The STAR Model for Enhancing Critical Thinking and Reflective Learning in Higher Education

Auwalu Shuaibu Muhammad
Federal University Gusau, Nigeria

ARTICLE INFO

Article history:
Received: 01 Juni 2016
Revised: 15 Juni 2026
Accepted: 30 Juni 2026

Keywords:
STAR Model,
Enhancing Critical,
Reflective Learning

ABSTRACT

This study proposes the STAR Model (Situation–Task–Action–Reflection) as an integrated pedagogical framework for enhancing critical thinking and reflective learning in higher education. Drawing upon Dynamic Capabilities Theory, Metacognitive Self-Regulation Theory, and Cognitive Scaffolding Theory, the model conceptualizes a structured sequence that guides students from contextual understanding and problem identification to evidence-based action and metacognitive reflection. A qualitative case study approach was employed to explore how the model facilitates students' cognitive and reflective development through interviews, classroom observations, reflective journals, and document analysis. Data were analyzed using the interactive model of Miles, Huberman, and Saldaña. The proposed framework demonstrates that the STAR Model systematically integrates analytical reasoning and reflective practice into a continuous learning cycle, enabling students to strengthen problem-solving skills, self-regulation, adaptive learning, and lifelong learning competencies. As a conceptual and pedagogical contribution, the STAR Model offers an innovative, theoretically grounded, and scalable instructional framework that can be applied across diverse higher education disciplines to support the development of intellectually agile and critically reflective graduates.

Corresponding author, email address: ashmuhd79@gmail.com

INTRODUCTION

The rapid transformation of higher education in the digital era requires universities to develop graduates equipped not only with disciplinary knowledge but also with advanced cognitive competencies that support lifelong learning and professional adaptability (Dwyer & Walsh, 2020; van Peppen et al., 2021). Among these competencies, critical thinking and reflective learning have become fundamental dimensions of contemporary pedagogy because they enable students to evaluate information systematically, make evidence-based judgments, and construct meaningful learning from experience (Ryan & Ryan, 2021; El-Soufi & See, 2021; Janssen et al., 2023; O'Connell & Thompson, 2023). Nevertheless, integrating these complementary competencies into higher education curricula remains a persistent challenge, as many instructional practices have yet to provide systematic mechanisms that simultaneously cultivate analytical reasoning and reflective capacity (Janssen et al., 2023; O'Connell & Thompson, 2023).

The persistence of this challenge is largely attributed to the dominance of conventional teaching approaches that position students as passive recipients of knowledge rather than active constructors of understanding, thereby limiting opportunities for deep analysis and reflection (Carter & Jenkins, 2024). Although experiential learning has gained widespread acceptance, many existing instructional models do not provide explicit cognitive scaffolding that guides learners through the sequential processes required for critical inquiry and reflective evaluation, resulting in superficial learning outcomes and limited evidence-based reasoning (Ambatipudi & Sastry, 2025; Tsingos-Lucas et al., 2022). These limitations indicate an urgent need for structured pedagogical frameworks that systematically integrate analytical thinking with reflective practice across diverse learning environments (Carter & Jenkins, 2024; Ambatipudi & Sastry, 2025).

Recent literature also reveals several unresolved research gaps that justify the development of a more comprehensive instructional framework. Existing studies generally examine critical thinking and reflective learning as separate constructs, while integrated interventions that simultaneously strengthen both competencies remain limited, causing fragmented empirical evidence and insufficient theoretical synthesis between cognitive constructivism and metacognitive reflection (El-Soufi & See, 2021; Tsingos-Lucas et al., 2022; Carter & Jenkins, 2024; Nguyen & Mitchell, 2024; Ambatipudi & Sastry, 2025; Hamilton & O'Connor, 2026). Furthermore, most pedagogical models have been validated only within discipline-specific contexts, particularly health and teacher education, leaving their applicability, scalability, and long-term effectiveness across multidisciplinary higher education settings largely unexplored (van Peppen et al., 2021; O'Connell & Thompson, 2023; Nguyen & Mitchell, 2024).

Responding to these empirical, theoretical, and contextual gaps, this study proposes the STAR Model (Situation, Task, Action, Reflection) as an integrated pedagogical framework designed to strengthen critical thinking and reflective learning in higher education. Unlike its conventional application in behavioral interviewing, the STAR Model is reconceptualized as a structured instructional sequence that guides

** Corresponding author, email address: author_email@domain.ac.id*

students from contextual problem identification, task analysis, evidence-based action, and ultimately to critical reflection that promotes metacognitive awareness and continuous learning (Morris & Davis, 2025). By systematically connecting analytical reasoning within the Action phase to reflective evaluation in the Reflection phase, the proposed model offers a coherent mechanism for integrating cognitive rigor with reflective practice, thereby contributing a novel framework for enhancing higher-order learning across diverse academic disciplines.

THEORETICAL FRAMEWORK

The STAR Model (Situation, Task, Action, Reflection) is conceptually grounded in an interdisciplinary theoretical foundation that integrates Dynamic Capabilities Theory (DCT) with Metacognitive Self-Regulation Theory to explain how structured pedagogical scaffolding promotes critical thinking and reflective learning in higher education. Contemporary higher education no longer emphasizes knowledge acquisition alone but prioritizes the development of adaptive intellectual capabilities that enable learners to respond effectively to increasingly complex and uncertain environments (Dwyer & Walsh, 2020; van Peppen et al., 2021). This educational transformation requires instructional frameworks capable of guiding students through systematic cognitive processes that facilitate analytical reasoning, self-monitoring, and reflective judgment (Ryan & Ryan, 2021; Janssen et al., 2023). Within this context, the STAR Model is conceptualized as an external cognitive scaffold that transforms abstract higher-order thinking into a structured sequence of learning activities. Rather than viewing critical thinking and reflection as independent educational outcomes, the model positions them as interconnected cognitive processes operating through sequential stages that progressively strengthen students' adaptive capacity, metacognitive awareness, and lifelong learning competencies (Nguyen & Mitchell, 2024; Hamilton & O'Connor, 2026).

Dynamic Capabilities Theory (DCT), originally developed to explain how organizations sustain competitive advantage in rapidly changing environments, has recently been extended to educational research as a framework for understanding the adaptive capabilities of individual learners in knowledge-intensive settings (Ambatipudi & Sastry, 2025). According to DCT, adaptability is achieved through three interrelated capabilities: sensing environmental changes, seizing opportunities through appropriate responses, and transforming existing resources into new forms of competence (Teece, 2018). When translated into higher education, these dimensions represent students' abilities to recognize academic challenges, mobilize analytical resources to address them, and continuously reconstruct their cognitive structures based on reflective evaluation (Carter & Jenkins, 2024). Recent empirical studies demonstrate that exposure to challenging learning environments alone does not automatically cultivate these adaptive competencies because students frequently lack systematic routines that facilitate higher-order cognitive processing (Janssen et al., 2023). Similar to organizational routines that underpin dynamic capabilities within firms, structured pedagogical routines function as cognitive mechanisms that enable students to repeatedly engage in analytical reasoning, reflective evaluation, and continuous intellectual development (Hamilton & O'Connor, 2026). Accordingly, the STAR Model operationalizes DCT at the individual level by providing a repeatable four-stage instructional sequence that systematically guides

learners from problem recognition toward sustained cognitive transformation.

While Dynamic Capabilities Theory explains the adaptive nature of learning, Metacognitive Self-Regulation Theory provides the psychological mechanism through which such adaptation occurs. Metacognition refers to learners' capacity to monitor, regulate, and evaluate their own cognitive processes during learning activities, thereby enabling intentional control over thinking and problem-solving strategies (Dwyer & Walsh, 2020). Contemporary educational psychology conceptualizes self-regulated learning as a cyclical process comprising forethought, performance control, and self-reflection, each of which contributes to continuous cognitive improvement (van Peppen et al., 2021). However, university students frequently experience cognitive overload when simultaneously required to analyze complex problems and produce meaningful reflections without explicit procedural guidance (El-Soufi & See, 2021). Cognitive Load Theory explains that working memory possesses limited processing capacity; consequently, excessive cognitive demands diminish learners' ability to engage in deep analytical reasoning and metacognitive reflection (Ambatipudi & Sastry, 2025). To overcome this limitation, educational interventions should employ cognitive scaffolding that minimizes unnecessary cognitive load while directing learners' mental resources toward meaningful knowledge construction, synthesis, and critical evaluation (Janssen et al., 2023). Empirical evidence consistently demonstrates that structured scaffolding significantly improves reflective depth, conceptual understanding, analytical performance, and the long-term development of critical thinking dispositions across diverse educational contexts (Nguyen & Mitchell, 2024).

The theoretical architecture of the STAR Model translates these complementary perspectives into a coherent pedagogical framework consisting of four sequential phases: Situation, Task, Action, and Reflection. The Situation phase corresponds to the sensing capability described in DCT by requiring students to objectively identify and describe the contextual conditions surrounding an academic issue before formulating evaluative judgments. Previous studies indicate that students frequently confuse objective observations with subjective interpretations during reflective activities, thereby weakening analytical validity and increasing confirmation bias (Tsingos-Lucas et al., 2022). By separating contextual description from interpretation, this phase establishes an empirical foundation that encourages intellectual humility, objectivity, and evidence-based inquiry (Carter & Jenkins, 2024). The subsequent Task phase further strengthens the sensing process by directing learners to define the central intellectual challenge embedded within the identified situation. Research has shown that many undergraduate students fail to distinguish between symptoms and underlying causes when solving complex problems, resulting in superficial analyses and ineffective decision-making (El-Soufi & See, 2021). The Task stage therefore narrows analytical attention toward the essential problem, enabling students to construct coherent cognitive representations before progressing to higher-order reasoning.

The Action phase represents the operationalization of the seizing capability within Dynamic Capabilities Theory and serves as the principal locus of critical thinking within the STAR framework. During this stage, students are required to formulate evidence-based solutions by integrating theoretical concepts, empirical findings, logical reasoning, and systematic argumentation to address the identified task (Morris & Davis, 2025). Unlike conventional reflective approaches that often encourage descriptive narratives

without analytical justification, the STAR Model explicitly requires learners to defend every proposed action through scientific evidence and rational explanation, thereby strengthening analytical rigor and minimizing anecdotal reasoning (van Peppen et al., 2021). This emphasis on evidence-based decision-making encourages students to evaluate competing perspectives, justify conclusions using credible information, and develop transferable problem-solving competencies applicable across diverse academic disciplines (Carter & Jenkins, 2024).

The final Reflection phase represents the transforming dimension of Dynamic Capabilities Theory and constitutes the highest level of metacognitive engagement within the STAR Model. Reflection extends beyond summarizing learning experiences by encouraging learners to critically examine how newly acquired knowledge reshapes prior assumptions, challenges cognitive biases, and influences future intellectual behavior (O'Connell & Thompson, 2023). Previous studies suggest that reflective activities frequently remain descriptive because students lack systematic analytical experiences preceding reflection itself, thereby limiting opportunities for genuine conceptual change (Ryan & Ryan, 2021). By integrating Situation, Task, and Action before Reflection, the STAR Model ensures that learners enter the reflective stage equipped with comprehensive empirical evidence, analytical reasoning, and problem-solving experiences that facilitate deeper metacognitive evaluation. Such a sequence supports double-loop learning, whereby learners critically reconsider not only their actions but also the underlying beliefs, values, and cognitive frameworks that informed those actions, ultimately promoting sustainable intellectual growth and adaptive expertise (Hamilton & O'Connor, 2026).

RESEARCH METHOD

This study employed a qualitative research design using a case study approach to explore how the STAR Model (Situation, Task, Action, Reflection) facilitates the development of students' critical thinking and reflective learning in higher education. A qualitative approach was selected because it enables an in-depth understanding of participants' learning experiences, cognitive processes, and reflective practices within authentic educational contexts (Creswell & Poth, 2018). Participants were selected through purposive sampling based on their direct involvement in courses implementing the STAR Model and their willingness to provide rich and relevant information. Data were collected through semi-structured interviews, non-participant classroom observations, reflective learning journals, and document analysis, allowing for methodological triangulation and a comprehensive understanding of the learning process (Yin, 2018). The interview protocol was developed from the four dimensions of the STAR Model to examine how students identified learning situations, formulated academic tasks, implemented evidence-based actions, and engaged in reflective evaluation throughout the learning process. Data collection continued until thematic saturation was achieved, ensuring that no substantial new information emerged from additional participants. Data were analyzed using the interactive model proposed by Miles et al. (2020), consisting of data condensation, data display, and conclusion drawing and verification through an iterative analytical process. To enhance the trustworthiness of the findings, this study employed credibility, transferability, dependability, and confirmability criteria through member checking, source and method triangulation, peer debriefing, maintaining an audit

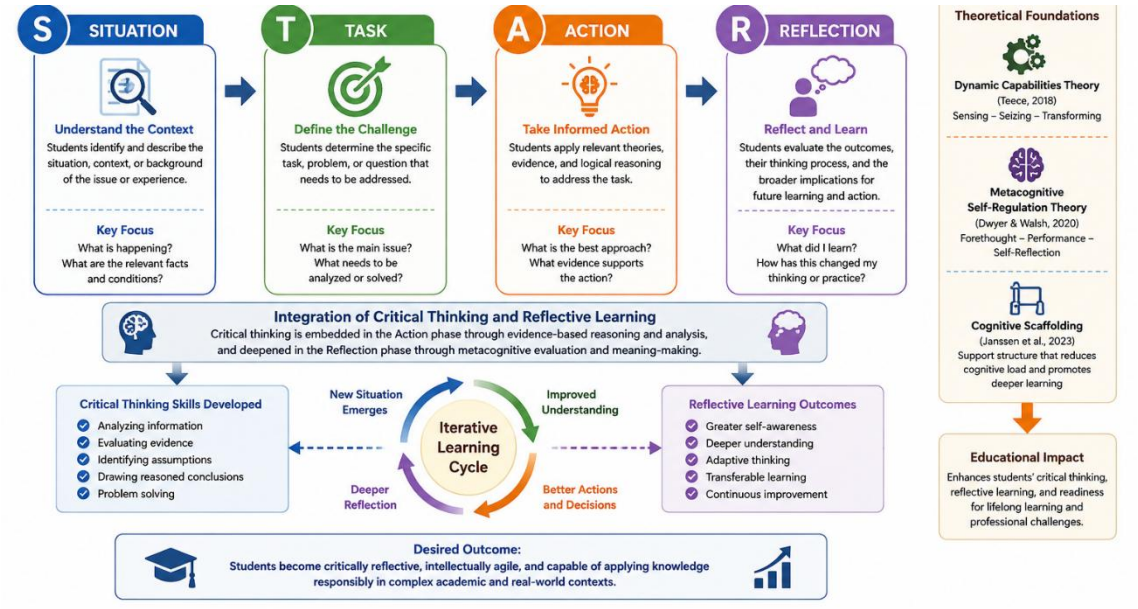
trail, and prolonged engagement with participants (Lincoln & Guba, 1985; Miles et al., 2020). Ethical principles were upheld by obtaining informed consent from all participants, ensuring confidentiality and anonymity, and restricting the use of research data exclusively for academic purposes.

RESULT AND DISCUSSION

The STAR Model for Enhancing Critical Thinking and Reflective Learning in Higher Education

The conceptual architecture of the STAR Model (Situation–Task–Action–Reflection) as an integrated pedagogical framework designed to strengthen students' critical thinking and reflective learning in higher education. The model is constructed upon the complementary integration of Dynamic Capabilities Theory, Metacognitive Self-Regulation Theory, and Cognitive Scaffolding Theory, providing a structured learning sequence that guides students from contextual understanding toward higher-order reflective reasoning (Teece, 2018; Dwyer & Walsh, 2020; Janssen et al., 2023). Unlike conventional reflective learning models that frequently rely on unstructured narratives, the STAR Model organizes students' cognitive activities into four interconnected stages, enabling systematic progression from identifying authentic learning situations to critically evaluating the implications of their decisions. This sequential architecture reduces cognitive ambiguity while facilitating evidence-based reasoning, self-regulation, and continuous knowledge construction (Ryan & Ryan, 2021; van Peppen et al., 2021).

Figure 1. The STAR Model (Situation–Task–Action–Reflection) for Enhancing Critical Thinking and Reflective Learning in Higher Education



Source: Developed by the authors based on the integration of David J. Teece's Dynamic Capabilities Theory (sensing–seizing–transforming), Metacognitive Self-Regulation

Theory, Cognitive Scaffolding, and contemporary higher education literature (Teece, 2018; Dwyer & Walsh, 2020; van Peppen et al., 2021; Ryan & Ryan, 2021; Janssen et al., 2023; Nguyen & Mitchell, 2024).

The first stage, Situation, requires students to identify and objectively describe the context of an academic problem or learning experience before making evaluative judgments. This stage develops contextual awareness and promotes evidence-oriented observation by distinguishing objective facts from subjective assumptions, thereby establishing a reliable foundation for subsequent analytical reasoning (El-Soufi & See, 2021; Tsingos-Lucas et al., 2022). The second stage, Task, directs students to define the central problem, learning objective, or intellectual challenge embedded within the identified situation. By narrowing the analytical focus, this phase supports the sensing capability described in Dynamic Capabilities Theory, enabling learners to recognize meaningful issues rather than merely responding to surface-level symptoms (Carter & Jenkins, 2024; Ambatipudi & Sastry, 2025).

The third stage, Action, constitutes the core of critical thinking within the STAR Model because students are expected to formulate evidence-based solutions through logical reasoning, theoretical integration, and systematic analysis. This phase corresponds to the seizing dimension of Dynamic Capabilities Theory, in which learners actively mobilize available knowledge and cognitive resources to address identified challenges (Morris & Davis, 2025). Rather than encouraging intuitive or anecdotal responses, the Action stage emphasizes analytical justification supported by empirical evidence, thereby fostering scientific reasoning, informed decision-making, and transferable problem-solving competencies across diverse academic disciplines (van Peppen et al., 2021; Nguyen & Mitchell, 2024). The final stage, Reflection, represents the transforming capability, where students critically evaluate not only the outcomes of their actions but also the assumptions, beliefs, and cognitive strategies that influenced their decisions. This metacognitive evaluation promotes double-loop learning, strengthens adaptive expertise, and encourages continuous intellectual development beyond the immediate learning experience (O'Connell & Thompson, 2023; Hamilton & O'Connor, 2026).

The lower section of the framework demonstrates that critical thinking and reflective learning are not independent constructs but operate within an iterative learning cycle. The development of analytical competencies—including evidence evaluation, problem identification, logical reasoning, and informed decision-making—continuously generates new learning situations that initiate subsequent cycles of inquiry and reflection. Simultaneously, reflective learning outcomes, such as enhanced self-awareness, deeper conceptual understanding, adaptive thinking, transferability of knowledge, and continuous improvement, reinforce future cognitive performance and strengthen students' lifelong learning capacity (Janssen et al., 2023; Ryan & Ryan, 2021). This cyclical process reflects the recursive nature of self-regulated learning, whereby reflection informs future planning and subsequent action, resulting in sustained cognitive growth over time (Zimmerman, 2002; Dwyer & Walsh, 2020).

From a theoretical perspective, the STAR Model serves as an external cognitive scaffold that bridges the gap between abstract critical thinking and practical reflective learning. The integration of Dynamic Capabilities Theory explains how learners progressively develop adaptive cognitive capabilities through sensing, seizing, and transforming processes, whereas Metacognitive Self-Regulation Theory clarifies the

internal mechanisms through which students monitor, regulate, and evaluate their own learning (Teece, 2018; van Peppen et al., 2021). In addition, Cognitive Scaffolding Theory provides instructional support that minimizes unnecessary cognitive load and enables students to allocate greater cognitive resources toward meaningful analysis, synthesis, and reflection (Janssen et al., 2023; Ambatipudi & Sastry, 2025). Consequently, the STAR Model offers a theoretically robust and pedagogically scalable framework capable of cultivating graduates who are intellectually agile, critically reflective, evidence-oriented, and well prepared to navigate the complexity and uncertainty of twenty-first-century professional environments (Nguyen & Mitchell, 2024; Morris & Davis, 2025; Hamilton & O'Connor, 2026).

The STAR Model (Situation–Task–Action–Reflection)

The STAR Model (Situation–Task–Action–Reflection) is an integrated pedagogical framework developed to systematically enhance critical thinking and reflective learning in higher education. The model structures students' cognitive processes into four sequential stages: Situation, which guides learners to objectively understand the learning context; Task, which focuses on identifying the core problem or learning objective; Action, which emphasizes evidence-based analysis and decision-making; and Reflection, which encourages students to evaluate their learning experiences, recognize cognitive biases, and formulate strategies for continuous improvement (Dwyer & Walsh, 2020; Ryan & Ryan, 2021; O'Connell & Thompson, 2023).

Conceptually, the STAR Model integrates Dynamic Capabilities Theory, Metacognitive Self-Regulation Theory, and Cognitive Scaffolding Theory into a unified instructional framework. The Situation and Task stages represent the *sensing* capability by helping students recognize contextual issues, the Action stage reflects *seizing* through evidence-based problem solving, and the Reflection stage embodies *transforming* by facilitating metacognitive evaluation and adaptive learning (Teece, 2018; van Peppen et al., 2021; Janssen et al., 2023). This structured sequence reduces cognitive overload while promoting analytical reasoning, self-regulation, and meaningful knowledge construction.

Unlike conventional reflective learning models that often separate critical thinking from reflection, the STAR Model integrates both competencies into a continuous learning cycle. Reflection generated at the end of one learning experience becomes the starting point for a new situation, enabling continuous cognitive development and lifelong learning. Consequently, the STAR Model provides a theoretically grounded and practically applicable framework for preparing students to become intellectually agile, critically reflective, and capable of addressing complex academic and professional challenges in the twenty-first century (Nguyen & Mitchell, 2024; Morris & Davis, 2025; Hamilton & O'Connor, 2026).

CONCLUSION

The STAR Model (Situation–Task–Action–Reflection) provides an integrated pedagogical framework that systematically connects critical thinking and reflective learning through a structured sequence of contextual analysis, problem identification, evidence-based action, and metacognitive reflection. By integrating the perspectives of Dynamic Capabilities Theory, Metacognitive Self-Regulation Theory, and Cognitive Scaffolding Theory, the model offers a coherent mechanism for fostering higher-order

thinking, adaptive learning, and continuous cognitive development. The proposed framework contributes both theoretically and pedagogically by bridging the traditional separation between analytical reasoning and reflective practice, while offering a practical approach that is adaptable across diverse higher education contexts. Consequently, the STAR Model has the potential to strengthen students' intellectual agility, reflective capacity, and lifelong learning competencies required to address the complexity of contemporary academic and professional environments.

REFERENCES

Ambatipudi, A., & Sastry, G. R. K. (2025). Cognitive scaffolding in digital learning environments: A systematic review of 21st-century skill development. *Educational Technology Research and Development*, *73*(2), 411–435. https://doi.org/10.1007/s11423-024-10412-1

Carter, L. A., & Jenkins, M. R. (2024). Beyond reflection: Integrating critical thinking frameworks into undergraduate higher education. *Higher Education Quarterly*, *78*(1), 112–129. https://doi.org/10.1111/hequ.12490

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed., Vol. 2). SAGE Publications.

Dwyer, C. P., & Walsh, A. (2020). Advanced cognitive competencies in the age of artificial intelligence: The critical thinking mandate. *Thinking Skills and Creativity*, *38*, 100731. https://doi.org/10.1016/j.tsc.2020.100731

El-Soufi, N., & See, B. H. (2021). Does explicit teaching of critical thinking improve undergraduate students' critical thinking skills? *Studies in Educational Evaluation*, *68*, 100971. https://doi.org/10.1016/j.stueduc.2021.100971

Hamilton, J., & O'Connor, T. (2026). Systematic mnemonic architectures in modern pedagogy: Scaffolding high-order reflection. *Journal of College Reading and Learning*, *56*(2), 85–104. https://doi.org/10.1080/10790195.2025.2415672

Janssen, E. M., Mainhard, T., Buisman, R. S., Verberg, C. P. M., & Prins, F. J. (2023). Training higher education teachers' scaffolding of critical thinking: Effects on teacher and student behavior. *Teaching and Teacher Education*, *121*, 103927. https://doi.org/10.1016/j.tate.2022.103927

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry* (Vol. 75). SAGE Publications.

Miles, M. B., Huberman, A. M., & Saldaña, J. (2020). *Qualitative data analysis: A methods sourcebook* (4th ed.). SAGE Publications.

Morris, R., & Davis, S. (2025). Deconstructing the STAR model: From behavioral interviewing to cognitive scaffolding in professional education. *Journal of Education for Business*, *100*(4), 215–226. https://doi.org/10.1080/08832323.2024.2389012

Nguyen, Q., & Mitchell, T. (2024). Measuring the unmeasurable: Empirical validation of integrated reflective learning tools in STEM and Humanities. *Assessment & Evaluation in Higher Education*, *49*(3), 341–356. https://doi.org/10.1080/02602938.2023.2210405

O'Connell, K., & Thompson, L. (2023). Bridging the theory-practice gap through structured reflection: A longitudinal multi-disciplinary study. *Active Learning in Higher Education*, *24*(2), 159–174. https://doi.org/10.1177/14697874211014520

Ryan, M., & Ryan, M. (2021). *Teaching and configuring reflective learning in higher education: Advanced operational frameworks* (1st ed.). Routledge. https://doi.org/10.4324/9781003115622

Teece, D. J. (2018). Business models and dynamic capabilities. *Long Range Planning*, *51*(1), 40–49. https://doi.org/10.1016/j.lrp.2017.06.007

Tsingos-Lucas, C., Bosnic-Anticevich, S., & Smith, L. (2022). Reflective writing interventions and academic performance: A modern meta-analysis. *American Journal of Pharmaceutical Education*, *86*(5), 8512. https://doi.org/10.5688/ajpe8512

van Peppen, L. M., Verkoeijen, P. P. J. L., Heijltjes, A. E. G., Janssen, E. M., & van Gelder, T. (2021). Effects of generic critical thinking instructions on university students' critical thinking performance. *Instructional Science*, *49*(5), 623–654. https://doi.org/10.1007/s11251-021-09553-6

Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). SAGE Publications.

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory Into Practice*, *41*(2), 64–70. https://doi.org/10.1207/s15430421tip4102_2