

Towards a Holistic Self-Regulated Programming Learning Model: Integrating Al-Ghazali's Concept of Self-Reflection

Ke Arah Model Pembelajaran Pengaturcaraan Kawalan Kendiri yang Holistik: Mengintegrasikan Konsep Muhasabah Diri Al-Ghazali

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ABSTRACT

Self-reflection is an important component of Self-Regulated Learning (SRL) that helps learners evaluate their performance and improve future learning. However, novice programmers often engage in reflection at a superficial level, focusing mainly on task completion rather than understanding their learning processes. Existing approaches to self-reflection in programming education are largely based on cognitive and metacognitive perspectives, with limited attention given to ethical dimensions. This conceptual paper explores the integration of Al-Ghazali's concepts of *Tafakkur* (deep reflection), *Muhasabah* (self-accountability), and *Adab* (ethical conduct) into Zimmerman's self-reflection phase of SRL. Using a structured review and comparative conceptual analysis, the study examines the relationships between these concepts and contemporary self-reflection theory. The findings indicate several areas of convergence, particularly in self-evaluation, deep reflection, and ethical reflection in learning. The paper argues that Al-Ghazali's concepts may enrich existing understandings of self-reflection and contribute to a more holistic approach to programming learning. The proposed conceptual framework provides a foundation for future empirical studies and the development of a holistic self-regulated programming learning model for novice programmers.

Keywords: *Self-Regulated Learning, Programming Education, Self-Reflection, Al-Ghazali, Tafakkur, Muhasabah, Adab.*

INTRODUCTION

Programming education is widely recognised as one of the most challenging areas in computing education. Previous studies have reported that novice programmers commonly face challenges related



to problem-solving skills, prior knowledge, programming processes, and personal learning characteristics, all of which may affect their ability to learn programming effectively (Ahmad & Ghazali, 2020). Success in programming requires more than technical knowledge; it requires the capacity to manage one's own learning through planning, monitoring, evaluating, and adapting learning strategies. Consequently, Self-Regulated Learning (SRL) has emerged as an important theoretical framework for understanding how learners manage and direct their learning processes in programming education (Zimmerman, 2000; Loksa et al., 2022). Students who effectively employ SRL strategies are better able to overcome programming challenges, persist through difficulties, and achieve improved learning outcomes. Recent research has further highlighted the importance of self-regulated learning elements in introductory programming courses, suggesting that effective planning, monitoring, reflection, and learning management contribute to successful programming learning experiences (Ahmad et al., 2024).

Within the SRL framework, self-reflection plays a particularly critical role. It is widely recognised by researchers and educators as one of the most important dimensions of effective learning because it enables learners to evaluate their performance, identify errors in their reasoning, and adjust their strategies for future tasks (Zimmerman, 2000; Panadero, 2017; Loksa et al., 2022). Empirical evidence consistently demonstrates that novice programmers are among the least reflective learners in higher education, often moving rapidly from one coding attempt to the next without pausing to examine what went wrong, why it went wrong, or how their thinking might be improved (Cheng et al., 2024; Ahmad, 2024). As a result, learners tend to repeat ineffective strategies, limiting their ability to develop sustainable programming competence and independent learning habits.

This gap between the theoretical importance of reflection and its observed underutilisation in practice represents one of the major challenges in programming education research. Existing approaches to promoting self-reflection in programming, including structured journals, code replay systems, AI-generated prompts, and reflective rubrics, have produced promising outcomes (Ahmad, 2024; Masuwai et al., 2024; Hartley et al., 2024). However, these approaches primarily operate within cognitive and behavioural paradigms that emphasise performance improvement and metacognitive regulation. Although beneficial, these methods frequently neglect wider aspects of reflective engagement, such as personal accountability, ethical consciousness, and meaningful processes that could affect learners' motivation and dedication to improve further.

A growing body of educational literature argues that effective learning should be viewed holistically, recognising that cognitive development is closely interconnected with personal values, self-awareness, and reflective practice. In this regard, the integration of perspectives from diverse educational traditions may offer new insights into strengthening existing SRL frameworks. One particularly relevant perspective is found in the educational philosophy of Imam Abu Hamid Al-Ghazali (1058–1111 CE), whose writings in *Ihya' Ulum al-Din* emphasise the importance of self-examination, moral development, and continuous self-improvement as fundamental aspects of learning.

Al-Ghazali's concepts of *Tafakkur* (deep contemplative reflection), *Muhasabah* (honest self-accountability), and *Adab* (ethical conduct in learning relationships) provide a rich framework for understanding reflective practice beyond conventional cognitive evaluation. Although these concepts originate from the Islamic intellectual tradition, their emphasis on self-awareness, responsibility, and ethical learning possesses broader educational relevance. These concepts address the same fundamental question explored in contemporary SRL research: how can learners meaningfully examine their learning experiences, identify areas for improvement, and sustain motivation for future growth? While Zimmerman's (2000) self-reflection phase focuses on self-judgement and self-reaction following learning activities, Al-Ghazali's perspective offers additional dimensions that may deepen the quality and purpose of reflective engagement.

Despite the growing literature on self-regulated learning in programming education and the extensive scholarship on Al-Ghazali's educational philosophy, there has been limited research attempting to establish a theoretical linkage between these two traditions. In particular, the potential contribution of

Tafakkur, *Muhasabah*, and *Adab* to contemporary understandings of self-reflection within programming education remains largely unexplored. This gap is significant because self-reflection functions as a critical mechanism within the broader SRL cycle. Enhanced reflective capacity has the potential to influence subsequent planning, strategy selection, self-monitoring, and learning behaviours, thereby contributing to the development of a more holistic self-regulated programming learning model.

Therefore, this paper explores the theoretical possibility and rationale for integrating Al-Ghazali's concepts of self-reflection with Zimmerman's (2000) self-reflection phase within the context of programming education. The paper is conceptual in nature and does not propose a validated model or claim empirical support for the integration. Rather, it advances a theoretically grounded conceptual argument by identifying areas of convergence between Islamic educational philosophy and contemporary self-regulated learning theory, examining the unique contributions of each tradition to the understanding of self-reflection, and demonstrating why such integration is theoretically coherent and educationally meaningful.

There are three contributions from this paper. First, it identifies and articulates key points of convergence between Al-Ghazali's concepts of *Tafakkur*, *Muhasabah*, and *Adab* and Zimmerman's self-reflection phase within the SRL framework. Second, it highlights how Al-Ghazali's concepts may enrich contemporary understandings of self-reflection within programming education. Third, it outlines future directions for empirical research and model validation that may support the development of a comprehensive self-regulated learning programming model. By bridging insights from contemporary self-regulated learning theory and Al-Ghazali's educational philosophy, this paper contributes to ongoing discussions on how reflective practices can be enriched to support both effective learning and meaningful personal development in programming education.

LITERATURE REVIEW AND THEORETICAL BACKGROUND

Self-Reflection in Self-Regulated Learning

Self-reflection is a fundamental component of Zimmerman's (2000) cyclical model of Self-Regulated Learning (SRL), which consists of three interrelated phases: forethought, performance, and self-reflection. Occurring after task completion, the self-reflection phase comprises two key processes: self-judgement and self-reaction. Self-judgement involves evaluating one's performance against established goals and identifying the causes of success or failure, whereas self-reaction refers to learners' emotional responses and decisions regarding future actions (Zimmerman, 2000; Panadero, 2017).

Within programming education, self-reflection is particularly important because it enables learners to analyze their problem-solving processes, identify conceptual misunderstandings, and improve future learning strategies. However, studies consistently show that novice programmers often engage only in superficial reflection, focusing primarily on whether their code functions correctly rather than examining the reasoning and learning processes behind their solutions (Loksa et al., 2022; Cheng et al., 2024). As a result, they may repeatedly employ ineffective strategies and struggle to develop the adaptive learning behaviors associated with successful self-regulated learners.

Effective self-reflection in programming requires learners to critically evaluate their approaches, identify gaps in understanding, and formulate actionable improvement plans. Yet these metacognitive processes are cognitively demanding and rarely occur spontaneously without instructional support (Ahmad, 2024; Loksa et al., 2022). This limitation highlights the need for approaches that can strengthen learners' engagement in meaningful and sustained reflective practice. Table 1 describes the Self-Reflection components in Zimmerman's Self-Regulated Learning framework.

Table 1: The components of Self-Reflection

SRL Self-Reflection Element	Description	Key Sources
Self-Judgement	Evaluation of performance and causal attribution.	Zimmerman (2000); Panadero (2017)
Self-Reaction	Satisfaction/dissatisfaction and adaptive decisions	Zimmerman (2000); Panadero (2017)

Limitations of Existing Self-Reflection Approaches

Zimmerman's self-reflection model provides a robust framework for understanding how learners evaluate and regulate their learning experiences. Nevertheless, existing approaches to self-reflection in programming education are predominantly grounded in cognitive and behavioral perspectives that focus on performance improvement and metacognitive regulation. While these approaches successfully support learners in monitoring progress and correcting mistakes, they provide limited insight into the deeper motivational, ethical, and relational dimensions that influence the quality of reflective engagement.

In particular, cognitive models offer only partial explanations regarding why learners engage in honest self-evaluation, how they develop accountability for their learning, and how relationships with lecturers and peers shape reflective practices. Reflection is not solely an intellectual activity; it is also influenced by personal values, attitudes, and a learner's willingness to critically examine their own strengths and weaknesses. Consequently, there is a need to explore complementary perspectives that can enrich contemporary understandings of self-reflection beyond purely cognitive considerations.

Al-Ghazali's Concept of Self-Reflection

A potentially valuable perspective is found in the educational philosophy of Imam Abu Hamid Al-Ghazali (1058–1111 CE), whose works emphasize the holistic development of learners through the integration of intellectual, moral, and spiritual dimensions. In Al-Ghazali's view, education extends beyond the acquisition of knowledge and encompasses the cultivation of character, ethical conduct, and continuous self-improvement (Izuddin et al., 2026; Jemeela & Al-Hidabi, 2025).

Three concepts are particularly relevant to the present discussion: *Tafakkur*, *Muhasabah*, and *Adab*. Together, these concepts provide a comprehensive framework for reflective practice that complements contemporary self-regulated learning theory.

Table 2: Mapping concept of Tafakkur, Muhasabah, and Adab with Self-Reflection

Concept	Description	Relevance to Self-Reflection	Key Resources
<i>Tafakkur</i>	Deep contemplative reflection that seeks understanding, meaning, and insight.	Encourages learners to move beyond surface evaluation and critically examine their learning experiences.	Al-Ghazali (2018); Shahzadi et al. (2021)

Muhasabah	Honest self-accountability and self-examination of one's actions, intentions, and performance.	Supports sincere self-evaluation and identification of areas for improvement.	Masuwai et al. (2024); Al-Ghazali (2018)
Adab	Ethical conduct and appropriate behaviour in learning relationships.	Promotes openness to feedback, respectful engagement with lecturers and peers, and reflective learning within social contexts.	Izuddin et al. (2026); Jemeela & Al-Hidabi (2025)

Table 2 explains the concept of *Tafakkur*, *Muhasabah*, and *Adab* and the relevance to self-reflection. According to Al-Ghazali, *Tafakkur* encourages learners to engage in deep and purposeful contemplation, examining not only what happened during learning but also why it happened and what lessons can be derived from the experience (Al-Ghazali, 2018; Shahzadi et al., 2021). *Muhasabah* emphasizes honest self-examination and accountability, encouraging learners to critically evaluate their efforts, decisions, and outcomes in pursuit of continuous improvement (Masuwai et al., 2024; Al-Ghazali, 2018). *Adab* provides the ethical foundation for learning by shaping how learners interact with lecturers, peers, and feedback processes, thereby influencing the quality of reflective engagement (Izuddin et al., 2026; Jemeela & Al-Hidabi, 2025).

Although these concepts originate from the Islamic educational tradition, they address issues that are highly relevant to contemporary educational contexts, including self-awareness, accountability, ethical learning behavior, and personal development. Collectively, *Tafakkur*, *Muhasabah*, and *Adab* offer dimensions of reflective practice that extend beyond cognitive self-evaluation and provide a broader foundation for understanding self-reflection in programming education.

METHODOLOGY

This study adopts a conceptual paper approach to explore the theoretical integration of Al-Ghazali's concept of self-reflection with Zimmerman's Self-Regulated Learning (SRL) model in the context of programming education. Conceptual research seeks to develop new perspectives, clarify relationships between existing theories, and generate theoretical propositions by synthesizing and analyzing relevant literature rather than collecting primary empirical data.

Relevant literature was searched using Scopus and Google Scholar. Searches were conducted using combinations of keywords such as "*self-regulated learning*", "*programming education*", "*self-reflection*", "*Zimmerman*", "*Al-Ghazali*", "*Tafakkur*", "*Muhasabah*", and "*Adab*". Boolean operators (AND/OR) were used where appropriate to refine the search results. The retrieved literature was then screened based on its relevance to the theoretical focus of this conceptual paper.

Relevant literature was then identified through a structured review of scholarly sources related to self-regulated learning, programming education, self-reflection, and Al-Ghazali's educational philosophy. A total of 17 key references were selected for analysis, comprising six studies on self-regulated learning and programming education, nine studies on Al-Ghazali's educational thought and Islamic education, and two supporting studies on reflective practices and technology-enhanced learning. Relevant sources were identified from peer-reviewed journal articles, conference proceedings, books, and scholarly publications addressing self-regulated learning, metacognitive reflection, Islamic educational thought, and reflective learning practices. Particular attention was given to Zimmerman's (2000) self-reflection phase and Al-Ghazali's concepts of *Tafakkur*, *Muhasabah*, and *Adab*.

The analysis was carried out in three stages. First, key concepts and elements associated with self-reflection within Zimmerman's Self-Regulated Learning framework were identified and synthesized from literature on self-regulated learning and programming education. Second, the selected Al-Ghazali's

concepts of *Tafakkur*, *Muhasabah*, and *Adab* were examined to determine their educational meanings and implications for reflective learning. Third, a comparative conceptual analysis was conducted to identify areas of convergence between the two perspectives. Based on these convergences, the study developed a theoretical explanation of how Al-Ghazali's concepts may enrich contemporary understandings of self-reflection within programming education.

The study does not seek to test hypotheses or validate a model empirically; rather, it aims to develop a theoretically grounded conceptual framework that may guide future empirical investigations.

FINDINGS AND DISCUSSIONS

Convergences Between Zimmerman's Self-Reflection Phase and Al-Ghazali's Educational Philosophy

A careful comparative analysis of Zimmerman's metacognitive self-reflection phase and Al-Ghazali's concepts of *Tafakkur*, *Muhasabah*, and *Adab* reveals three significant points of convergence. These convergences suggest that the proposed integration is not simply a combination of two different perspectives, but a theoretically coherent alignment of traditions that share a common understanding of meaningful self-reflection.

A comparative analysis identified three key points of convergence between Zimmerman's self-reflection phase and Al-Ghazali's concepts of *Tafakkur*, *Muhasabah*, and *Adab*. These convergences are summarized in Table 3.

Table 3: Points of Convergence Between Zimmerman's Self-Reflection Phase and Al-Ghazali's Concepts

No.	Point of Convergence	Zimmerman's SRL (Self-Reflection Phase)	Al-Ghazali's Concept	Significance for Programming Education
1	Self-Evaluation	Self-judgement: self-evaluation against standards and causal attribution of outcomes	<i>Muhasabah</i> : honest self-accounting and sincere examination of effort and performance	Encourages learners to critically evaluate their understanding rather than focusing solely on program output.
2	Deep Reflection	Self-Reflection: Adaptive inference, deriving meaningful lessons from performance for future improvement	<i>Tafakkur</i> : deep contemplation that promotes understanding and insight	Encourages deeper conceptual understanding and meaningful learning from programming experiences.
3	Ethical Reflection	Self-Reflection: Feedback from teachers and peers as inputs for self-evaluation	<i>Adab</i> : ethical conduct in receiving feedback and engaging with others	Promotes constructive peer learning, respectful feedback, and reflective engagement in collaborative programming environments.

The first convergence relates to honest self-evaluation. Zimmerman's concept of self-judgement requires learners to evaluate their performance against established standards, while Al-Ghazali's concept of *Muhasabah* encourages sincere self-accountability and critical examination of one's efforts and actions. Both perspectives emphasize that meaningful improvement begins with honest reflection on one's learning experiences.

The second convergence concerns the depth of deep reflection. Zimmerman's adaptive inference encourages learners to derive lessons from previous experiences and use them to guide future learning. Similarly, *Tafakkur* promotes deep contemplation and understanding beyond surface-level evaluation. In programming education, this may encourage learners to reflect not only on whether a solution works but also on why it works and what can be learned from the experience.

The third convergence relates to ethical reflection. While Zimmerman's framework recognizes feedback from lecturers and peers as important inputs for self-evaluation, Al-Ghazali's concept of *Adab* provides an ethical foundation for reflective learning. *Adab* emphasizes humility, respect, sincerity, and openness when receiving feedback and interacting with others throughout the learning process. In programming education, these values encourage learners to engage constructively in peer discussions, code reviews, and reflective activities, thereby enhancing both the quality of reflection and the learning experience. By incorporating ethical considerations into reflective practice, *Adab* extends self-reflection beyond cognitive evaluation and promotes responsible and meaningful engagement with learning.

The comparative analysis indicates that Al-Ghazali's concepts of *Muhasabah*, *Tafakkur*, and *Adab* share important similarities with Zimmerman's self-reflection phase. While Zimmerman's framework emphasises self-evaluation and learning improvement, Al-Ghazali's concepts extend reflective practice by incorporating accountability, deeper contemplation, and ethical engagement in learning. These similarities suggest that the integration of both perspectives may contribute to a more holistic understanding of self-reflection in programming education.

Implications for Programming Education

The proposed integration has several implications for programming education. First, it suggests that self-reflection can be strengthened by incorporating values-based reflective practices that encourage learners to engage in deeper and more honest self-evaluation. Second, the concepts of *Tafakkur* and *Muhasabah* may support the development of reflective activities that promote conceptual understanding rather than merely focusing on task completion. Third, *Adab* highlights the importance of ethical and respectful interactions during collaborative learning, peer review, and feedback sessions.

From a theoretical perspective, the integration extends contemporary self-regulated learning theory by introducing ethical and relational dimensions that are often underrepresented in existing programming education literature. The framework also provides a foundation for future empirical studies aimed at validating the proposed relationships and examining their impact on programming learning outcomes.

CONCLUSION

This conceptual paper demonstrates that integrating Al-Ghazali's educational philosophy with Zimmerman's self-reflection phase offers a broader perspective on reflective learning, especially in programming education. Rather than viewing reflection solely as a cognitive process of evaluating performance, the proposed conceptual integration highlights the importance of purposeful contemplation, personal accountability, and ethical engagement in shaping meaningful learning experiences.

The analysis further demonstrated that Al-Ghazali's educational philosophy may complement contemporary SRL theory by extending self-reflection beyond cognitive and metacognitive processes to include ethical, motivational, and relational dimensions. In particular, the concepts of *Muhasabah*, *Tafakkur*, and *Adab* provide additional perspectives that may enrich reflective practices among novice programmers and contribute to a more holistic understanding of self-regulated learning.

This paper does not claim empirical validation of the proposed integration. Rather, it provides a theoretically grounded conceptual framework that highlights potential areas for future investigation. The theoretical framework presented in this study serves as a foundation for future research aimed at validating the proposed relationships and examining their implications for programming education.

As programming education continues to evolve in an era increasingly influenced by artificial intelligence and technology-enhanced learning, the need for meaningful self-reflection remains essential. The integration of Al-Ghazali's concepts with contemporary self-regulated learning theory offers a promising direction for fostering reflective, responsible, and self-regulated learners. Future studies should focus on expert validation, instrument development, and empirical evaluation of the proposed framework to determine its effectiveness in supporting holistic programming learning experiences.

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REFERENCES

- Ahmad, S. N., & Ghazali, J. M. (2020). Programming teaching and learning: Issues and challenges. In *Proceedings of the International Conference on Information Technology and Society (ICITS 2020)*. Faculty of Science and Technology Multimedia, Universiti Islam Selangor.
- Ahmad, S. N., Mohd Ghazali, J., Abdullah Asuhaimi, F., & Baharuddin, H. (2024). Analysis of self-regulated learning elements in introductory computer programming. *Malaysian Journal of Information and Communication Technology (MyJICT)*, 9(1), 11–16. <https://doi.org/10.53840/myjict9-1-174>
- Ahmad, S. N. (2024). A deep dive into self-regulated learning: Reflective diaries role and implementation strategies. *International Journal of Academic Research in Progressive Education and Development*, 13(3). <https://doi.org/10.6007/IJARPED/v13-i3/22080>
- Al-Ghazali, A. H. M. (2018). *Ihya' Ulum al-Din* (Vols. 1–5). Dar al-Kutub al-'Ilmiyyah. (Original work published c. 1107)
- Anam, A. M., Acikgenc, A., Fahmi, M. I., & Alwiyah, N. (2026). The dialectics of metacognition and spirituality: Integrating self-regulated learning within the Islamic intellectual tradition. *Dialogium: Journal of Islamic Studies*, 1(1), 13–26. <https://doi.org/10.1213/djis.v1i1.95707>
- Arifin, Z. (2018). Al-Ghazali's Thought of Islamic Education And its Relevance with the Modern Education. *Khalifa: Journal of Islamic Education*, 2(1), 1-20.
- Cheng, G., Zou, D., Xie, H., & Wang, F. L. (2024). Exploring differences in self-regulated learning strategy use between high- and low-performing students in introductory programming: An analysis of eye-tracking and retrospective think-aloud data from program comprehension. *Computers & Education*, 208, Article 104948. <https://doi.org/10.1016/j.compedu.2023.104948>
- Fairuzzaman, R. R. (2025). Al-Ghazali on self-regulation: The integration from psychological concept. In *Proceedings of Transactions on Islam, Science, and Society (TISS)* (Vol. 1, No. 1, pp. 74–82). Universitas Darussalam Gontor. <https://tiss.proceeding.unida.gontor.ac.id/index.php/tiss/article/view/8>
- Garcia, R., Falkner, K., & Vivian, R. (2018). Systematic literature review: Self-regulated learning strategies using e-learning tools for computer science. *Computers & Education*, 123, 150–163. <https://doi.org/10.1016/j.compedu.2018.05.006>
- Hartley, K., Hayak, M., & Ko, U. H. (2024). Artificial intelligence supporting independent student learning: An evaluative case study of ChatGPT and learning to code. *Education Sciences*, 14(2), Article 120. <https://doi.org/10.3390/educsci14020120>
- Izuddin, A., Muhammad, A. N., & Assegaf, A. R. (2026). Adab in teacher–student relations: An analysis of Al-Ghazali's educational thought. *AL-ADABIYAH: Jurnal Pendidikan Agama Islam*, 7(1). <https://doi.org/10.35719/adabiyah.v7i1.1263>
- Jemeela, J., & Al-Hidabi, D. (2025). Al-Ghazali's framework of teaching professional values: Analyzing the pedagogical principles in Islamic education. *Al-Burhan Journal of Qur'an and Sunnah Studies*, 9(1).
- Loksa, D., Margulieux, L., Becker, B. A., Craig, M., Denny, P., Pettit, R., & Prather, J. (2022). Metacognition and self-regulation in programming education: Theories and exemplars of use.

ACM Transactions on Computing Education, 22(4), Article 39.
<https://doi.org/10.1145/3487050>

- Masuwai, A., Zulkifli, H., & Hamzah, M. I. (2024). Self-assessment for continuous professional development: The perspective of Islamic education. *Heliyon*, 10(19), e38268. <https://doi.org/10.1016/j.heliyon.2024.e38268>
- Panadero, E. (2017). A review of self-regulated learning: Six models and four directions for research. *Frontiers in Psychology*, 8, Article 422. <https://doi.org/10.3389/fpsyg.2017.00422>
- Shahzadi, M., Awan, T. H., & Irfan, F. (2021). Self-regulated learning and Al-Ghazali's theory of education. *South Asian Journal of Social Sciences and Humanities*, 2(2), 172–180.
- Shukor, K. A., Jasmi, K. A., & Safar, A. (2013). Impact of akhlaq self-regulation and self-regulated learning on performance in Islamic education course among premier polytechnic students. In *Proceedings of the First Postgraduate Seminar, Faculty of Islamic Civilization* (pp. 175–202). Universiti Teknologi Malaysia.
- Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 13–39). Academic Press. <https://doi.org/10.1016/B978-012109890-2/50031-7>
- 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