

Readiness for Self-Directed Learning among Paramedic Students in Jordan: A Multi- Institutional Study

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Abstract

Objectives

Self-directed learning has been encouraged as an effective training method for healthcare students. This study aims to assess the level of self-directed learning readiness (SDLR) among paramedic students in Jordan and identify any associated factors.

Methodology

This is a cross-sectional survey using an online questionnaire on a sample of paramedic students in Jordan. All enrolled undergraduate paramedic students in the three institutions were included as potential participants.

Results

A total of 529 participants completed the questionnaire. The overall mean score was 141.9 (SD \pm 35.5) and a total of 302 (57.1%) participants had a high level of SDLR (score $>$ 150). Students with a high level of SDLR were more likely to be male ($p = 0.039$) and have high academic performance levels ($p = 0.006$).

Conclusions

This study found that even though the majority of our participants achieved a high level of SDLR, the overall mean score was among the lowest in the literature.

First: Introduction

Over the past decade, there has been a steady move from a didactic style of learning, a teacher-driven approach, into a student-centred learning style in healthcare education (Klunklin et al., 2010; Peine et al., 2016; Stewart, 2007). Healthcare students and professionals need to continuously develop their knowledge and skills to keep up with the advancement in the ever-changing medical field. Emergency medical services (EMS) is a field of healthcare that is rapidly expanding in many countries and requires development in knowledge and skills to maintain their professional activities (B. Williams et al., 2013). Self-directed learning (SDL) has been encouraged as an effective training method for healthcare students and professionals (AbuAssi & Alkorashy, 2016; Hussain et al., 2019).

It was reported that self-directed learning readiness (SDLR) exists along a continuum and presents in all individuals to some extent (O’Kell, 1988; Wiley, 1983). SDLR is defined as “*the extent of control degree which the learners are willing to take over their own learning and have the necessary conditions for autonomous learning such as attitudes, abilities, talents and personality features*” (Wiley, 1983). Self-directed learning is an educational approach that helps students develop their needs and goals, identify resources and appropriate learning strategies, and evaluate educational outcomes, with or without the help of others (M. Fisher et al., 2001). Medical and healthcare students can benefit from using SDL by gaining more independence, motivation, and life-long learning skills (M. Fisher et al., 2001; Saeid & Eslaminejad, 2016). It can also help develop greater self-control, self-confidence, and self-management (O’Shea, 2003; Saeid & Eslaminejad, 2016). Many factors have been reported to play a dynamic role in the level of SDLR such as age, gender, and previous experience that could act as either a facilitator or barrier to self-directed learning (Alotaibi, 2016; Avdal, 2013; Chen et al., 2006; M. J. Fisher & King, 2010; Hussain et al., 2019; Kan’an & Osman, 2015; Premkumar et al., 2018; Saeid & Eslaminejad, 2016; Slater et al., 2017; Wiley, 1983).

The extraordinary outbreak of the novel coronavirus disease (COVID-19) has led to schools and universities closing their doors in almost all countries around the globe. This has led to a shift in the approaches of teaching and learning and created more challenges for students and instructors (Almaiah et al., 2020; Mahlaba, 2020). The COVID-19 pandemic has forced remote education that necessitates students to be more responsible of their learning whilst at home (Almaiah et al., 2020; Mahlaba, 2020). As such, it is inevitable to invest in students’ learning skills and promote self-directed learning to enable them to pursue their learning process and objectives during such pandemics and health disasters.

SDL is an important element for sustainability in paramedic education, which is an area of health care that is growing and developing at a rapid rate, and needs persistent knowledge and practical skills (B. Williams et al., 2013). Very limited research has been done in the field of EMS to assess students’ SDL readiness (Chang et al., 2017; B. Williams et al., 2013). In Jordan, there has been a recent move in paramedic education from the associate degree to a bachelor’s degree in a desire to professionalize the prehospital services in the country. Two bachelor’s degree programs have been launched, one at Jordan University of Science and Technology (JUST) and the other at the Prince Al Hussein Bin Abdullah II Academy for Civil Protection (PHA). This is along with the Civil Defence College (CDC) that provides an associate degree in paramedicine. Assessment of attitude and readiness of paramedic students towards SDL in Jordan provides vital baseline information about the learning needs and assists in shaping a student-centred curriculum (B. Williams et al., 2013). Therefore, in this study, we assessed the SDL readiness of paramedic students in Jordan and the factors that could be associated with higher readiness levels.

Second: Methods

Design, setting, and participants

This was a cross-sectional descriptive study, which was undertaken at three paramedic institutions in Jordan including PHA, JUST, and CDC, during November and December of 2020. All enrolled paramedic students in the three institutions were included as potential participants. The total number of eligible students in the intuitions was 777 students. We only included full-time students who were interested in taking part in the study. The questionnaire was distributed online to students using a Google form link. Potential participants were reached through closed Facebook groups used for communication between students and instructors. These groups were important communication tools during the remote learning in response to the COVID-19 pandemic. Students were informed about the study aims and that the participation was anonymous and voluntary.

Instruments

The self-directed learner readiness (SDLR) scale was specifically developed for undergraduate nursing students by Fisher and King in 2001 (M. Fisher et al., 2001). This scale was used on medicine, nursing, and paramedic students in different settings and demonstrated good reliability (Aljohani & Fadila, 2018; El-Gilany & Abusaad, 2013; Huynh et al., 2009; Klunklin et al., 2010; Peine et al., 2016; Skydsgaard, 2020; B. Williams et al., 2013). The SDLR scale includes 40-items grouped under three subscales and measuring three components: Self-management (13 items), desire for learning (12 items), and self-control (15 items). The items were rated on a five-point Likert scale, where 'one' indicated strongly disagree and 'five' indicated strongly agree. Four items are negatively phrased and scored in reverse order for data analysis. Overall, the scores can range from 40 to 200, with a higher score indicating stronger readiness for self-directed learning. Based on the authors' instruction, an overall mean SDLR score of greater than 150 denotes a high level of readiness for self-directed learning, while a score of 150 or less denotes a low level of readiness for self-directed learning (M. Fisher et al., 2001). We measured the internal consistency using Cronbach's alpha coefficient. The Cronbach's alpha coefficient was 0.979 for the 40 items, 0.896 for the self-management subscale, 0.946 for the desire for learning subscale, and 0.966 for the Self-control subscale. We also collected the demographics of the study participants including age, gender, year of study, institution, and grade point average (GPA) level.

Statistical analysis

All data were analysed using SPSS version 25 (Chicago, Illinois). Descriptive and inferential statistics were applied. Mean and standard deviation (SD) were calculated for continuous data, whereas categorical data were reported as frequencies and percentages. The differences in mean scores between groups were assessed using Student t-test and one-way analysis of variance (ANOVA) as appropriate. We also categorized our sample into high SDLR scores (> 150) and low SDLR scores (≤ 150). The differences between these groups were assessed using the chi-square test and Fisher's exact test as appropriate. A two-sided P-value < 0.05 was considered statistically significant for all analyses.

Ethical approval

The Institutional Review Board at XXXX reviewed and approved the study procedure before starting data collection in compliance with the Helsinki Declaration (IRB NO: 39/133/2020).

Third: Results

Of the 777 eligible paramedic students in the three institutions, 529 (68.0%) participants completed the online questionnaire. **Table 1** describes the characteristics of the study participants. The majority of the participants were male students (56.1%) with a mean age of 21.2 (SD \pm 2.96). Most student participants were in the second year (60.9%), enrolled in a bachelor's degree program (73.9%), and had a *very good* GPA (56.9%). Among the three institutions involved in the study, JUST had the largest proportion (37.8%) of participants

Self-directed learning readiness

Table 2 demonstrates the mean scores for the SDLR and its subscales against the characteristics of the participants. The overall mean SDLR score was 141.9 (SD \pm 35.5). The mean scores for subscales were 44.1 (SD \pm 10.1) for self-management, 43.5 (SD \pm 11.5) for desire for learning, and 54.2 (SD \pm 15.0) for self-control.

The mean SDLR scores did not exceed 150 in all groups of the participants' characteristics. There was no significant difference in the mean scores of the total SDLR and its subscales between genders, age groups, academic institutions, year level, and academic degree. However, the mean total SDLR scores differed significantly between the academic performance level ($F = 4.87, p = 0.002$). Also, the mean subscales scores differed significantly between the academic performance level (self-management [$F = 4.30, p = 0.005$], desire for learning [$F = 4.61, p = 0.003$], and self-control [$F = 4.9, p = 0.002$]) (**Table 3**).

Factors associated with high-level SDLR

Table 4 demonstrates the association between demographic characteristics and levels of SDLR. A total of 302 participants (57.1%) had a high level of SDLR, whereas 227 (42.9%) had a low level of SDLR. We found that male students were more likely than female students to have a higher level of SDLR ($p = 0.039$). Additionally, students with *excellent* and *very good* GPA grading were more likely to have high levels of SDLR compared with students with *good* and *satisfactory* grading ($p = 0.006$). No other significant variations were found with demographic characteristics.

Fourth: Discussion

In this study, we assessed the level of SDLR among paramedic students in Jordan and potential influencing factors. We found that our population had lower SDLR (mean SDLR = 141.9) compared to the population of many previous studies indicating low readiness of Jordanian paramedic students as outlined by Fisher et al. (2001). However, the findings also show that the majority (57.1%) of participants achieved high levels of SDL readiness (scored above 150). We

also found that gender and academic performance level were significantly associated with the higher level of SDLR. To our knowledge, this is the first study assessing SDLR among healthcare profession students in Jordan including nursing, medicine, and paramedicine.

The mean total SDLR score in our sample was lower than that of an Australian study conducted on paramedic students who obtained an overall score of 157.7 and achieved the required level of SDLR (B. Williams et al., 2013). While there is a lack of other SDLR studies on paramedics, several other studies on nursing students have found satisfactory levels of SDLR in Saudi Arabia (Alotaibi, 2016; El-Gilany & Abusaad, 2013), Australia (Phillips et al., 2015; Smedley, 2007), Thailand (Klunklin et al., 2010), and China (Yuan et al., 2012). Our study findings, however, are in congruence with the findings of other research studies in Saudi Arabia, a regional country (AbuAssi & Alkorashy, 2016; Alharbi, 2018; Aljohani & Fadila, 2018), and India (Kar et al., 2014) on medical and nursing students.

In our study, the mean subscale scores of self-management, desire for learning, and self-control are very close to studies in Saudi Arabia (AbuAssi & Alkorashy, 2016; Alharbi, 2018) and India (Kar et al., 2014), but lower than other studies in Saudi Arabia (El-Gilany & Abusaad, 2013), and Nepal (Shankar et al., 2011). The low score on the desire for learning in our sample contradicts a previous study on Jordanian nursing students that found that 94.1% of participants had a desire to learn new things (Abu-Moghli et al., 2005). However, the high rate in this study was based on a direct question to students, whereas the desire for learning in our study is based on a more valid and reliable scale that consists of 12 items.

In the present study, we found that students with higher academic performance (high GPA levels) achieved higher mean scores in the SDLR scale, which is supported by the findings of previous studies (Alotaibi, 2016; Avdal, 2013; Kan'an & Osman, 2015; Saeid & Eslaminejad, 2016). For instance, Kan'an and Osman (2015) found that the SDLR score is a predictor of the National Exam of science subject in Qatar. Besides, Alotaibi (2016) suggested that SDLR is an important factor in enhancing the academic performance of students (Alotaibi, 2016). However, contrary to that, Hussain et al. (2019) found no significant relationship between SDLR scores and the academic achievement of graduate students in Pakistan.

Gender has been shown to play a role in SDL readiness in the present study. That is, high SDL readiness levels were more often reported among males than females. Gender effect on SDL readiness was varied in the previous research studies. For instance, the findings of a study by Kar et al. (2014) were congruent with ours, as males had higher levels of SDLR than females. However, other studies contradict our results and found that females are more likely to achieve high SDLR scores compared to males (Kell, 2006; Slater et al., 2017). Several other studies found no gender effect on SDL readiness (Chen et al., 2006; Gyawali et al., 2011; Hussain et al., 2019; Premkumar et al., 2018).

Previous research studies reported that culture influences the readiness for self-directed learning (Aljohani & Fadila, 2018; Frambach et al., 2012; Premkumar et al., 2018). Frambach et al. (2012) found that students in the Middle Eastern culture expressed a feeling of uncertainty and difficulty in adapting to SDL due to the society's respect for tradition and the traditional way of teacher-centred education (Frambach et al., 2012). Additionally, a study by Shankar et al. (2011) found that Nepali medical students have lower SDL readiness than their counterparts in the Western countries (Shankar et al., 2011). The authors explained the results as Nepali medical students are more reliant on their families and teachers and less trained on SDL skills in their learning programs. This may explain the low mean scores of the SDLR scale in the present study and highlight the crucial need for the development of an appropriate learning environment that enhances self-directed learning.

To create a proper learning environment for paramedic students in Jordan that meets their current and future needs, educational institutions may promote the SDL skills among students. A recent study was performed to examine the effectiveness of blended learning (a combination of traditional and online learning) combined with flipped classrooms (pre-recorded video lectures at home followed by class discussion) on nursing students in Jordan (Halasa et al., 2020). The authors found that blended learning is an effective learning strategy in supporting self-directed learning and enhancing effective student competencies. Additionally, according to a study conducted in the United Kingdom (G. Williams & Lau, 2004), the problem-based learning (PBL) strategy may contribute to the development of SDL in our students. PBL is a type of student-centred learning that enables students to take control of their own education by encouraging them to be active learners who can integrate course material and apply it in a clinical context (Ku & Ha, 2016). PBL for university students proved to improve the students' performance in self-directed learning, problem-solving, decision making, and critical thinking (Ku & Ha, 2016; Thabet et al., 2017). This learning style was applied in many nursing schools in Saudi Arabia and proved its effectiveness (Alharbi, 2018). However, the majority of our faculty members have been trained in traditional curricula and may find it difficult to adjust to the demands of PBL. Therefore, facilitator training and a capacity building may be required if we are to apply such a teaching style for paramedic education.

As of writing this paper, more than a year and a half has passed and the COVID-19 pandemic is yet to be contained. Therefore, most higher education institutions around the globe are still resorting to remote teaching (Almaiah et al., 2020; Mahlaba, 2020; Murphy, 2020). Almaiah and colleagues (2020) explored the challenges of using e-learning during the COVID-19 pandemic and found that self-efficacy is an important element for the successful adoption of e-learning. It can safely be stated that students with high levels of readiness for SDL are likely to have higher self-efficacy than other students, and are ultimately better adapted to e-learning systems (Almaiah et al., 2020).

Finally, educational institutions may adjust their programs to introduce self-directed learning skills for paramedic students. Once these methods are introduced, students and educators will eventually adapt to these newer methods of education. According to Frambach et al. (2012), SDL readiness increased across different cultures despite the various challenges in each setting (Frambach et al., 2012). Innovative education approaches such as flipped classroom learning and problem-based learning need to be integrated into our curricula to prepare our paramedic graduates for successfully handling the difficulties of their ever-changing work setting.

Limitations

This study had the following limitations. Since the study was done on paramedic students, generalizing the results to other medical fields such as medicine and nursing should be considered with caution, even though most of these majors use the same traditional methods of education. The distribution of the total SDLR score was skewed to the left presenting many low values. This may be generated by the reporting bias by our participants. However, we dichotomized the SDLR into high and low levels in order to solve this issue. Finally, the data collection was done during online teaching times in response to the COVID-19 pandemic, so students' perceptions of self-directed learning might have changed during these times. Future studies might be needed to reassess their SDLR after the recovery from COVID-19 and the return of in-class teaching.

Fifth: Conclusions

This study found that even though the majority of our participants achieved a high level of SDLR, the overall mean score was among the lowest in the literature. High levels of SDL readiness were more often reported among male and high GPA level participants. There is a crucial need for a comprehensive plan to prepare students and faculty members to encourage and improve SDL skills.

These results provide curriculum designers at the academic institutions with important baseline data upon which curricula reform could be implemented to assist in shaping a student-centred curriculum. There is a crucial need for shifting the teaching method from the teacher-centred approaches and toward more active and independent learning practices to reinforce students to be more engaged in the learning process and encouraging self-directed learning.

Sixth: Disclosure And Declaration

Ethical considerations

The Institutional Review Board at Jordan University of Science and Technology (JUST) reviewed and approved the study procedure before starting data collection in compliance with the Helsinki Declaration (IRB NO: 39/133/2020).

Conflict of interest

The authors declare that they have no competing interests.

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Data availability

Data will be available upon reasonable request from corresponding author.

Authors' contributions

All authors have read and approved the final version of the manuscript. Each named author has substantially contributed to conducting the underlying research and drafting this manuscript. **Dr. Mahmoud Alwidyan** contribution: Conceptualization, Data curation, Validation, Formal analysis, Methodology, Project administration, Resources, Writing original draft. **Esraa Al-Nusour** contribution: Conceptualization, Formal analysis, Methodology, Validation, Writing - review & editing. **Dr. Ahmad Alrawashdeh** contribution: Methodology, Validation, Writing - review & editing. **Bayan Zabin** contribution: Data curation, Validation, Review & editing. **Salim Bani Omar** contribution: Data curation, Validation, Writing - review & editing. **Sajeda Abuzaid** contribution: Data curation, Validation, Writing - review & editing. **Eman Alsatari** contribution: Data curation, Validation, Writing - review & editing.

References

1. Klunklin, A., Viseskul, N., Sripusanapan, A., & Turale, S. (2010). Readiness for self-directed learning among nursing students in Thailand. *Nursing and Health Sciences*, 12(2), 177–181.
2. Peine, A., Kabino, K., & Spreckelsen, C. (2016). Self-directed learning can outperform direct instruction in the course of a modern German medical curriculum - Results of a mixed methods trial. *BMC Medical Education*. ;16(1):1–11. Available from: <http://dx.doi.org/10.1186/s12909-016-0679-0>
3. Stewart, R. A. (2007). Investigating the link between self directed learning readiness and project-based learning outcomes: the case of international Masters students in an engineering management course. *European Journal of Engineering Education*, 32(4), 453–465.
4. Williams, B., Boyle, M., Winship, C., Brightwell, R., Devenish, S., & Munro, G. (2013). Examination of self-directed learning readiness of paramedic undergraduates: A multi-institutional study. *Journal of Nursing Education and Practices*, 3(2), 102–111.
5. AbuAssi, N., & Alkorashy, H. (2016). Relationship between learning style and readiness for self-directed learning among nursing students at king Saud university, Saudi Arabia. *International Journal of Advanced Nursing Studies*, 5(2), 109–116.
6. Hussain, T., Sabar, A., & Jabeen, R. (2019). A Study of the Association between Self-Directed Learning Readiness and Academic Achievement of Student-Teachers in Pakistan. *Bulletin of Education and Research*, 41(3), 193–202.

7. O'Kell, S. (1988). A study of the relationships between learning style, readiness for self-directed learning and teaching preference of learner nurses in one health district. *Nurse Education Today*, 8(4), 197–204.
8. Wiley, K. (1983). Effects of a Self-Directed Learning Project and Preference for Structure on Self-Direct Learning Readiness. *Nursing Research*, 32(3), 181–185.
9. Fisher, M., King, J., & Tague, G. (2001). Development of a self-directed learning readiness scale for nursing education. *Nurse Education Today*, 21(7), 516–525.
10. Saeid, N., & Eslaminejad, T. (2016). Relationship between Student's Self-Directed-Learning Readiness and Academic Self-Efficacy and Achievement Motivation in Students. *International Education Studies*, 10(1), 225–231.
11. O'Shea, E. (2003). Self-directed learning in nurse education: A review of the literature. *Journal of Advanced Nursing*, 43(1), 62–70.
12. Fisher, M. J., & King, J. (2010). The self-directed learning readiness scale for nursing education revisited: A confirmatory factor analysis. *Nurse Education Today*, 30(1):44–48. Available from: <http://dx.doi.org/10.1016/j.nedt.2009.05.020>
13. Premkumar, K., Vinod, E., Sathishkumar, S., Pulimood, A. B., Umaefulam, V., Prasanna Samuel, P., & John, T. A. (2018). Self-directed learning readiness of Indian medical students: A mixed method study. *BMC Medical Education*, 18(1), 1–10.
14. Alotaibi, K. N. (2016). The learning environment as a mediating variable between self-directed learning readiness and academic performance of a sample of saudi nursing and medical emergency students. *Nurse Education Today*, 36:249–254. Available from: <http://dx.doi.org/10.1016/j.nedt.2015.11.003>
15. Avdal, E. (2013). The effect of self-directed learning abilities of student nurses on success in Turkey. *Nurse Education Today*, 33(8):838–841. Available from: <http://dx.doi.org/10.1016/j.nedt.2012.02.006>
16. Kan'an, A., & Osman, K. (2015). The Relationship between Self-Directed Learning Skills and Science Achievement among Qatari Students. *Creative Education*. May 19 [cited 2021 Jun 7];06(08):790–797. Available from: <http://www.scirp.org/journal/ce><http://dx.doi.org/10.4236/ce.2015.68082><http://dx.doi.org/10.4236/ce.2015.68082><http://creativecommons.org/licenses/by>
17. Slater, C. E., Cusick, A., & Louie, J. C. Y. (2017). Explaining variance in self-directed learning readiness of first year students in health professional programs. *BMC Medical Education*, 17(1), 1–11.
18. Chen, Y., Wang, C., & Lin, H. (2006). Explore the Relationships Among Demography, Personality Traits and Self-Directed Learning. *The Journal of Human Resource and Adult Learning*. (November):141–150.
19. Mahlaba, S. C. (2020). Reasons why self-directed learning is important in South African during the COVID-19 pandemic. *South African Journal of Higher Education*, 34(6), 120–136.
20. Almaiah, M. A., Al-Khasawneh, A., & Althunibat, A. (2020). Exploring the critical challenges and factors influencing the E-learning system usage during COVID-19 pandemic. *Education and Information Technologies*, 25(6), 5261–5580.
21. Chang, Y. T., Tsai, K. C., & Williams, B. (2017). What are the educational and curriculum needs for emergency medical technicians in Taiwan? A scoping review. *Advances in Medical Education and Practice*, 8, 649–667.
22. Skydsgaard, K. (2020). Improving motivation for self-directed training in Danish EMS personnel. *International Paramedic Practice*, 10(1), 8–13.
23. El-Gilany, A. H., & Abusaad, F. E. S. (2013). Self-directed learning readiness and learning styles among Saudi undergraduate nursing students. *Nurse Education Today*, 33(9):1040–1044. Available from: <http://dx.doi.org/10.1016/j.nedt.2012.05.003>
24. Aljohani, K., & Fadila, D. S. (2018). Self-directed learning readiness and learning styles among Taibah nursing students. *Saudi Journal of Health Sciences*, 7(3), 153–158.
25. Huynh, D., Haines, S. T., Plaza, C. M., Sturpe, D. A., Williams, G., Rodriguez De Bittner, M. A., & Roffman, D. S. (2009). The impact of advanced pharmacy practice experiences on students' readiness for self-directed learning. *American Journal of Pharmaceutical Education*, 73(4).
26. Phillips, B. N., Turnbull, B. J., & He, F. X. (2015). Assessing readiness for self-directed learning within a non-traditional nursing cohort. *Nurse Education Today*, 35(3):e1–e7. Available from: <http://dx.doi.org/10.1016/j.nedt.2014.12.003>
27. Smedley, A. (2007). The self-directed learning readiness of first year bachelor of nursing students. *Journal of Research in Nursing*, 12(4), 373–385.
28. Yuan, H., Bin, Williams, B. A., Fang, J. B., & Pang, D. (2012). Chinese baccalaureate nursing students' readiness for self-directed learning. *Nurse Education Today*, 32(4):427–431. Available from: <http://dx.doi.org/10.1016/j.nedt.2011.03.005>
29. Alharbi, H. A. (2018). Readiness for self-directed learning: How bridging and traditional nursing students differs? *Nurse Education Today*, 61, 231–234.
30. Kar, S. S., Premarajan, K. C., Ramalingam, A., Iswarya, S., Sujiv, A., & Subitha, L. (2014). Self-directed learning readiness among fifth semester MBBS students in a teaching institution of South India. *Education for Health: Chang in Learning and Practice*, 27(3), 289–292.
31. Shankar, P. R., Bajracharya, O., Jha, N., Gurung, S. B., Ansari, S. R., & Thapa, H. S. (2011). Change in medical students' readiness for self-directed learning after a partially problem-based learning first year curriculum at the KIST medical college in Lalitpur, Nepal. *Education for Health: Chang in Learning and Practice*, 24(2), 1–10.
32. Abu-Moghli, F. A., Khalaf, I. A., Halabi, J. O., & Wardam, L. A. (2005). Jordanian baccalaureate nursing students' perception of their learning styles. *International Nursing Review*, 52(1), 39–45.
33. Kell, C. (2006). Undergraduates' learning profile development: What is happening to the men? *Medical Teacher*, 28(1), e16–e24.
34. Gyawali, S., Jauhari, A. C., Ravi Shankar, P., Saha, A., & Ahmad, M. (2011). Readiness for self directed learning among first semester students of a medical school in Nepal. *Journal of Clinical and Diagnostic Research*, 5(1), 20–23.
35. Frambach, J. M., Driessen, E. W., Chan, L. C., & Van der Vleuten, C. P. M. (2012). Rethinking the globalisation of problem-based learning: How culture challenges self-directed learning. *Medical Education*, 46(8), 738–747.

36. Halasa, S., Abusalim, N., Rayyan, M., Constantino, R. E., Nassar, O., Amre, H., Sharab, M., & Qadri, I. (2020). Comparing student achievement in traditional learning with a combination of blended and flipped learning. *Nursing Open*, 7(4), 1129–1138.
37. Williams, G., & Lau, A. (2004). Reform of undergraduate medical teaching in the United Kingdom: a triumph of evangelism over common sense. *British Medical Journal*, 329, 92–94.
38. Ku, T. K., & Ha, M. (2016). The Application of Problem Based Learning in Undergraduate Nursing Education: A Strategy for Curriculum Reform. *Journal of Biosciences and Medicines*, 04(06), 52–59.
39. Thabet, M., Taha, E. E. S., Abood, S. A., & Morsy, S. R. (2017). The effect of problem-based learning on nursing students' decision making skills and styles. *Journal of Nursing Education and Practice*, 7(6), 108–116.
40. Murphy, M. P. A. (2020). COVID-19 and emergency eLearning: Consequences of the securitization of higher education for post-pandemic pedagogy. *Contemporary Security Policy*. ;41(3):492–505. Available from: <https://doi.org/10.1080/13523260.2020.1761749>

Tables

Table 1
demographic of study participants (n = 529).

Variable	n (%)
Gender	
Male	297 (56.1%)
Female	232 (43.9%)
Age (mean (SD))	21.2 (2.96)
Age groups	
20 or below	248 (46.9)
21–22	210 (39.7)
23 or more	71 (13.4)
Academic institute	
PHA	191 (36.1%)
JUST	200 (37.8%)
CDC	138 (26.1%)
Year level	
First year	38 (7.2%)
Second year	322 (60.9%)
Third year	49 (9.3%)
Forth year	120 (22.7%)
Degree	
Associate Degree	138 (26.1%)
Bachelor	391 (73.9%)
GPA level	
Excellent (90–100 or 3.9–4.2)	128 (24.2%)
Very good (80-89.9)	301 (56.9%)
Good	42 (7.9%)
Satisfactory	58 (11.0%)
n: number; SD: standard deviation; PHA: Prince Al Hussein Bin Abdullah II Academy for Civil Protection; JUST: Jordan University of Science and Technology; CDC: Civil Defence College; GPA: grade point average.	

Table 2
SDLR scores according to demographic variables

Variable	Total score Mean (SD)	Self-management Mean (SD)	Desire for learning Mean (SD)	Self-control Mean (SD)
All students	141.9 (35.5)	44.1 (10.1)	43.5 (11.5)	54.2 (15.0)
Gender				
Male	143.9 (36.3)	44.9 (10.3)	43.8 (11.6)	55.1 (15.2)
Female	139.4 (34.5)	43.1 (9.6)	43.0 (11.4)	53.2 (14.7)
Age				
20 or below	140.2 (34.8)	43.4 (9.8)	43.3 (11.2)	53.5 (15.0)
21–22	143.1 (34.7)	44.5 (9.9)	43.7 (11.5)	54.9 (14.3)
23 or more	144.4 (40.4)	45.6 (11.3)	43.5 (13.0)	55.2 (17.2)
Academic institute				
PHA	143.5 (35.1)	44.9 (10.2)	43.7 (11.1)	54.8 (14.8)
JUST	142.2 (34.8)	43.8 (10.0)	43.8 (11.7)	54.5 (14.5)
CDC	139.4 (37.2)	43.5 (10.0)	42.8 (12.0)	53.1 (16.0)
Year level				
First year	137.5 (38.0)	44.4 (11.7)	42.1 (12.0)	51.0 (14.9)
Second year	142.9 (33.0)	44.2 (9.2)	43.8 (10.7)	54.8 (14.2)
Third year	142.2 (36.5)	43.5 (10.3)	44.4 (12.0)	54.2 (15.4)
Forth year	140.6 (40.8)	44.0 (11.5)	42.6 (13.4)	53.9 (16.9)
Degree				
Associate Degree	139.4 (37.2)	43.5 (10.0)	42.3 (12.0)	53.1 (16.0)
Bachelor	142.8 (35.5)	44.3 (10.1)	43.7 (11.4)	54.7 (14.6)
GPA level				
Excellent	144.8 (31.5)	44.4 (9.3)	44.7 (10.3)	55.5 (13.6)
Very good	144.7 (36.3)	45.0 (10.2)	44.1 (11.8)	55.3 (15.2)
Good	125.3 (37.8)	40.2 (10.9)	38.1 (11.9)	47.0 (15.6)
Satisfactory	134.2 (34.8)	41.5 (9.3)	41.4 (11.3)	51.2 (15.0)
PHA: Prince Al Hussein Bin Abdullah II Academy for Civil Protection; JUST: Jordan University of Science and Technology; CDC: Civil Defence College; GPA: grade point average.				

Table 3
Scale and subscale comparisons

Demographics	Total scale	Self-management	Desire for learning	Self-control
Gender	t = 1.42, p = 0.154	t = 1.95, p = 0.051	t = 0.79, p = 0.425	t = 1.44, p = 0.149
Age	F = 0.57, p = 0.564	F = 1.48, p = 0.228	F = 0.08, p = 0.923	F = 0.66, p = 0.516
Institute	F = 0.53, p = 0.586	F = 0.99, p = 0.372	F = 0.35, p = 0.703	F = 0.58, p = 0.557
Year level	F = 0.33, p = 0.801	F = 0.62, p = 0.971	F = 0.75, p = 0.597	F = 0.75, p = 0.519
Degree	t = 1.42, p = 0.154	t = 1.95, p = 0.051	t = .799, p = 0.425	t = 1.44, p = 0.149
GPA level	F = 4.87, p = 0.002	F = 4.30, p = 0.005	F = 4.61, p = 0.003	F = 4.9, p = 0.002
t: Independent-samples t-test; F: One-way analysis of variance (ANOVA); GPA: grade point average				

Table 4
Factors associated with high-level SDLR

Variable	High level (score > 150) n (%)	Low level (score ≤ 150) n (%)	P value*
All students	302 (57.1)	227 (42.9)	
Gender			0.039**
Male	180 (60.6)	117 (39.4)	
Female	122 (52.6)	110 (47.4)	
Age			0.146
20 or below	131 (52.8)	117 (47.2)	
21–22	130 (61.9)	80 (38.1)	
23 or more	41 (57.7)	30 (42.3)	
Academic institute			0.965
PHA	109 (57.1)	82 (42.9)	
JUST	113 (56.5)	87 (43.5)	
CDC	80 (58.0)	58 (40.0)	
Year level			0.443
First year	17 (44.7)	21 (55.3)	
Second year	185 (57.5)	137 (42.5)	
Third year	29 (59.2)	20 (40.8)	
Forth year	71 (59.2)	49 (40.8)	
Degree			0.444**
Associate Degree	80 (58.0)	58 (42.0)	
Bachelor's degree	222 (56.8)	169 (43.2)	
GPA level			0.006
Satisfactory	29 (50.0)	29 (50.0)	
Good	15 (35.7)	27 (64.3)	
Very good	187 (62.1)	114 (37.9)	
Excellent	71 (55.5)	57 (44.5)	
*: Chi-square Test; **: Fisher's Exact Test PHA: Prince Al Hussein Bin Abdullah II Academy for Civil Protection; JUST: Jordan University of Science and Technology; CDC: Civil Defence College; GPA: grade point average			