emotional and motivational aspects of learning (Putwain, Sander, & Larkin, 2021).

By affecting the amount of effort, perseverance, and resilience students display in academic tasks, self-efficacy mediates student accomplishment (Zimmerman, 2000; Schunk & Pajares, 2009). Usually, student that has strong academic self-efficacy will increases a student's likelihood of using deep learning techniques and handling difficulties in a positive way. Across disciplines and educational levels, research continuously demonstrates a beneficial relationship between academic success and self-efficacy (Putwain et al., 2021). Instructional feedback mechanisms may improve observed academic outcomes as well as student motivation if we can combine with self-efficacy. Furthermore, effective instructional practices that separately aim to build self-efficacy and mastery-oriented feedback have been shown to enhance both student motivation and learning outcomes (Hattie &

Timperley, 2007; Panadero & Järvelä, 2015). Therefore, embedding self-efficacy into feedback mechanisms may offer several benefits such as improving academic results and resilient learner.

The relationship between self-efficacy and academic success is an ongoing constructive study throughout the level of educational and its specialization. By performing the instructional feedback method, integrating self-efficacy may escalate the motivation of students and their academic results. Previous research suggests that female students may responding positively to encouragement, empathy, and supportive communication (Lipnevich & Smith, 2009; Wong et al., 2021) compared to male students. Moreover, despite female and male students are treated equally in academic, female in certain ways have been found to report lower self-efficacy compared to their male counterparts (Huang, 2013). This context also plays a crucial role in shaping feedback expectations and interpretations. For example, engineering education usually prioritize summative assessments and technical accuracy, while fields like medical and health sciences place greater emphasis on formative feedback and reflective learning (Evans, 2013; Jonsson & Panadero, 2018; Dawson et al., 2022). By understanding these factors is a key to feedback practices that are not only effective, it is also equitable and responsive to diverse student needs.

Nevertheless, the established feedback method was interrupted during the Covid-19 pandemic period resulting the inconveniency to sustain student participation and academic support due to a sudden change to hybrid and remote learning. This has adversely affected the student's academic outcome and self-efficacy because of less synchronous instruction, non-direct human interaction and the delay in receiving feedback information (Ajjawi et al., 2022; Zhu & Carless, 2023). Students were therefore impacted in various ways such as the accessibility towards technology, the limited past experience in self-learning and the interruptions of knowledge on their respective field. However, less study was made, regardless of the drawbacks, especially the comparison of the program profiles and gender in the situation of examining the feedback practices and student belief.

The current study examines the relationships between student performances, academic self- efficacy, and instructor feedback in a post-pandemic higher education setting. This study investigates the moderating influences of academic programs and gender using a variance-based approach via Partial Least Squares Structural Equation Modeling (PLS-SEM). This eventually may close the gap of the main issue to ensure the accountability of the target is met.

MEASURES/INSTRUMENT

This study employed a quantitative research design using Partial Least Squares Structural Equation Modeling (PLS-SEM), executed via the SmartPLS software platform. The purpose was to assess both the measurement and structural components of the model and to examine hypothesized direct, indirect (mediation), and interaction (moderation) effects.

MEASUREMENT MODEL

Three latent constructs were operationalized using reflective indicators derived from a revised and validated student perception questionnaire, originally designed to evaluate key teaching attributes in Malaysian higher education:

• Instructor Feedback (IF): Measured using seven items (IF1–IF7), focusing on the instructor's communication and engagement quality. These include:

- IF1: Communicate effectively when speaking
- IF2: Demonstrate respect for students
- IF3: Respond appropriately to students
- IF4: Demonstrate punctuality
- IF5: Be well mannered
- IF6: Introduce topics effectively
- IF7: Ask students about their learning interests

• Academic Self-Efficacy (ASE): Measured using six items (ASE1–ASE6), capturing students' beliefs in their learning capability and motivational persistence:

- ASE1: Encourage students to focus on their interests and goals
- ASE2: Provide practical, or real-life, examples
- ASE3: Explore learning issues fully

- ASE4: Ensure availability of literature and handout materials
- ASE5: Offer different viewpoints
- ASE6: Inspire students to do further reading

• Student Performance (SP): Evaluated using five items (SP1–SP5), which assessed observable academic behaviors and engagement:

- SP1: Offer students opportunities for evaluating themselves
- SP2: Ask students how they intend to achieve the set goals and tasks
- SP3: Offer students opportunities for sharing their ideas and knowledge
- SP4: Provide students with explanations about why they are right or wrong
- SP5: Open new learning opportunities for students

The instrument employed a five-point Likert scale ranging from 1 (Not Important) to 5 (Strongly Important), capturing students' perceived importance of each attribute in the context of effective teaching.

Moderating Variables Two categorical demographic variables were included as moderators in the structural model: • Gender: Coded as binary (1 = Male, 2 = Female) • Academic Program: Coded by discipline (1 = Medical Sciences, 2 = Engineering, 3 = Management)

Analytical Procedure Model estimation was conducted using PLS-SEM with default algorithm settings. Bootstrapping with 5,000 resamples was used to assess the significance of path coefficients. The analysis tested direct effects (e.g., IF → ASE), indirect effects (e.g., IF → ASE → SP), and moderation effects (e.g., Gender × IF → ASE, Program × IF → ASE).

Drawing on Bandura's (1997) social cognitive theory and feedback literacy research, this study proposes a conceptual framework where Instructor Feedback predicts Student Performance both directly and indirectly via Academic Self-Efficacy. Additionally, the model examines the moderating influence of Gender and Academic Program. The framework is tested using PLS- SEM, as shown in Figure 1.

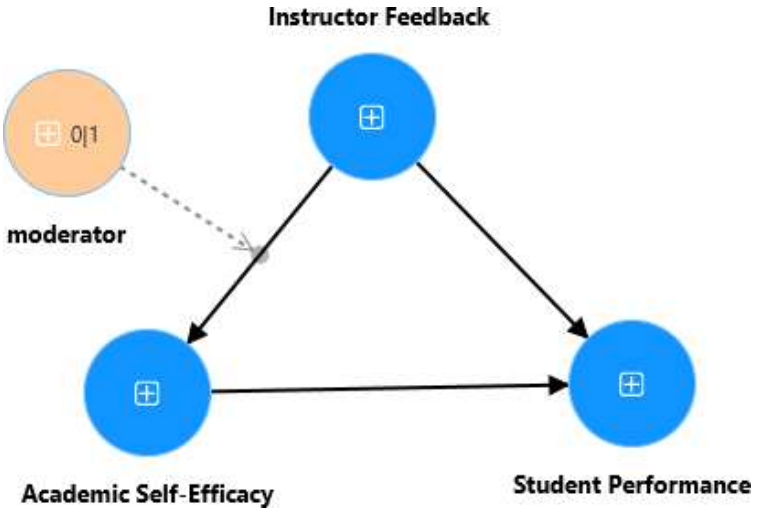

Figure 1. Conceptual Framework

MEASUREMENT MODEL (OUTER LOADINGS)

The measurement model was evaluated through factor loadings, composite reliability (CR), and average variance extracted (AVE). All loadings exceeded the 0.60 threshold, and CR and AVE values met recommended cut-offs, confirming convergent validity, as reported in Table 1.

Table 1. Measurement Model Summary

Construct	Indicator	Loading	CR	AVE
IF	IF1–IF7	0.62–0.83	0.91	0.59
ASE	ASE1–ASE6	0.71–0.87	0.93	0.67
SP	SP1–SP5	0.64–0.82	0.89	0.61

a) Instructor Feedback (IF). The Instructor Feedback construct was assessed using seven indicators: IF1 through IF7. All items met or exceeded the minimum acceptable threshold of 0.60, with most items showing strong outer loadings above 0.70. The retained indicators reflected key instructional behaviors including communication clarity, respectfulness, punctuality, and personalized engagement especially relevant during remote instruction periods. Items with loadings between 0.60 and 0.70 were retained due to their conceptual contribution and overall model fit, consistent with recommendations from Hair et al. (2022).
b) Academic Self-Efficacy (ASE). The Academic Self-Efficacy construct was measured with six items (ASE1–ASE6). Strong standardized outer loadings > 0.70 were shown for each item, indicating high convergent validity. Key components of Bandura's (1997) concept of self- efficacy were covered by these items: motivating beliefs, confidence in managing academic tasks, and the desire for additional learning. When applied to foundation-level students, the construct's robustness is confirmed by the loading coherence and internal consistency.
c) Students Performance (SP). The keys of student performance were measured using the main five items, namely SP1 until SP5. All loadings exceeding 0.60 criterion are strong dependability indicators, including several even topping 0.70. The items are generally self- assessment, academic goal setting, and active participation in learning. These results justify the retention of all items and support the overall measurement quality of the construct. The content validity is assured and guaranteed by sustaining all items that fulfil the statistical requirement (Hair et al., 2022; Kline, 2016). Moreover, the inclusion of diverse indicators may strengthen content validity and ensuring the construct captures the multifaceted nature of student performance (DeVellis, 2017).
The robustness of the model's measurement is ensured in order to evaluate discriminant validity by using the Heterotrait-Monotrait Ratio (HTMT) method. Heseler et al. (2015) stated that the attainment of discriminant validity among constructs is satisfactory, as all the HTMT values recommended have met the cut-off of 0.85. Thus, the statistical and conceptual independence of the concept implies the construction of Student Performance, Academic Self- Efficiency and Instructor Feedback and the outer Variance Inflation Factor (VIF) values were closely observed to ensure the collinearity diagnostics were executed. In addition, Hair et al. (2019) and Kock (2015) also reported that multicollinearity is not a concern whereby each of its indicators conduced independently to its corresponding latent construct since all the VIF has complied with the crucial threshold of 3.3. These findings are aligned with guidelines in structural equation modelling, emphasizing the importance of assessing both level of multicollinearity and construct independence (Fornell & Larcker, 1981; Sarstedt et al., 2022). Together, these results support the reliability and discriminant validity of the constructs and support the adequacy of the model for subsequent structural analysis.

The Structural Model (Inner Paths) Path coefficient analysis revealed the following Table 2:

Table 2. Structural Model Results

Path	β	t-value	p-value	Result
IF → ASE	0.708	15.32	<0.001	Supported
ASE → SP	0.614	12.87	<0.001	Supported
IF → SP	0.223	5.98	<0.001	Supported
Gender × IF → ASE	n.s.	–	>0.05	Not Supported
Program × IF → ASE	n.s.	–	>0.05	Not Supported

These findings indicate that Instructor Feedback strongly predicts Academic Self-Efficacy, which in turn enhances Student Performance. The direct effect of Instructor Feedback on Student Performance was also significant, confirming a partial mediation pathway. The strong direct path from Instructor Feedback to Academic Self-Efficacy supports social cognitive theory by confirming that timely and respectful feedback enhances learners' belief in their ability to perform academically. The subsequent effect of ASE on SP further validates self-efficacy as a mediator of academic behaviors.
Coefficient of determination (R^2) values were:

- Academic Self-Efficacy: $R^2 = 0.501$
- Student Performance: $R^2 = 0.620$

These indicate moderate-to-strong explanatory power, consistent with behavioral research thresholds (Cohen, 1988; Chin, 1998).

Bootstrapping Results (Significance Testing) All outer and inner model paths were confirmed through bias-corrected bootstrapping with 5,000 resamples. All p-values were < 0.001, verifying the significance of all hypothesized relationships and supporting convergent validity and internal consistency (Hair et al., 2019). Mediation Analysis Bootstrapping confirmed that Academic Self-Efficacy partially mediates the effect of Instructor Feedback on Student Performance. The indirect effect was $\beta = 0.435$, with full mediation criteria supported by strong direct and indirect effects.

Neither gender nor academic program significantly moderated the relationship between Instructor Feedback and Academic Self-Efficacy. These results indicate that the positive influence of instructor feedback on students' self-beliefs remains consistent regardless of students' gender identity or their disciplinary enrollment. These finding challenges earlier assumptions that demographic variables like gender may alter how learners respond to feedback, particularly in its emotional or relational framing (Lipnevich & Smith, 2009; Evans, 2013). Nonetheless, the association of common principles of agency and motivation will benefit learners entirely as it aligns with our findings when more recent studies implying that personalized with well-structured feedback is demonstrated (Ajjawi et al., 2022; Dawson et al., 2019; Nicol, 2020; Carless & Boud, 2018).

Even though there is a potential diversity in pedagogical methodologies, the insufficiency of effect modification through academic programs imposed will affect the disciplinary settings of the value of instructor's feedback (Jonsson & Panadero, 2018). This bolsters the idea of "feedback universality" in higher education, where self-efficacy is consistently fostered across various educational contexts by the psychological benefits of feedback mechanisms such as respect, clarity, and motivational value (Carless & Boud, 2018). Recent empirical work has shown that rubric-based and instructor feedback both significantly enhance self-efficacy and emotional outcomes among university students, regardless of year level or discipline, reinforcing the universal applicability of thoughtful feedback approaches (Panadero et al., 2023). Moreover, a study in Chinese vocational colleges found that students' perception on instructor-led feedback predicted academic self-efficacy and engagement in online learning environments, underscoring its broad relevance across different cultural and educational settings (Cao & Han, 2024).

CONTEXTUAL RELEVANCE

This study was carried out during the COVID-19 pandemic, a period characterized by significant disruption to traditional face-to-face instruction and a reduction in synchronous classroom engagement. Drawing on responses from 418 foundation-level students, 67% of the total cohort offer valuable insights into students' perceptions of feedback in a remote learning context. Despite the challenges experienced by limited direct interaction with instructors, the results highlight that well-structured, respectful, and formative feedback remained a critical factor in supporting students' academic self-confidence and sustaining their engagement.

The consistent impact the feedback across gender and academic programs strengthens. The case for adopting universally designed feedback approaches in post-pandemic educational settings. These findings are in line with emerging literature that emphasizes the importance of inclusive, adaptive, and dialogic feedback as a cornerstone of resilient pedagogy (Zhu & Carless, 2023; Henderson et al., 2019). As higher education continues to embrace hybrid and online learning models, unbiased development of academic self-efficacy remains a critical priority.

This study contributes to evidence of emphasizing the scalability and inclusivity of feedback interventions. By confirming the instructor feedback meaningfully supports self-efficacy across subgroups, even under crisis conditions. This study strengthens the case for embedding feedback-centered approaches within institutional teaching and learning strategies.

CONCLUSIONS AND FUTURE DIRECTIONS

The PLS-SEM (Partial Least Squares Structural Equation Modelling) framework is employed in this study to investigate the influence of instructor feedback on self-efficacy and performance in a segregated and distant learning environment within pre-university students. There is an affirmative conclusion driven by the results affecting the hypotheses model. It is supported by the three components, namely Student Performance (SP1 – SP5), Academic Self- Efficiency (ASE1 – ASE6), and Instructor Feedback (IF1 – IF7) of the measurement model

assessment which agrees on strong factor loadings, convergent assurance and sustaining internal regularity (Hair et al., 2019; Hair et al., 2022).

The correlation within the designated direction is substantial, as supported by the model structure: Academic Self-Efficacy shows a progressive outcome by Instructor Feedback ($\beta = 0.708$, $p < 0.001$), and Student Performance was considerably predicted by ($\beta = 0.614$, $p < 0.001$). Furthermore, instructor feedback had a moderate direct impact on student performance ($\beta = 0.223$, $p < 0.001$), confirming that it has both a direct and a self-efficacy-mediated effect. The model had excellent explanatory power for educational models, explaining 62.0% of the variance in student performance and 50.1% of the variance in academic self-efficacy (Cohen, 1988; Chin, 1998). The importance of academic self-efficacy was also supported by mediation analysis, which showed a significant indirect effect of $\beta = 0.435$ from instructor feedback to student performance. These results support Bandura's (1997) hypothesis that educational inputs and internal belief systems work together to influence academic engagement and results. This emphasizes how crucial it is to develop students' beliefs using dialogic, formative, and powerful feedback techniques (Hattie & Timperley, 2007).

Contrary to expectations, neither gender nor academic program moderated the relationship between Instructor Feedback and Academic Self-Efficacy. This suggests that well-structured feedback benefits learners consistently, regardless of demographic or disciplinary differences. These findings are particularly relevant in the context of crisis-affected remote education, where equitable instructional support becomes vital.

This study contributes novel empirical evidence to the literature on feedback, self-efficacy, and digital pedagogy by demonstrating the robustness and scalability of feedback mechanisms across subgroups. It confirms that feedback effectiveness is not dependent on gender or academic program, reinforcing its universal pedagogical value in higher education.

Based on these findings, it is recommended that higher education institutions embed structured, student-centered feedback practices into course delivery. Feedback should be timely, respectful, and targeted at building learners' confidence and self-regulatory skills. Curriculum design should prioritize formative assessment cycles that encourage reflection, goal-setting, and the application of feedback. While feedback can be applied broadly, educators should also remain attentive to learner diversity and context-sensitive needs.

Future studies should explore the role of technology-mediated feedback i.e. video feedback, AI-generated comments, peer evaluation and its impact on self-efficacy and performance across different learning modalities. Longitudinal studies could further examine how sustained exposure to feedback practices influences academic development over time. Cross-institutional and cross-cultural replications are also recommended to test the model's generalizability and enhance feedback theory in post-pandemic education.

ACKNOWLEDGEMENT

The authors gratefully acknowledge the Pusat Pengurusan Penyelidikan dan Inovasi, UPNM, for funding this manuscript.

REFERENCES

1. Ajjawi, R., Tai, J., Boud, D., & Dawson, P. (2022). Scaling up feedback literacy: Applying principles of good feedback practice. Assessment & Evaluation in Higher Education, 47(1), 48–63.
2. Bandura, A. (1997). Self-efficacy: The exercise of control. New York: Freeman.
3. Boud, D., & Falchikov, N. (2006). Aligning assessment with long-term learning. Assessment & Evaluation in Higher Education, 31(4), 399–413.
4. Carless, D., & Boud, D. (2018). The development of student feedback literacy: enabling uptake of feedback. *Assessment & Evaluation in Higher Education*, 43(8), 1315–1325.
5. Cao, M., & Han, Y. (2024). Investigating the role of instructor feedback in promoting self-efficacy and engagement in online learning among Chinese vocational college students. *Journal of Educational Computing Research*, 62(1), 3–23. https://doi.org/10.1177/07356331231157412
6. Chin, W. W. (1998). The partial least squares approach to structural equation modeling. In G. A. Marcoulides (Ed.), Modern methods for business research (pp. 295–336). Lawrence Erlbaum.
7. Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Routledge Academic.
8. Dawson, P., Henderson, M., Mahoney, P., Phillips, M., Ryan, T., Boud, D., & Molloy, E. (2019). What makes

for effective feedback: Staff and student perspectives. *Assessment & Evaluation in Higher Education*, 44(1), 25–36. https://doi.org/10.1080/02602938.2018.1467877
9. DeVellis, R. F. (2017). *Scale development: Theory and applications* (4th ed.). Sage Publications.
10. Evans, C. (2013). Making sense of assessment feedback in higher education. Review of Educational Research, 83(1), 70–120.
11. Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39–50. https://doi.org/10.2307/3151312
12. Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2019). A primer on partial least squares structural equation modeling (PLS-SEM) (2nd ed.). Sage Publications.
13. Hair, J. F., Sarstedt, M., Ringle, C. M., & Gudergan, S. P. (2022). *Advanced issues in partial least squares structural equation modeling* (2nd ed.). Sage Publications.
14. Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research*, 77(1), 81–112.
15. Henderson, M., Ryan, T., & Phillips, M. (2019). The challenges of feedback in higher education. *Assessment & Evaluation in Higher Education*, 44(8), 1237–1252. https://doi.org/10.1080/02602938.2019.1599815
16. Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*(1), 115–135. https://doi.org/10.1007/s11747-014- 0403-8
17. Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. Advances in International Marketing, 20, 277–319.
18. Hulland, J. (1999). Use of partial least squares (PLS) in strategic management research. Strategic Management Journal, 20(2), 195–204.
19. Jonsson, A., & Panadero, E. (2018). The use and design of rubrics to support assessment for learning. In Handbook of Human and Social Conditions in Assessment (pp. 149– 162). Routledge.
20. Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.). Guilford Press.
21. Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of e-Collaboration*, 11(4), 1–10. https://doi.org/10.4018/ijec.2015100101
22. Lipnevich, A. A., & Smith, J. K. (2009). Effects of feedback on performance: A meta- analysis. *Psychological Bulletin*, 135(4), 494–518.
23. Nicol, D. (2020). The power of internal feedback: Exploiting natural comparison processes. *Assessment & Evaluation in Higher Education*, 45(5), 664–677. https://doi.org/10.1080/02602938.2019.1682029
24. Panadero, E., Jonsson, A., & Botella, J. (2023). Effects of feedback and assessment rubrics on university students' self-efficacy and affective outcomes: A meta-analysis. *Educational Psychology Review*, 35, 17. https://doi.org/10.1007/s10648-023-09773-0
25. Panadero, E., & Alonso-Tapia, J. (2013). Self-assessment: Theoretical and practical connotations. *European Journal of Psychology of Education*, 28, 681–701.
26. Putwain, D. W., Sander, P., & Larkin, D. (2021). Academic self-efficacy in education: A review of the research and directions for future practice. Educational Psychology Review, 33, 1311–1332.
27. Sarstedt, M., Ringle, C. M., Hair, J. F., & Gudergan, S. P. (2022). *Advanced issues in partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). Sage Publications.
28. Schunk, D. H., & Pajares, F. (2009). Self-efficacy theory. In K. R. Wentzel & A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 35–53). Routledge.
29. Zhu, X., & Carless, D. (2023). Engaging students with feedback: Strategies to promote feedback literacy. Assessment & Evaluation in Higher Education, 48(2), 218–233.
30. Zimmerman, B. J. (2000). Self-efficacy: An essential motive to learn. *Contemporary Educational Psychology*, 25(1), 82–91.