
Original article**Self-Regulated Learning in the University of Tabuk: Gender Differences in Strategy and Outcomes**

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Abstract**Background**

Self-Regulated Learning (SRL) is defined as the adjustment of the individual's affective, meta-cognitive, and behavioral operations during learning to attain the desired level of academic achievement. It is an important skill for undergraduate students and its ignorance cause anxious behavior, a sense of potential failure, and avoidance of learning situations.

Objective

The objective of the study was to explore the pattern of SRL among medical students from a student perspective aiming to recognize the learning context and to provide recommendations for future support strategies.

Methods

This is a cross-sectional study that targeted a total coverage of medical students at the University of Tabuk, Saudi Arabia using a Self-Regulated Learning Questionnaire which composed of six constructs, namely: environment structuring, goal setting, time management, help-seeking, task strategies, and self-evaluation. An independent-samples test, ANOVA, and post-hoc analysis were conducted.

Results

Females agreed on regular practice of the four domains namely: "environmental structuring, time management, help-seeking, and self-evaluation", mean

scores: 3.7(SD=1.023), 3.42(SD=1.035), 3.68(SD=0.99), 3.54(SD=0.94) respectively.

Conclusion

This study identified a remarkable difference in SRL among undergraduate medical students. Females outperformed males in self-regulation; however, both genders in the second year have shown a low level in self-regulation in comparison to fifth year medical students.

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Keywords: Self-regulated learning, academic performance, help-seeking, goal setting, task strategies

Introduction

Self-Regulated Learning (SRL) is defined as the adjustment of the individual's affective, meta cognitive, and behavioral operations during learning to attain the desired level of academic achievement.[1]

SRL is an internal feeling and a finite temporal proactive strategy or response for learning that is naturally initiated by the student.[2] It describes the student's self-learning ability and it is influenced by overlapping and multi-factorial components. Unfortunately, lack of consciousness about SRL is associated with anxious behavior during learning, a sense of potential failure, and avoidance of learning situations.

In recent years, a great concern about SRL has been reflected by researchers in the fields of medical education in higher education in the gulf region in particular. This is partly due to the perceived

education outcomes and/or paucity of published researches tackling self-regulated learning.[3-5]

Mapping SRL at the level of undergraduate medical students is an extremely valuable tool for understanding, monitoring, and planning the learning environment in medical school curricula. This is necessary as most of the surveyed students in the literature were belonged to education and psychology.[6, 7]

Unfortunately, both teacher and student share a common concept by considering the issue of supporting student SRL as a separate topic which is out of the scope of a lecture.[8] As a consequence, University students failed to express their needs for support and then student-teacher communication regarding SRL is very minor.[9]

Zimmerman identified the social and psychological factors as major issues that could affect learning

performance.[10] However, the effect of SRL strategies and techniques on students' academic achievement and life-long learning is evident.[11] Therefore, academic leaders are invited to consider these factors and techniques when analyzing and designing undergraduate curriculum. In this study, we plan to identify the gap in the student SRL strategies regarding gender difference, academic achievement, and class levels.

Exploring SRL among undergraduate medical students is not only impacts the students' life-long learning ability; but will also help in redesigning, updating, and planning the instructional methods of clinical modules. Besides, it could promotes innovating extracurricular activities that support positive learning behavior and a good learning environment inside medical schools.[12, 13]

Research Methods

This is a cross-sectional study involved a total coverage of the undergraduate medical students at the University of Tabuk in the Kingdom of Saudi Arabia. Using a Self-Regulated Learning Strategy Questionnaire (SRLQ) derived from the work of Zimmerman and Barnard, Paton, and Lan .[14,15] The questionnaire consists of six important constructs of SRL, namely: (a) environment

structuring, (b) goal setting, (c) time management, (d) help-seeking, (e) task strategies, (f) and self-evaluation as Likert scales questions for each domain. The investigating team turned the questionnaire items into simple English language in order to facilitate similar understanding of the content of the questionnaire by all respondents. The questionnaire was revised two times for clarity, before and after piloting, in order to guard against any possibility of bias.

The questionnaire was self-administered during final examination immediately at the end of the exam. It was introduced to 500 undergraduate medical students from both genders across all class levels excluding first year students i.e. it includes only medical students from second to fifth years. Almost overall total 262 students responded in full, complete, correct, and accurate manner. First year students were excluded because their teaching environment is different as they belonged to the faculty of science. The selection of the second and fifth years for comparison is based on the idea that the second and fifth years are representing the entry and leaving stages in the life of medical student.

Data Analysis

Data entry, cleaning, and analysis were conducted using SPSS version

21. Arithmetic mean scores of all students regarding SRL strategies were calculated. Then, an independent-samples t-test was conducted to compare the difference in SRL strategies between female students in the 2nd and 5th class levels. A one-way between-subjects ANOVA was conducted to compare SRL strategies between male and female student groups; and to compare the effect of SRL strategies on grade point average (GPA) for all student groups (male and female).

Ethical consideration

Ethical approval was obtained from the Research Ethics Committee in the Faculty of Medicine at the University of Tabuk.

Before data collection, participant /student had given an informed consent after they recognized the objectives and the purpose of the study; students were given the right to refuse without any harm to them and were assured about confidentiality.

Respondents were requested to reflect their learning experience and were assured that their information will be kept confidential and will only be used for research purposes. The questionnaire does not include academic number or class level identification. Later on, we linked Grade Point Average (GPA) to the student academic number. Those who refused to participate were assured that this will not affect their credentials or confidentiality.

Results

The response rate was 75% and the test of normality revealed normal distribution of the collected data.

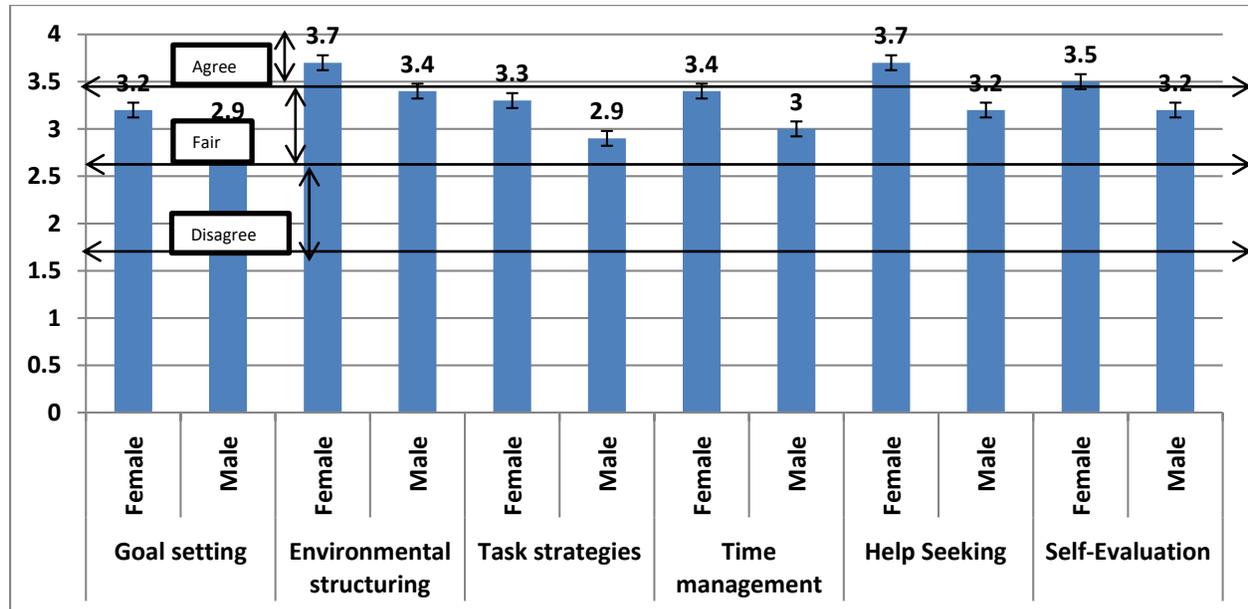


Figure 1. Descriptive statistics of self-regulated learning strategies among male and female medical students

The finding revealed that most of the female medical students agreed on practicing four domains of SRL strategies namely "environmental structuring, time management, help-seeking, and self-evaluation"; the mean scores: 3.7(SD=1.023), 3.42(SD=1.035), 3.68(SD=0.99), 3.54(SD=0.94) respectively.

On the opposite, male students had reported fair or disagreement on

practicing the same four domains of SRL strategies, figure (1).

The study results also reflect an inadequate use of the two domains of SRL strategies namely "goal setting and task strategies" by all respondents. Low mean scores for this two domains is very clear in both male and female student groups as depicted in figure (1), mean scores: 3.2(SD=0.89) for females; 2.9(SD=0.99) for males.

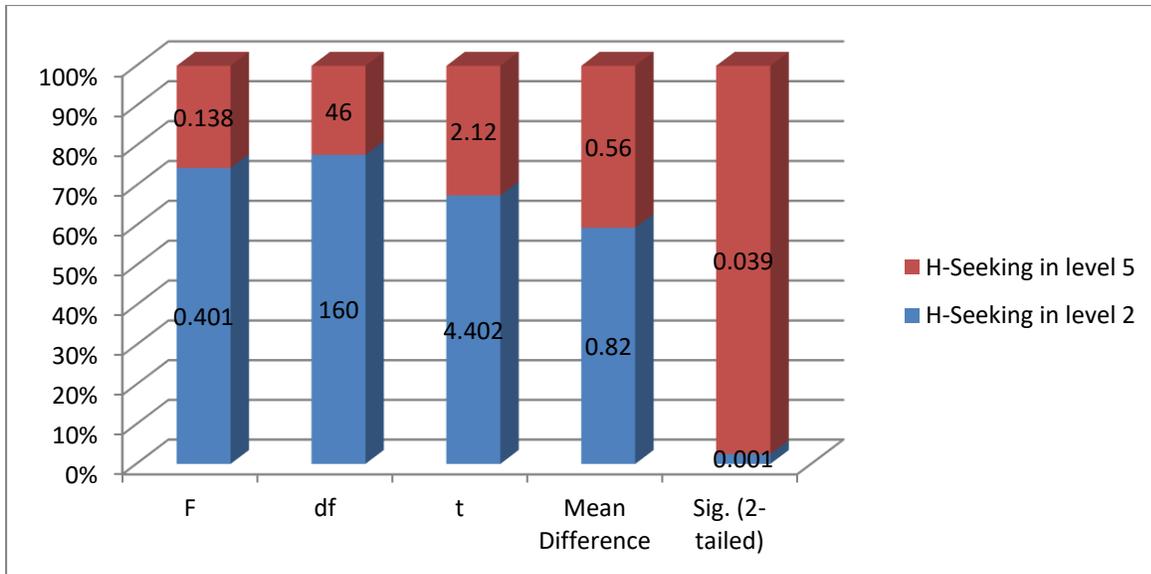


Figure 2. Independent samples t-test to compare self-regulated learning strategies of female students in the second and fifth levels

An independent-samples t-test was conducted to compare the difference in SRL strategies between all students in the second and fifth class levels. The results of comparison of male groups showed no statistical difference. Among females, there was a statistically

significant difference in the scores related to help-seeking SRL between second and fifth class levels ($t(160) = 2.27, p = 0.001$), $t(46) = 2.120, p = 0.039$) respectively; and the mean difference scores in the second and fifth class levels reported as: (0.82) and (0.56), respectively.

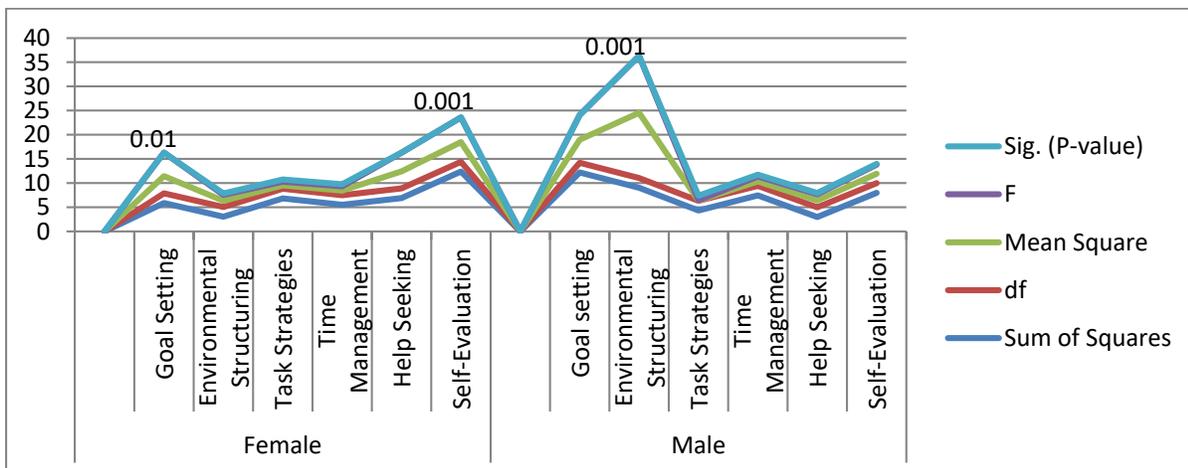


Figure 3. One-way ANOVA to compare the gender difference in self-regulated learning strategies

A one-way between-subjects ANOVA was conducted to compare SRL strategies between male and female student groups. There was a statistically significant gender difference in SRL strategies' scores in single domain, namely: "goal setting" ($F(2, 79) = 4.878, p = 0.01$); ($F(2, 177) = 5.110, p = 0.007$). LSD post-hoc test indicates that there was no statistically significant

gender difference in the rest of SRL strategies' scores.

This result reflects that, although there is a statistically significant gender difference in the domain: "goal setting"; however, still female surpass male students in using more SRL strategies like: "help-seeking and self-evaluation" SRL strategies.

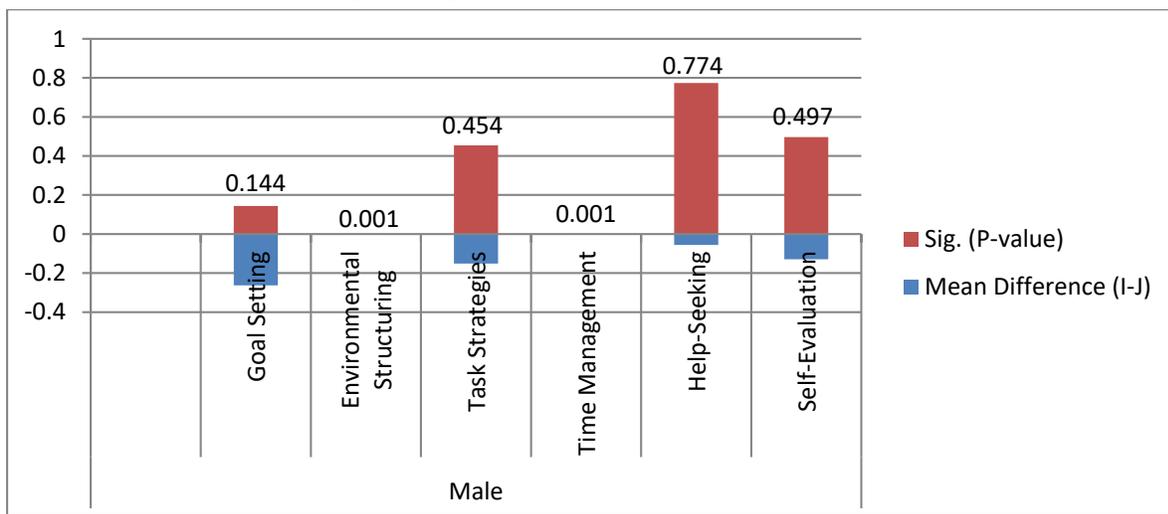


Figure 4. Post hoc test to compare the difference in self-regulated learning strategies among males

Post hoc comparisons using the LSD test indicated that there is a statistically significant difference in the means of two domains, namely: "environmental structuring and time management" SRL strategies among male student groups (P-Value: .008, 0.009) respectively.

This result suggests that the two domains: "environmental structuring and time management"

SRL strategies represent the more frequently used domains by male students.

Table 1. One-way ANOVA to compare the effect of self-regulated learning strategies on grade point average (GPA)

All Students	Type of learning strategy	Sum of Squares	df	Mean Square	F	Sig.(P-value)
	Goal setting	2.872	3,257	.957	1.016	.386
	Environmental structuring	4.211	3,257	1.404	1.144	.332
	Task strategies	4.203	3,257	1.253	1.253	.291
	Time management	6.306	3,257	2.143	2.143	.095
	Help seeking	1.066	3,257	.355	.317	.813
	Self-evaluation	1.858	3,257	.619	.599	.616
	Total	1.588	3,257	.529	.696	.555

A one-way between-subjects ANOVA was conducted to compare the effect of SRL strategies on grade point average (GPA) for all student groups (male and female). Initial results have shown no statistically significant difference seen in SRL strategy between different GPA scores achievers in all groups at the alpha $p < .05$ level ($F(3,257) = 0.696$, $P = 0.555$).

Discussion

This study explores the pattern in SRL strategies among undergraduate medical students in the faculty of medicine at the University of Tabuk in different dimensions. Overall, the study results have proved a statistically significant difference in the type of SRL strategies among different

gender and class levels in different classes.

At the outset, the finding confirms that female students surpass male students in using four out of six domains of SRL strategies namely: “environmental structuring, time management, help-seeking, and self-evaluation”. This finding confirms presence of big difference in SRL in favor of females, and it is consistent with previous studies that signify a greater influence of females over their SRL strategy than male students.[16–20]

The inadequate use of the couple of domains namely:” goal setting and task strategies” in both genders, could be inferred to the individual, contextual, curricular, and social factors as recognized in previous literatures.[21–23]

The study results explain that female medical students in both second and fifth year class levels have different level of help-seeking SRL strategies. This could be explained by the notion of “the feeling of new comers and leavers” as both class levels were facing a new experience of transfer, academic stress, motivation, and fear of potential failure.

This finding suggests two things: first, females are more help seekers for their SRL than males in general. Secondly, female students in the second year and fifth year are highly demanding and they are well prepared to receive training and coaching in SRL strategy. This finding is coherent with previous studies on self-regulated learning in the undergraduate and the pre-clinical settings.[24–28]

On the other hand, our study finding has shown that, medical students, i.e. both genders, are not appropriately using “goal setting and active learning” strategies like note taking, fighting against distraction, preparing questions before joining regular class, or working extra problems. Unfortunately, this is more apparent among male students. This result explained by previous study on the negative effect of contextual factors on male student’s SRL strategies.[27, 28]

Other explanation of not practicing the above two domains: “goal setting and active learning” could be the negative effect of the sudden shift from the preparatory year to the second-year medical school. Particularly, this shift is considered a great challenge as the students start completely different modules which are more related to medicine. Moreover, this finding is coherent with previous study results covering second year medical student, which ascribed the reluctant state to practice active learning to the lack of time for preparation and to the new learning experience for both student and faculties as well.[31]

Regarding the association of SRL scores with the academic achievement depicted in table (1), our finding has reported no association. This could be explained by taking into account the problem with linking the gross GPA of the student population during data analysis using the student self-reported academic number in the later date. Moreover, it is valuable to report that, in a few recent studies conducted in outside of the Arab Countries it has been indicated that there is a conflicting relationship of SRL strategies with the academic achievement.[32]

In addition, further studies had been suggested to investigate the phenomenon of diminished

association between SRL strategies and academic performance.[33]In contrast other studies confirm presence of positive association between SRL strategies and academic achievement.[34–36]

Therefore, for better academic achievement of medical students, medical teachers need to understand and monitor their student motivating factors and learning strategies. For instance, they should adapt to methods that foster active learning, a multi-modal, and a variety of student-oriented learning.[35, 36]

Again, further subgroups analysis describes that the two domains namely: “environmental structuring and time management” have a positive role in raising the level of academic achievement among males ($p= 0.008$), ($p= 0.009$) respectively. This could be interpreted in light of social, contextual, and other factors related to the learning environment. This result is matching a finding by other studies.[39]

Likewise, this study finding is coherent with previous study that confirms a significant role of environmental structuring on high academic achievement among male students.[40] Here it is advisable to consider enlightening male students about their strengths and the importance of taking the opportunity to care for their learning

by investing more in the domain environmental structuring.

Possible recommendation from the study findings:

- Feedback to the junior medical students on the importance of self-awareness concerning self-regulated learning is necessary.
- Care of the learning environment, student counseling, and training in SRL should be given to medical students in the second year.
- Intensive training of medical teachers to handle student cases in terms of help with learning difficulties and planning of SRL strategies is essential.
- Establishment of coaching units with mentors and a platform for feedback on students' self-regulated learning and reflection is required.

Our study findings indicate that self-regulated learning could be a promising modality of learning in the student population. Therefore, a future study among Saudi students to explore the role of social, cultural and habitual factors on self-regulated learning is recommended.

Conclusion

A remarkable difference in SRL among undergraduate medical students is noticed. This is obvious when comparing gender and class levels. The results confirm overall high scores of SRL in favor of female student groups in comparison to the male groups.

Limitations

One limitation of this study is the use of English language questionnaires for Arabic language speakers, with little change made to the level of language in order to be understandable by the respondents

Although, a limitation was come across while linking the GPA to the corresponding respondent during data entry phase, we will take into account the GPA score in our future study.

Authors' contribution

F A E: Planning & designing, executing & interpreting data, writing and revising the manuscript

M M A: Coordinating the execution, revising & editing the manuscript

Md.AI: Revising & editing the manuscript, and statistical analysis.

E A: Quality assurance of the statistical data analysis and test.

M E: Revising & editing the manuscript

Conflict of interest

The authors hereby declare no conflict of interest related to the research work of this article.

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References

1. 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. *Med Educ. Wiley Online Library*; 2018;52:1008–15.
2. Zimmerman BJ, Schunk DH. Self-regulated learning and academic achievement: Theoretical perspectives. *Routledge*; 2001.
3. Dradkh SA. Academic self-regulation: Its spread and obstacles from the point of view of undergraduate students in Saudi Arabia. *J Al-Quds Open Univ Educ Psychol Res Stud*. 2018;9:10.

4. Baothman A, AlJefri H, Agha S, Khan MA. Study habits of health science students at King Saud bin Abdulaziz University for health sciences, Jeddah, Saudi Arabia. *SAGE Open. SAGE Publications Sage CA: Los Angeles, CA*; 2018;8:2158244018778092.
5. Alkhasawneh S, Alqahtani MAM. Fostering Students' Self-Regulated Learning Through using a Learning Management System to Enhance Academic Outcomes at the University of Bisha. *TEM J. UIKTEN-Association for Information Communication Technology Education and Sciences*; 2019;8:662.
6. Roth A, Ogrin S, Schmitz B. Assessing self-regulated learning in higher education: a systematic literature review of self-report instruments. *Educ Assess Eval Account. Springer*; 2016;28:225–50.
7. Mega C, Ronconi L, De Beni R. What makes a good student? How emotions, self-regulated learning, and motivation contribute to academic achievement. *J Educ Psychol. American Psychological Association*; 2014;106:121.
8. Vansteenkiste M, Sierens E, Goossens L, Soenens B, Dochy F, Mouratidis A, et al. Identifying configurations of perceived teacher autonomy support and structure: Associations with self-regulated learning, motivation and problem behavior. *Learn Instr. Elsevier*; 2012;22:431–9.
9. Smakova K. Promotion of self-regulated learning in project-based approach. *Bull Kazakh Natl Womens Teach Train Univ No1 81*. 2020;106–13.
10. Alipio M. Predicting Academic Performance of College Freshmen in the Philippines using Psychological Variables and Expectancy-Value Beliefs to Outcomes-Based Education: A Path Analysis. *EdArXiv*; 2020;
11. Zimmerman BJ, Schunk DH. Self-regulated learning and performance. *Handb Self-Regul Learn Perform*. 2011;1–12.
12. Guilmette M, Mulvihill K, Villemare-Krajden R, Barker ET. Past and present participation in extracurricular activities is associated with adaptive self-regulation of goals, academic success, and emotional wellbeing among university

- students. *Learn Individ Differ. Elsevier*; 2019;73:8–15.
13. Al Junaibi S, Al Yahya'ei AN, Al Rahbi AN, Al Battashi BA, Al Ghaithi IH, Al KA, et al. Experiences of Foundation Year Students at Oman College of Health Sciences. *Edelweiss*, 2019;
 14. Zimmerman BJ. A social cognitive view of self-regulated academic learning. *J Educ Psychol. American Psychological Association*; 1989;81:329.
 15. Barnard L, Lan WY, To YM, Paton VO, Lai S-L. Measuring self-regulation in online and blended learning environments. *Internet High Educ. Elsevier*; 2009;12:1–6.
 16. Alghamdi A, Karpinski AC, Lepp A, Barkley J. Online and face-to-face classroom multitasking and academic performance: Moderated mediation with self-efficacy for self-regulated learning and gender. *Comput Hum Behav. Elsevier*; 2020;102:214–22.
 17. Weis M, Heikamp T, Trommsdorff G. Gender differences in school achievement: The role of self-regulation. *Front Psychol. Frontiers*; 2013;4:442.
 18. Demirören M, Turan S, Öztuna D. Medical students' self-efficacy in problem-based learning and its relationship with self-regulated learning. *Med Educ Online. Taylor & Francis*; 2016;21:30049.
 19. Denton CA, Wolters CA, York MJ, Swanson E, Kulesz PA, Francis DJ. Adolescents' use of reading comprehension strategies: Differences related to reading proficiency, grade level, and gender. *Learn Individ Differ. Elsevier*; 2015;37:81–95.
 20. Rohman F, Indriati D. Gender differences on students' self-regulated learning in mathematics. *IOP Publishing*; 2020. p. 012053.
 21. Kizilcec RF, Pérez-Sanagustín M, Maldonado JJ. Self-regulated learning strategies predict learner behavior and goal attainment in Massive Open Online Courses. *Comput Educ. Elsevier*; 2017;104:18–33.
 22. Van Lent M, Souverijn M. Goal setting and raising the bar: A field experiment. *J Behav Exp Econ. Elsevier*; 2020;101570.
 23. Kismihók G, Zhao C, Schippers MC, Mol ST,

- Harrison S, Shehata S. Translating the Concept of Goal Setting into Practice--What'Else'does it Require than a Goal Setting Tool? *ArXiv Prepr ArXiv200508669*. 2020;
24. Lucieer SM, van der Geest JN, Elói-Santos SM, de Faria RMD, Jonker L, Visscher C, et al. The development of self-regulated learning during the pre-clinical stage of medical school: a comparison between a lecture-based and a problem-based curriculum. *Adv Health Sci Educ. Springer*; 2016;21:93–104.
25. Virtanen P, Nevgi A. Disciplinary and gender differences among higher education students in self-regulated learning strategies. *Educ Psychol. Taylor & Francis*; 2010;30:323–47.
26. Panadero E, García-Pérez D, Fernández-Ruiz J, Sánchez-Centeno H. A Transitional Year Level to Higher Education: Challenges, Experiences and Self-regulatory Strategies during the Final Year of the University Preparatory Level. *Estud Sobre Educ*. 2020;39:109–33.
27. Yick K, Yip J, Au S, Lai Y, Yu A. Effectiveness of blended learning in the first year of fashion education. *Int J Fash Des Technol Educ. Taylor & Francis*; 2018;
28. Thibodeaux J, Deutsch A, Kitsantas A, Winsler A. First-year college students' time use: Relations with self-regulation and GPA. *J Adv Acad. Sage Publications Sage CA: Los Angeles, CA*; 2017;28:5–27.
29. Barnard-Brak L, Paton VO, Lan WY. Profiles in self-regulated learning in the online learning environment. *Int Rev Res Open Distrib Learn. Athabasca University Press (AU Press)*; 2010;11:61–80.
30. Ghazvini SD, Khajehpour M. Gender differences in factors affecting academic performance of high school students. *Procedia-Soc Behav Sci. Elsevier*; 2011;15:1040–5.
31. Tsang A, Harris DM. Faculty and second-year medical student perceptions of active learning in an integrated curriculum. *Adv Physiol Educ. American Physiological Society Bethesda, MD*; 2016;40:446–53.
32. Ningrum R, Kumara A, Prabandari Y. The relationship

- between self-regulated learning and academic achievement of undergraduate medical students. *IOPscience*, 2018. p. 012155.
33. Lucieer SM, Jonker L, Visscher C, Rikers RM, Themmen AP. Self-regulated learning and academic performance in medical education. *Med Teach. Taylor & Francis*; 2016;38:585–93.
34. Abbasnasab S. Self-regulated learning strategies (SRLS) and academic achievement in pre-university EFL learners. *Calif Linguist Notes*. 2012;37.
35. Agustiani H, Cahyad S, Musa M. Self-efficacy and self-regulated learning as predictors of students academic performance. *Open Psychol J*. 2016;9.
36. Berkhout JJ, Helmich E, Teunissen PW, van den Berg JW, van der Vleuten CP, Jaarsma ADC. Exploring the factors influencing clinical students' self-regulated learning. *Med Educ. Wiley Online Library*; 2015;49:589–600.
37. Nabizadeh S, Hajian S, Sheikhan Z, Rafiei F. Prediction of academic achievement based on learning strategies and outcome expectations among medical students. *BMC Med Educ. Springer*; 2019;19:99.
38. Carter Jr RA, Rice M, Yang S, Jackson HA. Self-regulated learning in online learning environments: strategies for remote learning. *Inf Learn Sci. Emerald Publishing Limited*; 2020;
39. Wolters CA, Won S, Hussain M. Examining the relations of time management and procrastination within a model of self-regulated learning. *Metacognition Learn. Springer*; 2017;12:381–99.
40. Altun S, Erden M. Self-regulation based learning strategies and self-efficacy perceptions as predictors of male and female students' mathematics achievement. *Procedia-Soc Behav Sci. Elsevier*; 2013;106:2354–64.