

# INPLASY PROTOCOL

To cite: Fatima et al. Evaluating the effectiveness of instructional strategies in promoting self-regulated learning during clinical clerkship years. A protocol for systematic review. Inplasy protocol 202310065. doi: 10.37766/inplasy2023.1.0065

Received: 19 January 2023

Published: 19 January 2023

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**Support:** This study is  
supported by UMSC Care  
grant PV014-2020.

**Review Stage at time of this  
submission:** Formal screening  
of search results against  
eligibility criteria.

**Conflicts of interest:**  
None declared.

## INTRODUCTION

**Review question / Objective:** Considering the evidence-based beneficial effects of

## Evaluating the effectiveness of instructional strategies in promoting self-regulated learning during clinical clerkship years. A protocol for systematic review

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**Review question / Objective:** Considering the evidence-based beneficial effects of self-regulated learning in medical education, the aim of this systematic review is to determine the instructional strategies used to promote self-regulated learning in medical students during clinical clerkship years. We used the "PICO" framework to formulate the research questions: P - Undergraduate or graduate entry medical students in clinical clerkship years and/or medical teachers in clinical clerkship years. I - Instructional strategy. C - Traditional didactic instructional strategies (where applicable). O- Self-regulated learning or any of its components. To this end, the proposed systematic review will address the following questions: i. What instructional strategies have been used to influence self-regulated learning in medical students during clinical clerkship? ii. What influence did the instructional strategies exert on medical students' self-regulated learning approaches during clinical clerkship?

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 19 January 2023 and was last updated on 19 January 2023 (registration number INPLASY202310065).

self-regulated learning in medical education, the aim of this systematic review is to determine the instructional strategies used to promote self-regulated

learning in medical students during clinical clerkship years. We used the "PICO" framework to formulate the research questions: P - Undergraduate or graduate entry medical students in clinical clerkship years and/or medical teachers in clinical clerkship years. I - Instructional strategy. C - Traditional didactic instructional strategies (where applicable). O- Self-regulated learning or any of its components. To this end, the proposed systematic review will address the following questions: i. What instructional strategies have been used to influence self-regulated learning in medical students during clinical clerkship? ii. What influence did the instructional strategies exert on medical students' self-regulated learning approaches during clinical clerkship?

**Rationale:** In today's era where self-regulated learning is considered necessary to all practicing healthcare professionals as a societal obligation to continuously develop their knowledge, the importance of self-regulated learning in the field of medical education cannot be over-emphasized (10). It is critical for medical doctors to become lifelong proactive learners in order to keep their knowledge up to date and adapt to the fast-changing trends in healthcare. As a result, from the moment they enter medical school, medical students must create a self-regulated attitude to learning, which they must maintain throughout their careers. Many current approaches to teaching and learning in medical education, use certain features of self-regulation theory (11). However, more attention can be paid to the implementation of key self-regulation processes in teaching and learning, such as encouraging and facilitating student goal-directed behaviour, using specific strategies to achieve goals, and adapting and modifying strategies when goals are not met (7). Consequently, medical schools are increasingly being expected to support students' self-directed learning in their curricula (12). A systematic approach to understanding self-regulated learning and the provision of structured training is required to enhance learning and performance. Self-regulation theory is

included in many existing ways to teaching and learning in medical education, and significant research evidence suggests that it might be incredibly beneficial in both undergraduate and postgraduate medical education. (7). Currently, there has been little research in identifying opportunities to integrate self-regulation into existing curricula and for the remediation of underachieving students. (7).

Self-regulated learning processes are of particular importance during clinical clerkship years. Embedding self-regulated learning in classroom teaching is different from embedding self-regulation in clinical teaching and learning activities. Clinical setting is a crucial venue for the reinforcement and extension of self-directed and self-regulated learning skills necessary to integrate self-regulatory behaviours into clinical practice (13). In comparison to classroom settings, active participation in lifelong learning in clinical settings necessitates different learning methodologies and requires metacognitive awareness in students along with the provision of tailored learning opportunities (14). Faculty can demonstrate that practising self-regulation is crucial to becoming a physician by engaging in it through appropriate teaching tactics (13). There are several limitations and challenges due to the lack of specific guidelines for SRL implementation and therefore, further research is needed for structured methods and strategies for its effective implementation in medical students.

The heterogeneity in the published literature on the use of SRL by medical students and teachers provided further impetus for this study. Van Houten (15) conducted a systematic review of self-regulated learning in clinical context that reviewed studies till July 2016. The aforementioned review determines the strategies that promoted self-regulated learning in medical students in their clinical clerkship as well as in medical residents. The review focused on learning in the clinical workplace. Our review aims to overview all the studies that mention strategies used to influence self-regulation in medical students during clinical

clerkship years including learning at clinical learning environment as well as outside clinical workplace over an extended period from January 2012 to December 2022. The findings of the study will help medical educators devise instructional strategies and interventions that support SRL in the clinical clerkship years.

**Condition being studied:** Self-regulation (or self-regulated learning, SRL) refers to learning that results from students' self-generated thoughts and behaviours that are systematically oriented towards the attainment of their learning goals (1). Comprehensively, self-regulated learning has been defined as learning that occurs when one is 'metacognitively, motivationally, and behaviourally proactive in the learning process (2). Self-regulated learners are able to monitor their own progress toward self-set goals and thus reflect on the effectiveness of their learning approaches, have high levels of self-efficacy, and thus engage in and persist with learning behaviours that maximize the degree to which learning occurs (2, 3). Zimmerman's model of self-regulated learning is demonstrated in three iterative phases of forethought, performance, and self-reflection comprising of interconnected, cyclical processes meaning each performance of the task provides feedback for the strategy used in future tasks (4). In the forethought phase, the students approach and analyze the task, assess their capacity and potential to perform it successfully, and establish goals and plans for effective completion (Panadero & Alonso Tapia, 2014). Motivational beliefs and drives influence the standard of goal setting in this phase of self-regulation (5, 6). In the performance phase, the students implement the planned strategies and monitor their progress to ensure they remain focused and motivated (6). In the self-reflection phase, the students judge and evaluate the effectiveness of the implemented strategies and adopt appropriate measures by reviewing the outcomes (6). Self-regulated learning can be significantly useful in two main domains of medical

education: improved academic achievement and enhanced clinical performance (7). Not only academic achievement, but self-regulated learning also influences the mental well-being of students and is negatively associated with depression among medical students (8). Self-regulation in students helps them to seek appropriate help and execute remedial strategies to cope with failures (9). Therefore, it's important to understand the processes of self-regulation in students and build strategies to cultivate self-regulated learning among students.

## METHODS

**Search strategy:** We will be conducting this systematic review according to the guidelines of the Association for Medical Education in Europe (AMEE). The review will be reported using the Structured Approach to the Reporting in the healthcare Education of Evidence Synthesis (STORIES) statement (16). We developed the search strategies according to the guidelines for each database. We used MESH and Boolean operators to refine the search. Filters of period from Jan 2012 to Dec 2022 and English language were applied.

PubMed: (((("Self-Control"[Mesh:NoExp] OR self-regulat\* OR SRL) AND ("Teaching"[Mesh] OR "teaching" OR "method\*" OR "tools" OR "pedagog\*" OR "activit\*" OR "instruction\*" OR "strateg\*")) AND ("Students, Medical"[Mesh] OR "medical education" OR "health profession\* education")) AND ("Clinical Clerkship"[Mesh] OR "Clinical placement" OR "Clinical apprenticeship" OR "Clinical train\*" OR "Clinical clerk\*" OR "Clinical years" OR "clinical context" OR "clinical environment" OR Clinical)

Web of Science: (((ALL=(self-regulat\* OR SRL) AND ALL=(Teaching OR method\* OR "tools" OR "pedagog\*" OR "activit\*" OR "instruction\*" OR "strateg\*")) AND ALL=("medical education" OR "health profession\* education")) AND ALL=(clinical OR "Clinical placement" OR "Clinical apprenticeship" OR "Clinical train\*" OR "Clinical clerk\*" OR "Clinical years" OR

"clinical context" OR "clinical environment" OR "clinical posting")

Scopus: ( ALL ( "self-regulat\*" OR srl ) AND ALL ( "Teaching" OR "method\*" OR "tools" OR "pedagog\*" OR "activit\*" OR "instruction\*" OR "strateg\*" ) AND ALL ( "medical education" OR "health profession\* education" ) AND ALL ( "Clinical" OR "Clinical placement" OR "Clinical apprenticeship" OR "Clinical train\*" OR "Clinical clerk\*" OR "Clinical years" OR "clinical context" OR "clinical environment" OR "clinical posting" ) ) AND PUBYEAR > 2011 AND ( LIMIT-TO ( PUBSTAGE , "final" ) ) AND ( LIMIT-TO ( DOCTYPE , "ar" ) ) AND ( LIMIT-TO ( LANGUAGE , "English" ) )

Ebsco: ("self-regulat\*" OR srl) AND ("Teaching" OR "method\*" OR "tools" OR "pedagog\*" OR "activit\*" OR "instruction\*" OR "strateg\*") AND ("medical education" OR "health profession\* education") AND ("Clinical" OR "Clinical placement" OR "Clinical apprenticeship" OR "Clinical train\*" OR "Clinical clerk\*" OR "Clinical years" OR "clinical context" OR "clinical environment" OR "clinical posting")

Sciencedirect: (("self-regulated learning") AND (teaching) AND ("medical education") AND (Clinical)).

**Participant or population:** The participants are undergraduate or graduate entry medical students and/or medical teachers in clinical clerkship years.

**Intervention:** Instructional strategies that influence self-regulated learning in medical students during clinical clerkship years. In the context of present study, instructional strategies refer to all teaching learning activities that are intentional, meaningful, learner-centered activities and opportunities designed or deployed by medical teachers to bring about, create, and cultivate self-regulated learning among medical students during clinical clerkship years .

**Comparator:** Any traditional didactic or newly developed mode of instruction (where applicable).

**Study designs to be included:** We will be considering quantitative, qualitative, and mixed-method studies to be included in the review. The following study designs will be included in the systematic review: A.Descriptive (Cross-sectional, qualitative) B. Experimental or quasi-experimental (non-randomized controlled trials ) C. Single group pretest-posttest or posttest only D. Analytic observational (cross-sectional, case control, cohort).

**Eligibility criteria:** The inclusion criteria described below are based on the PICOS: Population: The participants in the reviewed studies include undergraduate or graduate entry medical students in clinical clerkship years and/or medical teachers in clinical clerkship. In a setting where professional medical degree program consists of a 3-year Bachelors and a subsequent 3-year Masters in Medicine, the latter will be considered similar to clinical clerkships where medical students are placed in different clinical departments to train for the competencies that a doctor needs. Intervention: Instructional strategies influencing self-regulated learning in medical students during clinical clerkship years. In the context of present study, instructional strategies refer to all teaching learning activities that are intentional, meaningful, learner-centered activities and opportunities designed or deployed by medical teachers to bring about, create, and cultivatable change due to the instructional delivery or experience. Articles in which the outcome establishes the promotion or influene self-regulated learning among medical students during clinical clerkship years. Comparator: Any other teaching method, can be traditional didactic or newly developed (where applicable). Outcome: Studies that assess self-regulated learning as a whole or any of its components including motivation and task analysis, learning strategies and monitoring of performance, and reflection as the measurce on SRL or any of its component even when SRL is not used for conceptualization of the study will also be considered for inclusion. Study types: Quantitative, qualitative, and mixed method studies with a well-established outcome

will be included. Only peer reviewed original articles in English language available in full text form will be considered for inclusion. The exclusion criteria include: Studies involving a health professional educational setting other than medical education (e.g., Nursing, Pharmacy, Dentistry, and other allied health sciences). Articles that exclusively involve pre-clinical medical students and/or postgraduate residents. Articles written in languages other than English. Articles where the outcome of instructional strategy does not clearly establish any influence on self-regulated learning or any of its components. Grey literature including conference proceedings, theses and dissertations, newsletters, informal communications, and pre or post print articles, and non-empirical research.

**Information sources:** A systematic search for relevant articles will be carried out in the following databases: i Web of Science; ii Scopus; iii ScienceDirect; iv EBSCO; v PubMed - In addition to electronic search, hand search for titles and abstracts will be done for the last five years from 2018 to 2022 in the following journals: Academic Medicine, Medical Teacher, and Medical Education. Finally, we will review the bibliographies of the included articles to identify other relevant articles.

**Main outcome(s):** Knowledge, Strategies, and Behaviours. The aim of this review is to analyze the key instructional strategies used to promote SRL in clinical clerkship students. The results of the review will be structured according to research questions and will be qualitatively synthesized. The outcomes of the review will help medical educators to use SRL to its maximum potential in clinical clerkship contexts.

**Quality assessment / Risk of bias analysis:** The methodological quality of all included articles will be assessed by two reviewers independently using the Medical Education Research Study Quality Instrument (MERSQI) (17) for quantitative studies, and Joanna Briggs Institute's critical appraisal checklist for qualitative research (18). Any disagreements will be sorted out by

discussion or consultation with another author with expertise in methodology.

**Strategy of data synthesis:** A data extraction form will be devised to extract relevant information including participants' information, instructional strategy with its conceptualization, any comparative strategy if used, and the results and outcome focusing on the impact on SRL in clinical clerkship. The adapted data extraction form will be pilot tested with 2-3 studies before starting the actual data extraction to identify ambiguous definitions and other areas that may require further clarification (19). Two reviewers will extract data independently and disagreements will be resolved by reaching a consensus or consulting a third reviewer.

Since the research questions can be addressed by both quantitative and qualitative research designs, the convergent integrated approach will be followed for its synthesis and integration (20).

**Subgroup analysis:** Not Applicable.

**Sensitivity analysis:** The studies that score very low on quality assessment will be excluded from final inclusion. Since there are no cut-off values given for the quality assessment tools used in this review, therefore, the decision to include or exclude a study on low methodological quality will be at the researchers' discretion with expert opinion from the authors' team.

**Language restriction:** Only articles published in English language will be considered for inclusion.

**Country(ies) involved:** Malaysia.

**References:**

1. Schunk DH, Zimmerman BJ. Self-regulation and learning. 2013.
2. Zimmerman BJ. Investigating Self-Regulation and Motivation: Historical Background, Methodological Developments, and Future Prospects. *American Educational Research Journal*. 2008;45(1):166-83.

3. Pintrich PR, Smith DA, Garcia T, McKeachie WJ. Reliability and predictive validity of the Motivated Strategies for Learning Questionnaire (MSLQ). *Educational and psychological measurement*. 1993;53(3):801-13.
4. Zimmerman BJ. Attaining self-regulation: A social cognitive perspective. *Handbook of self-regulation*: Elsevier; 2000. p. 13-39.
5. Panadero E, Alonso Tapia J. How do students self-regulate?: review of Zimmerman's cyclical model of self-regulated learning. *Anales de psicología*. 2014.
6. Zimmerman BJ, Moylan AR. Self-regulation: Where metacognition and motivation intersect. *Handbook of metacognition in education*: Routledge; 2009. p. 311-28.
7. Sandars J, Cleary TJ. Self-regulation theory: applications to medical education: AMEE Guide No. 58. *Medical teacher*. 2011;33(11):875-86.
8. Van Nguyen H, Laohasiriwong W, Saengsuwan J, Thinkhamrop B, Wright P. The relationships between the use of self-regulated learning strategies and depression among medical students: an accelerated prospective cohort study. *Psychology, Health & Medicine*. 2015;20(1):59-70.
9. Patel R, Tarrant C, Bonas S, Yates J, Sandars J. The struggling student: a thematic analysis from the self-regulated learning perspective. *Med Educ*. 2015;49(4):417-26.
10. Archbold Hufty Alegría D, Boscardin C, Poncelet A, Mayfield C, Wamsley M. Using tablets to support self-regulated learning in a longitudinal integrated clerkship. *Medical Education Online*. 2014;19(1):23638.
11. Lycke KH, Grøttum P, Strømsø HI. Student learning strategies, mental models and learning outcomes in problem-based and traditional curricula in medicine. *Medical teacher*. 2006;28(8):717-22.
12. Brydges R, Butler D. A reflective analysis of medical education research on self-regulation in learning and practice. *Medical education*. 2012;46(1):71-9.
13. Ricotta DN, Richards JB, Atkins KM, Hayes MM, McOwen K, Soffler MI, et al. *Self-Directed Learning in Medical Education: Training for a Lifetime of Discovery. Teaching and Learning in Medicine*. 2021.
14. Berkhout JJ, Helmich E, Teunissen PW, van den Berg JW, van der Vleuten CP, Jaarsma AD. Exploring the factors influencing clinical students' self-regulated learning. *Med Educ*. 2015;49(6):589-600.
15. Van Houten-Schat MA, Berkhout JJ, Van Dijk N, Endedijk MD, Jaarsma ADC, Diemers AD. Self-regulated learning in the clinical context: a systematic review. *Medical Education*. 2018;52(10):1008-15.
16. Gordon M, Gibbs T. STORIES statement: publication standards for healthcare education evidence synthesis. *BMC medicine*. 2014;12(1):1-9.
17. Reed DA, Cook DA, Beckman TJ, Levine RB, Kern DE, Wright SM. Association between funding and quality of published medical education research. *Jama*. 2007;298(9):1002-9.
18. Lockwood C, Munn Z, Porritt K. Qualitative research synthesis: methodological guidance for systematic reviewers utilizing meta-aggregation. *JBI Evidence Implementation*. 2015;13(3):179-87.
19. Cook DA, West CP. Conducting systematic reviews in medical education: a stepwise approach. *Medical education*. 2012;46(10):943-52.
20. Hong QN, Pluye P, Bujold M, Wassef M. Convergent and sequential synthesis designs: implications for conducting and reporting systematic reviews of qualitative and quantitative evidence. *Systematic reviews*. 2017;6(1):1-14.

**Keywords:** Self-regulated learning; medical education; instructional strategy; clinical clerkship, systematic review.

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