A Survey on Self-Directed Learning Readiness Among Clinical Year Medical Students of Melaka-Manipal Medical College, Malaysia

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Abstract

Self-directed learning (SDL) is known as the process of learning on one's own initiative, with or without the help of others during the planning, implementing and evaluating of one's effort and has been used extensively in higher education especially in tertiary institutions as a method of instruction. The aim of conducting the research is to determine the readiness of self-directed learning among medical students in their clinical years in Melaka Manipal Medical College. This study also aimed to assess the association of variables such as age, gender, ethnicity, nationality, semester of study, and future career choice with the readiness of self-directed learning in medical students in their clinical years. An analytic cross-sectional study was conducted amongst undergraduate clinical year medical students from March to April 2020 in our college. A non-probability purposive sampling method was used to enrol students for this study and a validated questionnaire was distributed online via Google forms to the students of each semester. The questionnaire comprised two parts. The first part was on informed consent, the demographic details of the participants and the sector of choice in their future career (health or non-health, public or private). The second part was on the 42-item Fisher's SDLRS questionnaire which was further subdivided into three components, 'self-management', 'desire for learning' and 'self-control'. A total of 179 participants enrolled in this study with 59.22% of the participants obtained an average level for SDL readiness, while 25.24% of the participants scored above average and the remaining 15.64% got below average level. Self-control, one of the subscales in our study, has a mean score of 58.74, desire for learning with 54.89 and then self-management with 47. The mean of the total score of SDL readiness is 160.63. There are significant associations between age, ethnicity, and current semester with the subscale of self-management of self-directed learning readiness. It is found that nationality is associated with the subscale of self-control of SDL readiness. The study also shows that there is a significant association between future career sector and self-directed learning readiness amongst undergraduate clinical year medical students.

1. Introduction

Self- directed learning (SDL) has been used extensively in higher education especially in tertiary institutions as a method of instruction. [1] SDL is known as the process of learning on one's own initiative, with or without the help of others during the planning, implementing and evaluating of one's effort. [2, 3] Several studies have also demonstrated the importance of SDL particularly in higher education. [4, 5] Readiness for SDL is absolutely necessary as learners are expected to be responsible for their own learning. With SDL as an approach, it has been suggested that it could be

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the solution for the spoon-feeding problem in education as the individuals can become more self-directed with extra motivation and support. [6] Institutes of higher learning in Malaysia have come to acknowledge the importance of SDL as an essential skill for 21st- century learners. Instead of sticking to the traditional way of teaching, educators become the facilitators for the students by creating a productive classroom environment to develop their independent learning skills, critical thinking, accountability and responsibility which they will need in their career development. [7] Over the years, there have been continuous advancements in medicine and biomedical sciences where it is necessary for professionals to possess SDL skills in order to allow them to stay knowledgeable and keep up with the latest literature. [8]

SDL plays a significant role in medical education because of the constantly changing nature of diagnostic studies with time along with improvement in investigation and treatment modalities. [9] Self-directed learners can decide on the preferred learning method and study content that they view as essential. The way the learners control the freedom of learning will depend on the learners' personality, view, and skill. [1] Moreover, there is a social component in self-directed learning wherein the individuals share their own interests during group activities and there is presence of interactions amongst them. This includes the learner's willingness to engage with and rely on others. [10] Students should be assured to have good self-directed learning levels in early study stages to prepare them for the end of semester projects. [11] In a study on Malay adult learners on self-directed learning and culture states that culture potentially influences the extent of readiness and initiation of self-directed learning in Malaysia. [12] On another note, students are necessitated to possess the appropriate skills in self-regulation, metacognition, and reflection so as to enable them to keep track of the knowledge construction process. [13] A research article on the relationship between self-directed learning and career decision making showed that the students who get high measurement on self-directed learning discover it easier in career decision-making. [14] In addition to that, there are also study findings which fairly support the idea of gender differences in self-directed learning engagement among community members. [10] In another study which explains the variance in self-directed learning readiness of first year students in health professional programs, females have remarkably higher self-directed readiness. Not only that, the study also finds that self-directed readiness increases with age. [15] A research article describes self-directed learning as a maturational process as it was noted that SDL readiness scores were significantly lower in the first academic year when compared with subsequent years. [16]

Essentially, the possession of self-directed learning skills is necessary in the pursuit of lifelong learning amongst medical students. [17] Medical students are required to be driven in taking charge of their own learning to improve on areas of content knowledge that they're weak in, self-identified through introspection and by discussing with clinical faculty/practitioners. [18] A research from an Egyptian university suggested that the shift from traditional learning to a more active and independent education via self-learning requires support. The article also recommends that students should consistently assess opportunities for readiness for self-directed learning. Furthermore, faculty should develop a plan of action to encourage SDL readiness and at the same time assess as well as help their students to identify their preferred learning styles. [19]

To our knowledge, there is no research on the readiness of self-directed learning among medical students in their clinical years that has been conducted in our setting. It is therefore important to address the need for self-directed learning amongst medical students, especially those in their clinical years and how it prepares them for life-long learning in their housemanship, and later during their postgraduate studies in the Malaysian medical setting. In our study, we used a self-directed learning readiness scale (SLRS) developed by Murray J. Fisher that has been extensively used and modified in various studies. The scale itself is divided into the three domains of 'self-management', 'desire for learning' and 'self-control'. [1, 20] This study aimed to determine the readiness of self-directed learning among medical students in their clinical years in Melaka Manipal Medical College. We also aimed to assess the association of variables such as age, gender, ethnicity, nationality, semester of study, and future career choice with the readiness of self-directed learning in medical students in their clinical years.

2. Methodology

2.1. Study Design, Time, Setting, Population

An analytic cross-sectional study was conducted amongst undergraduate clinical year medical students from March to April 2020 in our college, Melaka-Manipal Medical College, Malaysia. Our college has two campuses; one based in Muar, Johor and the other is based in Malacca. The Muar campus offers Bachelor of Medicine and Bachelor of Surgery (MBBS) Semester 6 and 7, while the Malacca campus offers Bachelor of Dental Surgery (BDS), Foundation in Science (FIS) and MBBS Semester 8, 9 and 10. This study aimed to determine the self-directed learning readiness among clinical year medical students and

therefore a study population of 600 medical students which were in semester 7, 8, 9 and 10 from MMMC was selected. Students in semester 6 were not included as they have yet to resume their studies in Malaysia during this time because they have yet to be enrolled.

2.2. Sample Size

The sample size was calculated using a sample size calculator from the application Epi Info called StatCalc. The minimum sample size needed was calculated as shown below:
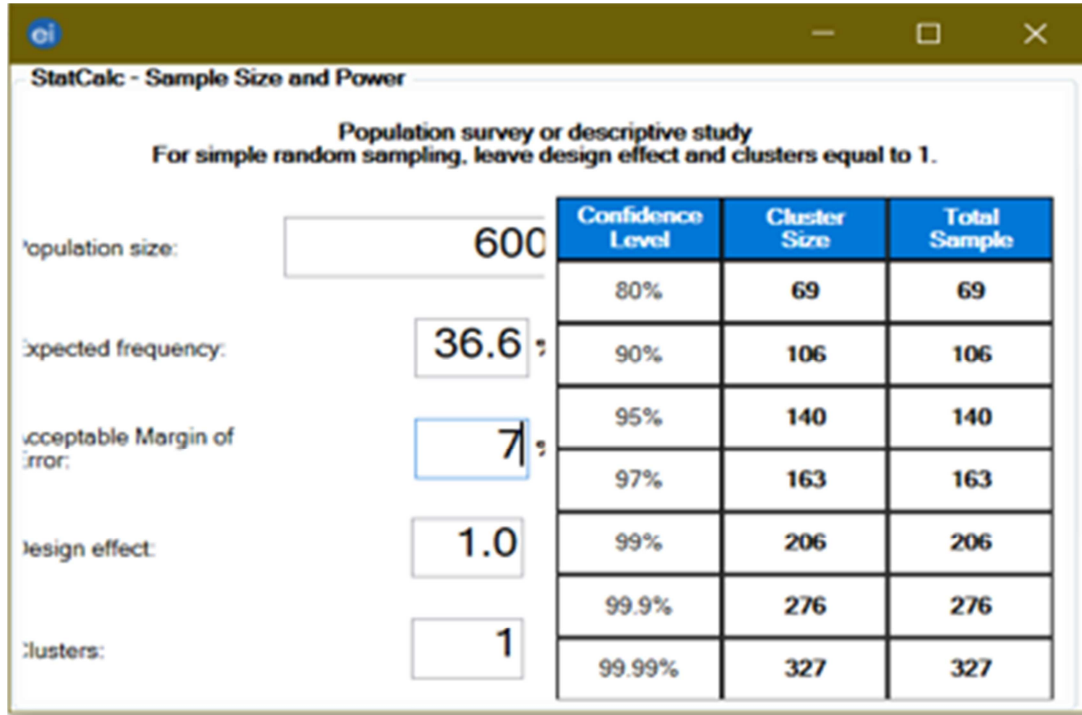

Figure 1. Sample size calculation.

Application used: Epi Info - StatCalc

Population size: 600

Expected frequency: 36.6% (Percentage of average score on the SDLRS among medical students in Umm Al-Qura University, Saudi Arabia [9])

Acceptable Margin of Error: 7.0%

Minimum sample size with 95% confidence level: 140

$$n_{sample\ size} = \frac{n_{calculated}}{1 - nonresponse\ rate\ (\%)}$$

$$n_{sample\ size} = \frac{140}{1 - 0.2} = 175$$

The minimum sample size calculated using the application was 140. However, after calculating the non-response rate of 20%, the final sample size obtained for the study was 175.

2.3. Sampling Method

A non-probability purposive sampling method was used wherein the samples were selected amongst clinical year medical students who are studying at Melaka-Manipal Medical College. They were Semester 7 medical students from Muar campus and also Semester 8, 9 and 10 medical students from the Malacca campus. The inclusion criteria for our study were that the participants must be clinical year medical students of Melaka-Manipal Medical College and they must consent to participate in the study. The exclusion criteria were incomplete questionnaire, unwilling participation and irrelevant response.

2.4. Data Collection

The questionnaire comprised two parts. The first part of the survey was on informed consent, the demographic details of the participants (age, gender, ethnicity, nationality and semester) and the sector of choice in their future career (health or non-health, public or private). The second part of the survey was on self-directed learning readiness and consisted of 42 questions. The questionnaire used in this study was Fisher's SDLRS. [1, 20] The questionnaire was taken from a journal on nursing education and was modified accordingly to fit our study. Following that, the questionnaire was distributed online via Google forms to the students of each semester.

The 42-item Fisher's SDLRS questionnaire was subdivided into three components. The first component was on 'self-

management' comprising 13 questions as a measurement for time management and self-discipline, 'desire for learning' comprising 14 questions which questioned the participant on their readiness to absorb new information, and 'self-control' comprising 15 questions which assessed the participants on their self-evaluation of their personal goals. The answers were graded on a 5-point Likert scale ranging from 5 (strongly agree) to 1 (strongly disagree). The highest attainable score was 210 and the lowest attainable score was 42. Higher score indicated higher SDL readiness. Total self-directed learning readiness score was calculated as percentage score. Then, this was further categorized into three groups such as below average (<70%), average (70% - 80%) and above average (>80%). [9] The Cronbach's coefficient alpha for internal consistency of the total item and each component i.e. 'self-management', 'desire for learning' and 'self-control' were 0.924, 0.857, 0.847 and 0.830 respectively. [1]

2.5. Data Processing and Analysis

Data was fed into Microsoft Excel and compiled then subsequently statistically analysed using the software Epi Info version 7. For the qualitative data (gender, ethnicity, nationality, semester, future career choice), the frequency of those data were counted and the percentage were calculated. Meanwhile the quantitative data of age categories had its mean, standard deviation and range calculated. We set the level of significance at 5% which is 0.05. Statistical test that was used for the hypothesis testing was determined based on the independent and dependent variable and the details are tabulated as below.

Table 1. Statistical test used.

Independent variable	Dependent variable	Statistical test
Age categories	Self-directed learning	Unpaired t-test
Gender	readiness	Unpaired t-test
Ethnicity	Self-management	ANOVA
Nationality	Desire for learning	Unpaired t-test
Semester	Self-control	ANOVA
Future career sector	Total score	ANOVA

2.6. Ethical Consideration

An informed consent form with all the important and relevant details of the study was provided along with the survey questions. Participation in the study was strictly voluntary and participants had the option to withdraw from the study. The information provided was kept confidential to ensure their anonymity and privacy. Only relevant information was used for the purpose of research. The approval for this research was received from the Research Ethics Committee, Faculty of Medicine, Melaka Manipal Medical College, Melaka, Malaysia.

3. Results

Table 2. Demographic characteristics of undergraduate medical students (n=179).

Variables	Frequency (%)
Age	
≤23	96 (53.63%)
>23	83 (46.3%)
Mean (SD)	23.58 (1.66)
Minimum - Maximum	21 - 29
Gender	
Male	75 (41.90%)
Female	104 (58.10%)
Ethnicity	
Malay	59 (32.96%)
Chinese	45 (25.14%)
Indian	41 (22.91%)
Others	34 (18.99%)
Nationality	
Malaysian	164 (91.62%)
International student	15 (8.38%)
Semester	
7	69 (38.55%)
8	49 (27.37%)
9	34 (18.99%)
10	27 (15.08%)
Future career sector	
Health (Public sector)	81 (45.25%)
Health (Private sector)	84 (46.93%)
Non-Health	14 (7.82%)

Table 2 shows the socio demographic data of undergraduate medical students under the study. A total of 179 students participated in the study in which 58.10% were female and the rest were male. 91.62% of the study sample consisted of Malaysian students while the remaining were international students. Students with age more than 23 years old were 46.3% and high participation was observed among Malay students which was 32.96% followed by Chinese with 25.14%, Indians with 22.91% and the remaining comprising other ethnicities. Participation of students from semester 7, 8, 9 and 10 were 38.55%, 27.37%, 18.99% and 15.08% respectively. From this study, 46.93% of the students plan to work in a private health sector, 45.25% showing interest to work in a public health sector and the rest plan not to work in a health sector.

Table 3. Subscale of self-directed learning readiness among undergraduate medical students.

Variables	Mean (SD)	Minimum - Maximum
Self-management	47.00 (6.53)	33 - 65
Desire for learning	54.89 (5.90)	41 - 70
Self-control	58.74 (6.58)	43 - 75
Total score	160.63 (16.11)	122 - 193

Table 3 shows self-control, one of the components in Fisher's SDLRS questionnaire has the highest mean of 58.74 with

standard deviation of 6.58. The minimum score obtained for the self-control component is 43 and the maximum score is 75. Apart from that, the mean score for desire for learning component is 54.89 with standard deviation of 5.90. The minimum and maximum scores for the same component are 41 and 75 respectively. Next, the mean score for the self-management component in Fisher's SDLRS questionnaire is 47 with 6.53 standard deviation and the maximum score obtained in that component is 65 while the minimum score is 33. The mean of the total score of SDL readiness is 160.63 with a standard deviation of 16.11. In our sample, the minimum total score attained is 122 and the maximum total score is 193.

Table 4. Self-directed learning readiness categories among undergraduate medical students.

Subgroup	Frequency (%)
<70% (Below average)	28 (15.64%)
70% - 80% (Average)	106 (59.22%)
>80% (Above average)	45 (25.14%)

Table 4 answers our objective to determine the readiness of self-directed learning among medical students in their clinical years in Melaka Manipal Medical College. Out of 179 participants, 59.22% of the participants obtained an average score for SDL readiness, while 25.24% of the participants scored above average and the remaining 15.64% got below average score.

Table 5. The association between age categories and self-directed learning readiness among undergraduate medical students (n = 179).

Variables	>23 (n=83) Mean (SD)	≤23 (n=96) Mean (SD)	Mean Difference (95% CI)	P Value
Self-management	48.95 (6.14)	45.31 (6.42)	3.64 (1.78 to 5.50)	<0.001
Desire for learning	54.75 (5.96)	55.02 (5.88)	-0.27 (-2.02 to 1.48)	0.758
Self-control	58.87 (6.75)	58.63 (6.44)	0.24 (-1.71 to 2.19)	0.806
Total score	162.57 (16.34)	158.96 (15.81)	3.61 (-1.14 to 8.36)	0.136

Unpaired t-test

Table 5 shows the results of association between age and self-directed learning readiness among undergraduate medical students using unpaired T-test. For the self-management component, students with age more than 23 have a mean score of 48.95 (SD=6.14) which is higher than students with age less than or equal to 23 which have a mean score of 45.31 (SD=6.42). The mean difference is 3.64 with 95% CI range from 1.78 to 5.50 and p-value which is <0.001 showing that there is significant association between age and self-management. In the desire for learning component, students with age more than 23 have a mean score of 54.75 (SD=5.96) which is slightly lower than student with age less than or equal to 23 which have a mean score of 55.02 (SD=5.88). The mean difference is -0.27 with 95% CI range from -2.02 to -1.48 and p-value which is 0.758 showing that there is no significant association between age and desire for

learning. For the self-control component, students with age more than 23 have a mean score of 58.87 (SD=6.75) which is slightly higher than students with age less than or equal to 23 which have a mean score of 58.63 (SD=6.44). The mean difference is 0.24 with 95% CI range from -1.71 to 2.19 and p-value which is 0.806 indicating that there is no significant association between age and self-control. Total score shows that students with age more than 23 have a mean score of 162.57 (SD=16.34) which is higher than students with age less than or equal to 23 which have a mean score of 158.96 (SD=15.81). The mean difference is 3.61 with 95% CI range from -1.14 to 8.36 and p-value which is 0.136 showing that there is no significant association between age and self-directed learning readiness among undergraduate medical students.

Table 6. The association between gender and self-directed learning readiness among undergraduate medical students (n = 179).

Variables	Female (n=104) Mean (SD)	Male (n=75) Mean (SD)	Mean Difference (95% CI)	P Value
Self-management	48.01 (6.40)	46.27 (6.56)	-1.74 (-3.69 to 0.20)	0.078
Desire for learning	54.99 (5.59)	54.76 (6.34)	0.23 (-1.54 to 2.00)	0.797
Self-control	58.50 (6.32)	59.07 (6.92)	-0.57 (-2.53 to 1.40)	0.570
Total score	159.76 (15.45)	161.84 (17.03)	-2.08 (-6.90 to 2.74)	0.396

Unpaired t-test

Table 6 shows the association between gender and self-directed learning readiness among undergraduate medical students. For the self-management component, males have a mean score of 46.27 (SD=6.56) which is lesser than the females with a mean score of 48.01 (SD=6.40). The mean difference is -1.74 with 95% CI range from -3.69 to 0.20 and the p-value is 0.078 thus showing that there is no significant association between gender and self-management

component. In desire for learning, the mean value for male is 54.76 (SD=6.34) whereas female mean value is 54.99 (SD=5.59) which is slightly higher than the males. The mean difference is 0.23 with 95% CI range from -1.54 to 2.00 and the p-value is 0.797 which is larger than 0.05 so it is not a significant association. Then, for the self-control component of the SDLRS questionnaire, males have a mean score of 59.07 (SD=6.92) which is higher than the females with a

mean score of 58.50 (SD=6.32). The mean difference is -0.57 with 95% CI range from -2.53 to 1.40. However, there is no significant association between gender and self-control component as the p-value is more than 0.05, which is 0.570. The mean value for males in total score is 161.84 (SD=17.03). This shows that males have a higher mean value

in total score compared to females with a mean value of 159.76 (SD=15.45). The mean difference is -2.08 with 95% CI range from -6.90 to 2.74 and the p-value is 0.396. Hence, there is no significant association between gender and the SDL readiness as higher total score indicates higher readiness for SDL.

Table 7. The association between ethnicity and self-directed learning readiness among undergraduate medical students (n = 179).

Variables	Chinese (n=45) Mean (SD)	Indian (n=41) Mean (SD)	Malay (n=59) Mean (SD)	Others (n=34) Mean (SD)	F (Df1, Df2)	P Value
Self-management	48.27 (7.15)	48.39 (5.77)	46.97 (6.31)	43.71 (6.00)	4.29 (3,175)	0.006
Desire for learning	55.64 (6.48)	55.41 (5.92)	54.61 (5.50)	53.76 (5.79)	0.81 (3,175)	0.491
Self-control	58.13 (7.37)	60.63 (6.11)	58.59 (5.79)	57.50 (7.02)	1.70 (3,175)	0.168
Total score	162.04 (18.62)	164.44 (15.20)	160.17 (14.75)	154.97 (14.89)	2.35 (3,175)	0.075

ANOVA

Table 7 shows the association between ethnicity and self-directed learning readiness among undergraduate medical students. For the self-management component, the mean score for Chinese is 48.27 (SD = 7.15), Indian is 48.39 (SD = 5.77), Malay is 46.97 (SD = 6.31) while others is 43.71 (SD = 6.00). The p-value is 0.006 which is less than 0.05, showing that there is a significant association between ethnicity and self-management. In desire for learning, Chinese shows the highest mean score with 55.64 (SD = 6.48), followed by Indian with 55.41 (SD = 5.92), Malay with 54.61 (SD = 5.50) and finally others with 53.76 (SD = 5.79). The p-value which is 0.491 showing that there is no significant association between ethnicity and desire for

learning. For self-control, Indian had the highest mean score of 60.63 (SD = 6.11) and others with 57.50 (SD = 7.02) being the lowest mean score. Chinese and Malay obtained mean scores of 58.13 (SD = 7.37) and 58.59 (SD = 5.79) respectively. The p-value is 0.168 thus there is no significant association between ethnicity and self-control. Total score shows that Indian had the highest mean score of 164.44 (SD = 15.20), followed by Chinese with 162.04 (SD = 18.62), Malay with 160.17 (SD = 14.75) and finally others with 154.97 (SD = 14.89). P-value which is 0.075 indicates that there is no significant association between ethnicity and self-directed learning readiness among undergraduate medical students.

Table 8. The association between nationality and self-directed learning readiness among undergraduate medical students (n = 179).

Variables	International student (n=15) Mean (SD)	Malaysian (n=164) Mean (SD)	Mean Difference (95% CI)	P Value
Self-management	45.67 (6.02)	47.12 (6.58)	-1.46 (-4.94 to 2.03)	0.411
Desire for learning	52.53 (5.07)	55.12 (5.94)	-2.58 (-5.70 to 0.55)	0.106
Self-control	55.53 (5.07)	59.03 (6.62)	-3.50 (-6.45 to -0.03)	0.048
Total score	153.73 (10.92)	161.26 (16.39)	-7.53 (-16.06 to 1.00)	0.083

Unpaired t-test

Table 8 depicts the association between nationality and self-directed learning readiness amongst clinical year medical students. Our sample comprises 164 Malaysian students and 15 international students. Malaysian students have a mean total score of 161.26 with standard deviation of 16.39 which is higher than international students who have a mean total score of 153.73 and a standard deviation of 10.92. The mean difference for total score is -7.53 with 95% CI range from -16.06 to 1.00. Nonetheless, there's no significant association between nationality and self-directed learning readiness as the P-value is more than 0.05 (0.083). A closer look in the three subscales of 'self-management', 'desire for learning' and 'self-control' suggests that Malaysian students also slightly outperformed their international peers as reflected by their higher mean scores. For self-management, Malaysians have a mean score of 47.12 (SD = 6.58) compared with the

mean score of 45.67 (SD = 6.02) attained by international students. The mean difference is -1.46 (95% CI ranges from -4.94 to 2.03). This finding is similarly statistically insignificant as the P-value is 0.411 suggesting that there's no significant association between nationality and self-management. Similarly, Malaysians attained a mean score of 55.12 (SD = 5.940) in desire for learning which is slightly higher than the score of 52.53 (SD = 5.07) obtained by International students. For this component, the mean difference is -2.58 with a 95% CI ranging from -5.70 to 0.55. However, nationality is also not associated with desire for learning as reflected by the P-value of 0.106. In the subscale of self-control, Malaysian students obtained a mean score 59.03 (SD = 6.62) whereas international students attained 55.53 (SD = 5.07) with a mean difference of -3.50. 95% CI ranges from -6.45 to -0.03 for this component. Unlike the

other subscales, the P-value of 0.048 (<0.05) suggests that nationality is associated with the subscale of self-control of SDL readiness.

Table 9. The association between current semester and self-directed learning readiness among undergraduate medical students (n = 179).

Variables	7 (n=69) Mean (SD)	8 (n=49) Mean (SD)	9 (n=34) Mean (SD)	10 (n=27) Mean (SD)	F (Df1, Df2)	P Value
Self-management	45.10 (6.55)	46.98 (5.60)	49.06 (6.88)	49.30 (6.44)	4.42 (3,175)	0.005
Desire for learning	55.52 (6.19)	53.49 (4.96)	55.29 (5.42)	55.33 (7.07)	1.29 (3,175)	0.283
Self-control	58.65 (6.51)	57.65 (6.44)	59.91 (7.07)	59.44 (6.33)	0.91 (3,175)	0.435
Total score	159.28 (16.07)	158.12 (14.36)	164.26 (17.34)	164.07 (17.14)	1.56 (3,175)	0.203

ANOVA

Table 9 shows the association between current semester and self-directed learning readiness among undergraduate medical students. In the self-management component, students in semester 7 have a mean score of 45.10 (SD = 6.55), and students in semester 8 have a mean score of 46.98 (SD = 5.60) while the students in semester 9 have a mean score of 49.06 (SD = 6.88). The students in semester 10 have the highest mean score among all the current semester which is 49.30 (SD = 6.44). The p-value is 0.005 thus showing there is a significant association between current semester and self-management. In the desire for learning component, semester 7 students have a mean score of 55.52 (SD = 6.19) which is the highest compared to other semesters. The students in semester 8 have a mean score of 53.49 (SD = 4.96) while the students in semester 9 have a mean score of 55.29 (SD = 5.42) which is the lowest mean score among the current semesters. The students in semester 10 have a mean score of 55.33 (SD = 7.07). The p-value is 0.283 which means current semester is not associated with desire for learning. For the self-control component, students in semester 9 with a mean score of 59.91 (SD = 7.07) have the highest mean score among all the semesters. The mean score of students in semester 7 is 58.65 (SD = 6.51) and the mean score for semester 8 is 57.65 (SD = 6.44). Meanwhile, the mean score of students in semester 10 is 59.44 (SD = 6.33). There is no significant association between current semester and self-control because the p-value of 0.435 is more than 0.05. For total score, those who are in semester 9 have the highest mean score of 164.26 (SD = 17.34) meanwhile the students in semester 8 have the lowest with the mean score of 158.12 (SD = 14.36). The mean score for students in semester 7 is 159.28 (SD = 16.07) and the students in semester 10 have a mean score of 164.07 (SD = 17.14). The p-value is 0.203 suggesting that there is no significant association between the current semester and self-directed learning readiness among undergraduate medical students.

Table 10. The association between future career sector and self-directed learning readiness among undergraduate medical students (n = 179).

Variables	Health (Private sector) (n=84) Mean (SD)	Health (Public sector) (n=81) Mean (SD)	Non-Health (n=14) Mean (SD)	F (Df1, Df2)	P Value
Self-management	47.64 (6.40)	47.21 (6.37)	41.93 (6.57)	4.88 (2,176)	0.009
Desire for learning	55.64 (5.47)	54.83 (5.86)	50.79 (7.21)	4.23 (2,176)	0.016
Self-control	59.77 (6.49)	58.59 (6.13)	53.36 (7.23)	6.09 (2,176)	0.003
Total score	163.06 (14.93)	160.63 (15.77)	146.07 (18.32)	7.13 (2,176)	0.001

ANOVA

Table 10 shows the association between future career sector and self-directed learning readiness among undergraduate medical students. In the self-management component, the mean score of students planning to work in the health (private) sector is the highest with 47.64 (SD = 6.40). This is followed by students planning to work in the health (public) sector with 47.21 (SD = 6.37) and finally, the non-health sector with 41.93 (SD = 6.57). Result is significant as the p-value is 0.009 suggesting that there is association between future career sector and SDL readiness. For self-control, the mean score for the health (private) sector is 59.77 (SD = 6.49) which is slightly higher than the health (public) sector with 58.59 (SD = 6.13) and non-health with 53.36 (SD = 7.23). P-value is 0.003 which is <0.05 hence the result is significant wherein future career sector is associated with self-control. In the desire for learning component, those intending to work in the health (private) sector have a mean score of 55.64 (SD = 5.47) in contrast with the slightly lower 54.83 (SD = 5.86) for health (public) sector and 50.79 (SD = 7.21) of the non-health sector. Result for desire for learning component is also significant as the p-value is 0.016, which is less than 0.05 suggesting that future career sector is associated with desire for learning. For the total score, students who are planning to work in the private health sector attained the highest mean total score of 163.06 (SD = 14.93) followed by the ones planning to work in the public health sector with mean total score of 160.63 (SD = 15.77). Those who intended to work in the non-health sector attained the lowest mean total score with 146.07 (SD = 18.32). The P-value of 0.001 which is <0.05 suggests that the future career sector is associated with self-directed learning readiness amongst undergraduate clinical year medical students.

4. Discussion

A cross-sectional study was done among undergraduate medical students in Melaka Manipal Medical College, Malaysia to determine the self-directed learning readiness and assess the association of variables such as age, gender, ethnicity, nationality, semester of study, and future career choice with the readiness of self-directed learning in medical students in their clinical years. Our study result shows that the mean total score of SDL readiness is 160.63. Meanwhile, the mean score of self-management is 47.00, desire for learning is 54.89 and self-control is 58.74. From these mean scores, it was found that most of the undergraduate medical students are having average (59.22%) and above average SDL readiness (25.14%). However, 15.64% of the students are having below average SDL readiness. A previous study done among undergraduate nursing students in Australia showed a lower total mean score with 150.55, lower self-management and desire for learning with 44.26 and 47.31 respectively. Meanwhile, the mean score of self-control is almost the same with 58.78. [1] In a cross-sectional study done among medical students in Umm Al-Qura University, Saudi Arabia, 12.4% scored below average, 36.6% obtained an average score, and more than half of the students are above average with 51%. [9]

The SDL readiness was assessed by using the 42-item Fisher's SDLRS questionnaire and was subdivided into three components. The components were 'self-management', 'desire for learning' and 'self-control'. In our study, we found that there is a significant association between age and self-management. Older students with age more than 23 are better at time management and self-discipline compared to younger students with age less than or equal to 23. However, there was no significant association between age and desire for learning, self-control and total score. A single cohort cross-sectional survey was done in first year inter professional health science students at a metropolitan university in New South Wales, Australia and it was found that older students had higher SDLR, than younger students. However, there was a weak positive correlation between SDLR scores and age. [15] Another study by Reio and Davis (2005), for instance, found that after controlling for ethnicity, older adult students reported more readiness for SDL than adolescents and young adult students. [22] Our study shows that gender has no significant impact on SDLR scores. This result is supported by a previous study done in Saudi Arabia wherein the SDLR scores of medical students were not affected by gender. [9] Premkumar et al. also found no significant difference between male and female students in their self-directed learning readiness among Indian medical students at Christian Medical College in Vellore. [3] We

found that Chinese and Indian students have a better SDLR score compared to Malay and other students in the 'self-management' subscale scores. However, overall no significant relationship between ethnicity and SDLR scores was established in our study. Morris collected data from 157 randomly selected past and present students from a nontraditional graduate business institution to examine the use of SDLRS as a predictor of academic achievement, as well as to examine the possible relationships between SDLR and measures of academic achievement with various factors including ethnicity. It was found that ethnicity had no significant association with self-directed learning readiness, which was similar to our findings.

Furthermore, association between current semesters and SDL readiness shows that there is a significant association between current semesters and self-management. Senior year students had a higher degree for self-management compared to junior year students. However, there was no significant association between current semester and desire for learning, self-control and total score. A previous study was done in Manipal College of Medical Sciences, Pokhara, and the result showed that most of the first semester students had a high degree of readiness for self-directed learning. [21] Another cross-sectional study that investigated the readiness for SDL among undergraduate medical students at CMC, Vellore showed that there was a reduction in the SDLR in students across different curriculum years from first year till final year of studies. [3] However, A study conducted at an offshore Caribbean medical school to measure SDL readiness among premedical and basic science students revealed that the result obtained had no significant differences in scores according to the semester of the respondents. [23] The association between nationality and SDL readiness from our study showed that there was a significant association between nationality and self-control. Malaysian students had greater self-evaluation of their personal goals compared to international students. However, there was no significant relation between nationality and self-management, desire for learning and total score. In the previous study from Nasser Bin Abdullah Al-Atyyia (NBA) Independent School for boys in Qatar that comprised of 44 students from 10th grade and 39 students from 11th grade and also consist of 21 non-Qatari and 62 Qatari students, from a population of 271 students, it was found that there were no significant differences of SDLRS total scores between Qatari and non-Qatari students. [24] A previous research on Readiness for Self-Directed Learning and the Cultural of Values of Individualism/Collectivism among American and South Korean college students showed there was no statistically significant difference between the mean SDLRS score for Korean and the mean SDLRS score for American by

nationality. [25] On the association between future career and SDLR there was a significant result, where those choosing to further their career in the health sector had a higher score than those choosing to pursue a career in the non-health sector. Guglielmino et al. conducted a similar research on a sample population from a large American utility company, where 421 were managers, 318 were non-managers, and 14 subjects were classified as undefined occupational status. The results proved that those in jobs requiring a high degree of problem-solving skills had significantly higher SDLRS scores than others, as well as individuals who have completed higher levels of education also tend to have higher SDLRS scores. [26]

The limitation in our study is that we were not able to recruit the students of semester 6 as they have yet to be enrolled at the time of study. In addition to that, most of the participants in this study are from semester 7 and 8 and there is lesser participation from senior students of semester 9 and 10 leading to an uneven distribution. As this is a cross sectional study, we are unable to observe the changes over time as in the students could be much more ready for SDL in the future. Another limitation in our study is that this study was done only at Melaka Manipal Medical College and as such the findings obtained cannot be generalized to other universities as it is only representative to this institution.

The possession of self-directed learning skills is necessary in the pursuit of lifelong learning amongst medical students. [17] After all, self-directed learning is integral to modern education as the profession of a medical practitioner requires an individual to keep up to date with the most recent and latest diagnostic studies, investigation and treatment modalities. Therefore, both students and faculty should coordinate with each other so that the best way for self-directed learning to be initiated could be carried out. Furthermore, colleges and universities should provide the opportunity for students to participate in SDL and it is recommended that SDL is included in the academic module. Students should be encouraged to take part in SDL to enable them to experiment with various learning styles that could fit them the best. In addition to that, SDLR is described as a maturational process and this finding is significant in our study on the subscale of self-management. Future research should take into account the potential changes in SDL readiness with regards to time. Additionally, more senior students should be encouraged to participate in this study in order to have a more even distribution. More institutions of higher learning should also be included to obtain a more comprehensive and representative result as the findings in our study do not necessarily reflect and cannot be generalised to other institutions. This study of ours also demonstrates that there's a significant association between future career sectors

of choice and self-directed learning. This is worth further investigation as those with clear career goals have demonstrated higher SDLR scores compared with those without and this information could potentially be beneficial in career counselling and guidance in the workplace.

5. Conclusion

In conclusion, self-directed learning readiness among medical students in their clinical years in Melaka Manipal Medical College is fairly good. Out of 179 participants, 59.22% of the participants obtain an average score for SDL readiness, while 25.24% of the participants have scored above average and the remaining 15.64% gets below average score. There are significant associations between age, ethnicity, and current semester with self-management of self-directed learning readiness. Not only that, it is found that nationality is associated with self-control of SDL readiness. The study also shows that there is a significant association between future career sector and self-directed learning readiness amongst undergraduate clinical year medical students.

Medical students should be encouraged to be involved and well-trained in self-directed learning. Their readiness in SDL would ensure that the students stay knowledgeable and keep up with new information as well as to prepare themselves for their future career development.

Acknowledgements

References

[1] Fisher M, King J, Tague G. Development of a self-directed learning readiness scale for nursing education. Nurse Education Today. 2001; 21 (7): 516–525. DOI: 10.1054/nedt.2001.0589.

[2] Annuar N, Shaari R. The Antecedents Towards Self-directed Learning Among Distance Learners in Malaysian Public Universities, Management Faculty, Universiti Teknologi Malaysia, Proceeding of the Global Summit on Education GSE 2014. 2014 Mar 4-5; E- ISBN 978-967-11768-5-6.

[3] Premkumar K, Vinod E, Sathishkumar S, Pulimood AB, Umaefulam V, Prasanna Samuel P, John TA. Self-directed learning readiness of Indian medical students: a mixed method study. BMC Medical Education. 2018 Jun 8; 18 (1). DOI: 10.1186/s12909-018-1244-9.

[4] Raemdonck I, Leeden MV, Segers M, Thijssen J. Understanding work-related learning: the case of ICT workers. Journal of Workplace Learning. 2012 Aug 3; 24 (6), 416-429. DOI: 10.1108/13665621211250315.

[5] Dynan L, Cate T, Rhee K. The Impact of Learning Structure on Students' Readiness for Self-Directed Learning. Journal of Education for Business. 2010 Aug 7; 84 (2), 96-100. DOI: 10.3200/JOEB.84.2.96-100.

[6] Din N, Haron S, Rashid RM. Can Self-directed Learning Environment Improve Quality of Life? Procedia - Social and Behavioral Sciences. 2016 Jun 23; 222, 219–227. DOI: 10.1016/j.sbspro.2016.05.150.

[7] Nordin N, Abd Halim N, Malik M. Assessing Readiness for Self-Directed Learning among College Students in the Provision of Higher Learning Institution. Environment-Behaviour Proceedings Journal. 2016 Jul; 1 (3), 91-101. DOI: 10.21834/e-bpj.v1i3.296.

[8] Murad MH, Coto-Yglesias F, Varkey P, Prokop LJ, Murad AL. The effectiveness of self-directed learning in health professions education: a systematic review. Medical Education. 2010 Oct 15; 44 (11), 1057–1068. DOI: 10.1111/j.1365-2923.2010.03750.x.

[9] Salih M, Simbawa H, Baradwan S, Nuqali A. Self-directed learning readiness among medical students at Umm Al-Qura University, Saudi Arabia: a cross sectional study. Scholars Bulletin. 2016 Jan; 2 (1): 20-26.

[10] Grover KS, Miller MT. Gender differences in self-directed learning practices among community members. PAACE Journal of Lifelong Learning. 2014; 23: 19-31.

[11] Ahmad, Majid. Self-directed learning and culture: a study on Malay adult learners. Procedia - Social and Behavioral Sciences. 2010; 7: 254-63.

[12] M. H. Osman. Ready or not: students with self-directed learning? Journal of Engineering Science and Technology. 2015 June; (2): 84-90.

[13] Huynh D, Haines ST, Plaza CM, et al. The impact of advanced pharmacy practice experiences on students' readiness for self-directed learning. Am J Pharm Educ. 2009; 73 (4): 65. doi: 10.5688/aj730465

[14] Bruin KD. Self-directed learning and career decision-making. Akta Academica. 2011 Jan; 43 (2): 214-35.

[15] Slater, C. E, Cusick, A. & Louie, J. C. Y. Explaining variance

in self-directed learning readiness of first year students in health professional programs. BMC Medical Education. 2017 Nov; 17: 207. DOI: https://doi.org/10.1186/s12909-017-1043-8.

[16] Kocaman G, Ugur A, Dicle A. A longitudinal analysis of the self-directed learning readiness level of nursing students enrolled in a problem-based curriculum. Journal of Nursing Education. 2009 May 1; 48 (5): 286-90.

[17] Abraham RR, Fisher M, Kamath A, Izzati TA, Nabila S, Atikah NN. Exploring first-year undergraduate medical students' self-directed learning readiness to physiology. Advances in Physiology Education. 2011 Dec; 35 (4): 393-5.

[18] Shokar GS, Shokar NK, Romero CM, Bulik RJ. Self-directed learning: looking at outcomes with medical students. FAMILY MEDICINE-KANSAS CITY-. 2002 Mar 1; 34 (3): 197-200.

[19] Megahed AM, Adam S, Mohamed Abdel Aleem M. The Relation Between Readiness for Self-learning and Learning Style Preferences Among Nursing Students. Port Said Scientific Journal of Nursing. 2019 Dec 1; 6 (2): 78-93.

[20] Fisher MJ, King J. The self-directed learning readiness scale for nursing education revisited: A confirmatory factor analysis. Nurse education today. 2010 Jan 1; 30 (1): 44-8.

[21] Shankar PR. Readiness for self directed learning among first semester students of a medical school in Nepal. Journal of Clinical and Diagnostic Research. Journal of Clinical and Diagnostic Research. 2011 Jan; 1.

[22] Reio TG & Davis W. Age and gender differences in self-directed learning readiness: A developmental perspective. Int J Self Dir Learn. 2005 Jan; 2. 40-49.

[23] Shankar PR, Dakubo G, Patra S et al. Readiness for self-directed learning among basic science and premedical students at a Caribbean medical school. MedEdPublish. 2018 Jan; 7,, 38, https://doi.org/10.15694/mep.2018.0000107.1.

[24] Kan'an A & Osman K. The Relationship between Self-Directed Learning Skills and Science Achievement among Qatari Students. Creative Education. 2005; 6, 790-797. http://dx.doi.org/10.4236/ce.2015.68082.

[25] Lee, IH. readiness for Self-Directed Learning and the Cultural Values of Individualism/Collectivism among American and South Korean College Students Seeking Teacher Certification in Agriculture. 2004.

[26] Guglielmino PJ & Guglielmino LM. Productivity in the workplace: the role of self-directed learning and the implications for human resource management. International Journal of Human Resources Development and Management. 2008 July 17; 8 (2), 293-305. https://doi.org/10.1504/IJHRDM.2008.019541