Readiness for self-directed learning among basic science and premedical students at a Caribbean medical school

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**Abstract**

**Introduction:** Self-directed learning (SDL) skills are becoming increasingly important in modern medical education. Readiness for SDL among medical students can be measured using the scale of Hendry and Ginns. The present study was conducted at an offshore Caribbean medical school to measure SDL readiness among premedical and basic science students.

**Methods:** The study was conducted during March 2018 using the instrument mentioned previously. The survey was administered online. Gender and semester of study were noted. The total score and four subscale scores were calculated. The normality of the scores was determined and the scores compared among male and female students and among different semesters using appropriate statistical tests (p<0.05) with SPSS version 20.0 statistical software for windows.

**Results:** Fifty-seven of the total 75 students (76%) participated; 31 respondents (52.5%) were male. The mean ± SD total score was 140.95 ± 14.43 (maximum possible score being 175). The mean ± SD critical self-evaluation (CSE), learning self-efficacy (LSE), self-determination (SD) and effective organization for learning (EOL) scores were 20.77 ± 2.43, 75.37 ± 8.61, 17.17 ± 2.09 and 27.63 ± 3.52. The maximum possible scores were 25, 90, 20 and 40. The scores were not significantly different among different subgroups of respondents.

**Conclusion:** The SDL readiness of the students was good. The SDL readiness score should be studied again in the future as the curriculum progresses toward greater degree of SDL. Studies can be conducted to examine the relationship between SDL readiness and academic performance of students.
Keywords: Caribbean, medical students, self-directed learning

Introduction

The rapid increase in knowledge requires that medical students as future doctors develop self-directed learning skills to stay competitive for practice and to be able to provide safe, good quality care to their patients (Ainoda, Onishi & Yasuda, 2005; Greveson & Spencer, 2005). During self-directed learning (SDL), the learner decides what they need to learn and to what depth and breadth (Gyawali, Jauhari, Shankar, Saha & Ahmed, 2011). Students identify the resources required for learning, choose and implement learning strategies and finally evaluate the learning outcomes. SDL may be associated with increased curiosity, critical thinking, better understanding and retention of information, and improved motivation and confidence (Devi, Bhat, Ramya, Ravichandran, & Kanungo, 2016).

Offshore Caribbean medical schools admit students from the United States, Canada, India, Nigeria and other countries to the undergraduate medical (MD) course. Students complete the first two years of study in the countries where the school is located and then do their clinical rotations in the United States (US), Canada or the Caribbean. The agencies which accredit Caribbean medical schools have stressed the importance of SDL in medical education and have included the same in their core standards. American International Medical University (AIMU) located in Saint Lucia admits students mainly from India and Nigeria. The school is modifying its basic science curriculum and promoting SDL among the students. Students complete online learning modules, participate in a health humanities module and complete writing and reading assignments, which require them to search and evaluate the scientific literature.

Readiness for SDL includes the degree to which an individual student possesses the attitudes, abilities and personality traits that are necessary for SDL. Self-directed learners take control of the learning environment and accept the freedom to learn what they regard as important for themselves (Fisher, King & Tague, 2001). Readiness for SDL exists along a continuum and may be present to a certain extent among all individuals. Fisher and coauthors had developed a scale to measure readiness for SDL among nursing students (Fisher et al., 2001). This scale was modified by Hendry and Ginns for use among medical students (Hendry & Ginns, 2009). They concluded that a revised SDL readiness scale (SDLRS) is a valid measure of medical students' readiness to direct their own learning in a hybrid problem-based learning (PBL) programme.

Students' readiness for SDL has not been previously studied at the American International Medical University in Saint Lucia. As the recent changes to the curriculum requires students to take greater responsibility for their own learning measuring readiness for SDL among students is important. Hence the present study was conducted among both premedical and undergraduate basic science medical students to measure their readiness for SDL and note differences, if any, in the scores according to the gender and semester of study of the respondents.

Methods

The present study was conducted during the month of March 2018 among basic science medical and premedical students. The revised SDLRS developed by Hendry and Ginns was used in the present study (Hendry & Ginns, 2009). These authors had modified the scale developed by Fisher and coauthors (Fisher et al., 2001). Written permission was obtained to use the revised version of the scale in the present study.

The survey was administered using online survey software. An explanatory statement about the study was provided
and respondents indicated their willingness or otherwise to proceed with the study. The gender and semester of study of the respondents were noted. Respondents’ agreement with a set of statements was studied using a Likert type scale. The total score was calculated. To avoid response set bias certain items were phrased negatively and their scores reversed while calculating the total and subscale scores. Subscale scores were calculated using pre-determined items of the tool. Four subcales were used in the present study as recommended by Hendry and Ginns (Hendry & Ginns, 2009). These were critical self-evaluation (CSE), learning self-efficacy (LSE), self-determination (SD) and effective organization for learning (EOL). The one sample Kolmogorov-Smirnov (K-S) test was used to analyze whether the total score and subcategory scores follow a normal distribution. Depending on the results, appropriate statistical tests were used. A p value of less than 0.05 was taken as statistically significant. Data was entered, cleaned and analyzed using SPSS version 20.0 for windows.

The total and subcategory scores were compared among male and female students as well as students belonging to different semesters using appropriate statistical tests. The study was approved by the Institutional Review Board of the American International Medical University vide notification AIMU/IRB/2017/01.

**Results**

Fifty-seven of the total of 75 students (76%) participated in the study. Thirty-one students (52.5%) were male. The semester of study of the respondents were grouped into three categories. The premed semesters were the first category, the first and second basic science semesters was the second category while semesters three, four and five of the basic sciences formed the third category. Sixteen students (27.1%) were from category 1, 23 students (39%) were from category 2 while 18 respondents (30.5%) were from category 3.

The distribution of the four subcategory scores and the total scores were found to be normal. Hence mean and standard deviation were used as measures of central tendency and variance. The mean ± SD total score was 140.95 ± 14.43 (maximum possible score being 175). The mean ± SD CSE, LSE, SD and EOL scores were 20.77 ± 2.43, 75.37 ± 8.61, 17.17 ± 2.09 and 27.63 ± 3.52. The maximum possible scores for CSE, LSE, SD and EOL were 25, 90, 20 and 40 respectively. Some studies have examined the mean scores by not adding up the scores in each category. The total subcategory score was divided by the number of items in the particular subcategory and the total score was divided by 35 to obtain this set of scores. The mean ± SD scores calculated using this method for CSE, LSE, SD and EOL were 4.15 ± 0.49, 4.19 ± 0.48, 4.3 ± 0.52 and 3.45 ± 0.44. The mean ± SD total score was 4.03 ± 0.41

Table 1 shows the subcategory scores and the total scores among male and female respondents. The scores were higher among male respondents but the difference was not statistically significant. Table 2 represents the subcategory and total scores among the students grouped into three categories according to the semester of study. There were no significant differences in scores according to the semester categories.

| Parameter                  | Male       | Female     | P value |
|----------------------------|------------|------------|---------|
| Critical self-evaluation   | 21.32      | 20.11      | 0.060   |
| Male                       |            |            |         |
| Female                     |            |            |         |

Table 1: Subcategory and total scores among male and female respondents
| Learning self-efficacy | Male | Female | P value |
|------------------------|------|--------|---------|
|                        | 75.74| 74.92  | 0.722   |

| Self-determination    | Male | Female | P value |
|-----------------------|------|--------|---------|
|                       | 17.26| 17.08  | 0.748   |

| Effective organization for learning | Male | Female | P value |
|------------------------------------|------|--------|---------|
|                                    | 28.39| 26.73  | 0.075   |

| Total                         | Male | Female | P value |
|-------------------------------|------|--------|---------|
|                               | 142.71| 138.85 | 0.318   |

Table 2: Subcategory and total scores according to the semester of study

| Parameter                         | Mean scores | P value |
|-----------------------------------|-------------|---------|
| Critical self-evaluation          |             |         |
| Category 1                        | 21.25       |         |
| Category 2                        | 20.74       |         |
| Category 3                        | 20.39       | 0.595   |
| Learning self-efficacy            |             |         |
| Category 1                        | 76.06       |         |
| Category 2                        | 76.35       |         |
| Category 3                        | 73.5        | 0.544   |
| Self-determination                |             |         |
| Category 1                        | 17.12       |         |
| Category 2                        | 17.26       |         |
| Category 3                        | 17.11       | 0.969   |
| Effective organization for learning |         |         |
| Category 1                        | 27.87       |         |
| Category 2                        | 28.39       |         |
| Category 3                        | 26.44       | 0.205   |
| Total                            |             |         |
| Category 1                        | 142.31      |         |
| Category 2                        | 142.74      |         |
| Category 3                        | 137.44      | 0.457   |

**Discussion**

Student readiness for SDL was studied using the revised version of the SDLRS. The mean score was around 141 (maximum score 175). There were no significant differences in scores according to either the semester or the gender.
of the respondents. The original instrument designed by Fisher and coworkers (Fisher et al., 2001) consisted of 40 items providing a maximum possible score of 200. Hendry and Ginns concluded that the revised SDLRS is a valid measure of SDL among medical students (Hendry & Ginns, 2009).

A variety of instruments have been used to measure SDL readiness among students. These range from Guglielmino's scale, the scale developed by Fisher and coworkers and the modified version of the scale used in the present study. Readiness for SDL has been studied among health students in a variety of countries. SDL Readiness was studied in Pokhara, Nepal using the scale developed by Fisher and coworkers (Gyawali et al., 2011). The mean observed score was 157.8 and the authors mentioned that a score greater than 150 indicates readiness for SDL. Like in the present study the scores were not significantly different among various groups of students. The authors concluded that the students had a high degree of readiness for SDL. Change in readiness for SDL after a partly problem-based first year curriculum was studied at another medical school in Nepal (Shankar et al., 2011). The original scale of Fisher and coworkers was used and SDL Readiness scores increased from 152.7 to 157.3. There was a significant increase in the self-management scores at the end of the first year. In this study certain categories of scores were significantly different among various subgroups of respondents. The authors mentioned that the scores were lower than those reported elsewhere.

Another study using the 40-item instrument of Fisher and King was conducted at a medical college in South India (Kar et al., 2014). The mean SDLRS score was 140.4. Nineteen students (30% of respondents) had scored higher than 150 which indicated high readiness for SDL. Male students had significantly higher SDL readiness scores compared to females. In the present study also, scores were higher among males but the difference was not significant. In another study conducted in an Indian medical school (Abraham et al., 2011) the mean score was 151.4 and 60% of students had a high degree of readiness for SDL. More self-directed learning activities during the course and emphasis on problem-based learning may have accounted for the higher scores.

In the Caribbean, a study on readiness for SDL was conducted among medical students of the University of the West Indies (UWI) enrolled at its Cavehill and St Augustine campuses (Bodkyn & Stevens, 2015). SDL readiness was measured using the instrument developed by Fisher and King (Fisher et al., 2001). UWI uses small group-learning approaches during both the clinical and the basic sciences (Bodkyn & Stevens, 2015). The basic sciences are learnt in an integrated organ system-based manner. A total of 485 students participated in the study. The mean SDLRS score was 146.8 which is higher than that reported in the present study. The study showed that intrinsic motivation and self-directed learning had a positive impact on student performance. SDL readiness was also studied at the University of Saskatchewan, Canada (Premkumar et al., 2013). The authors used the Guglielmino's SDL Readiness Scale (SDLRS). Older students were more self-directed and the initial scores at the beginning of medical school were high. There was a significant decrease in scores at the end of the first year of medical school and no significant changes to scores as students progressed through medical school. The authors concluded that the educational methods used may need to be re-examined and modified to ones which promote SDL. SDLR was studied at five medical schools in Indonesia. (Leatemia, Susilo & van Berkel, 2016). The 40-iten instrument of Fisher and King was used. The authors concluded that only half the students had a high degree of SDL readiness and this proportion was lower among the more senior students compared to the more junior ones. Another study conducted at two medical schools in Saudi Arabia found that the overall readiness for SDL of the participants was good (Soliman & Al-Shaikh, 2015). Students however, may need assistance to improve their self-management skills.

Most students join the MD program at AIMU after completing the Premedical program. Students from India do two semesters of the Premedical program while those from Africa do the entire four semesters of the program to become eligible for admission to the MD program. In both Africa and India learning is centered on didactic lectures
and active learning sessions are less common. This may partly account for the lower SDL readiness scores. During the last year the MD curriculum at AIMU has been modified and a greater amount of small group learning and active learning strategies have been introduced. A health humanities module and online modules have been initiated. Obtaining information about the readiness of students for SDL and to take increasing responsibility for their own learning is hence, important. No significant differences in scores according to respondent’s gender or semester of study were noted like in many previous studies. Faculty education sessions have been conducted and faculty members are supported in creating learning experiences for students which favor SDL. SDL readiness was measured at a US medical school (Monroe, 2016). The average CSE, LSE, SD and EOL scores were 4.08, 4.31, 3.68 and 3.68 respectively. The EOL score is our study was lower while the scores in the other subcategories were higher. The author concluded that while SDL readiness is important for medical schools measuring the same using readiness scale and other parameters may be difficult.

The good response rate was the strength of the study. SDL readiness was studied using a previously validated instrument. The study also had limitations. SDL readiness was studied only using one instrument and the data was not triangulated with that obtained from other sources. We studied only SDL readiness and did not measure other parameters as has been done in some other studies. The academic performance of students with low and high SDL readiness was not studied.

Conclusion

The SDL readiness of the students was good. No significant differences in scores among students of different semesters and between male and female students were noted. The SDL readiness score should be studied again in the future as the curriculum progresses toward greater degree of SDL. Studies can be conducted to study the relationship between SDL readiness and academic performance of students. Studies in other off shore Caribbean schools will be helpful.

Take Home Messages

- This is one of the few studies examining the readiness for self-directed learning among premedical and basic science students at a Caribbean medical school using the modified scale of Hendry and Ginns recommended for use among medical students.
- Students readiness for SDL was good and there was no significant difference in scores among male and female students and according to the semester of study.
- The SDL score can be correlated with academic achievement of students in future studies.
- Studies among clinical students can be considered in future.
- Studies in other Caribbean medical schools will be useful.

Notes On Contributors

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Bibliography/References

Abraham, R.R., Fisher, M., Kamath, A., Izzati, T.A., Nabila, S., & Atikah, N.N. (2011). Exploring first year undergraduate medical students' self-directed learning readiness to physiology. Advances in Physiology Education, 35, 393-395.

https://doi.org/10.1152/advan.00011.2011

Ainoda, N., Onishi, H., & Yasuda, Y. (2005). Definitions and goals of 'self-directed learning' in contemporary medical education literature. Annals of Academy of Medicine Singapore, 34, 515-519.

Bodkyn, C., & Stevens, F. (2015). Self-directed learning, intrinsic motivation and student performance. Caribbean Teaching Scholar, 5, 79-93.

Devi, S., Bhat, K.S., Ramya, S.R., Ravichandran, K., & Kanungo, R. (2016). Self-directed learning to enhance active learning among the 2nd-year undergraduate medical students in Microbiology: An experimental study. Journal of Current Research in Scientific Medicine, 2, 80-83.

https://doi.org/10.4103/2455-3069.198379

Fisher, M., King, J., & Tague, G. (2001). Development of a self-directed learning readiness scale for nursing education. Nurse Education Today, 21, 516-525.

https://doi.org/10.1054/nedt.2001.0589

Greveson, G.C., & Spencer, J.A. (2005). Self-directed learning – the importance of concepts and contexts. Medical Education, 39, 348-349.

https://doi.org/10.1111/j.1365-2929.2005.02115.x

Gyawali, S., Jauhari, A.C., Shankar, P.R., 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, 2023.

Hendry, G.D., & Ginns, P. (2009). Readiness for self-directed learning: validation of a new scale with medical
students. Medical Teacher, 31, 918-920.

https://doi.org/10.3109/01421590802520899

Kar, S.S., KC, P., 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, 27, 289-292.

https://doi.org/10.4103/1357-6283.152193

Leatemia, L.D., Susilo, A.P., & van Berkel, H. (2016). Self-directed learning readiness of Asian students: students perspective on a hybrid problem based learning curriculum. International Journal of Medical Education, 7, 385-392.

https://doi.org/10.5116/ijme.582e.021b

Monroe, K.S. (2016). The relationship between assessment methods and self-directed learning readiness in medical education. International Journal of Medical Education, 7, 75-80.

https://doi.org/10.5116/ijme.56bd.b282

Premkumar, K., Pahwa, P., Banerjee, A., Baptiste, K., Bhatt, H., & Lim, H.J. (2013). Does medical training promote or deter self-directed learning? A longitudinal mixed-methods study. Academic Medicine, 88, 1754-1764.

https://doi.org/10.1097/ACM.0b013e3182a9262d

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, 24, 552.

Soliman, M., & Al-Shaikh, G. (2015). Readiness for Self-Directed learning among first year Saudi Medical students: A descriptive study. Pakistan Journal of Medical Sciences, 31:799-802.

Appendices

Declaration of Interest

The author has declared that there are no conflicts of interest.