Designing, Implementation and Evaluation of "Student as Teacher" Elective Course for Undergraduate Students at the Faculty of Medicine, Suez Canal University

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ABSTRACT
Background: Student as teacher programs are training courses designed aiming to motivate students in medical education and provide them with the fundamental expertise of the teachers.
Objective: The aim of the current study was to develop a framework for introducing "Student as Teacher" course as one of the essential training programs for all of the undergraduate students as a step to enable the future graduates to be professional educators.
Subjects and methods: The present study is a descriptive/quasi-experimental one that included 37 first-year medical students assessing the difference in their knowledge, skills and attitude before and after the implementation of the "Student as Teacher" course at FOM-SCU. A 6-weeks course was designed and implemented addressing several topics. Students' satisfaction regarding the course was also assessed through structured self-administered questionnaires that evaluate the course.
Results: A significant difference between the students' scores in the pre and post-tests was detected and there was 100% satisfied with the course.
Conclusion: There is a need to include a "Student as Teacher" course in the undergraduate curriculum at the Faculty of Medicine, Suez Canal University as it improves the knowledge, skills and attitude of the first-year students regarding their teaching skills as a significant difference between their scores in the pre and post-tests was detected.
Keywords: SAT, Self-Directed Learning, Peer teaching, quasi-experimental, Suez Canal University.

INTRODUCTION

Physicians play active roles in the education of their medical students and allied other health professionals when they discuss care plans. Physicians also give health education to patients that have a positive effect on patients' compliance and health outcomes, so all doctors should be competent educators. SAT programs participate in faculty development by student engagement and promoting partnerships [1].

The need to prepare students for their roles as teachers is mandated by medical education competency standards, which is why so many medical schools have adopted student as teacher courses. Students can take SAT courses to learn about the theories and practices of medical education. The courses combined practice-based instruction with didactic, principle-based teaching [2].

As a first step in boosting students' engagement throughout the educational continuum, the facilitators of FAIMER-Brazil created a "student-as-teacher" training program to introduce the fundamental knowledge and skills of a medical educator [1].

Through constant observation, instruction, and practice, one can improve the ability of effective teaching. In order to address the crucial teaching skills during undergraduate medical education, Students as Teachers (SAT) programs have been drawing attention [3].

Nowadays, there is a changing role of the student in contrast to the traditional teaching which depended on the teacher's instruction. One of the student's roles currently is to be a teacher [4].

Limited formal training is provided to medical students to enhance their teaching skills, despite the fact that teaching is an important aspect of medical practice [5].

The current study aimed to develop a framework for introducing "Student as Teacher" course as one of the essential training programs for all of the undergraduate students as a step to enable the future graduates to be professional educators.

SUBJECTS AND METHODS

The current study was descriptive/quasi-experimental (pre-test - post-test) study that included 37 first-year medical students were conducted at the Faculty of Medicine, Suez Canal University. A convenient sample was used to conduct the study.

- Designing and implementation of the "Students as Teacher" course:

Seven workshops were designed, conducted virtually using the ZOOM application, recorded and uploaded on the MOODLE platform. The workshops conducted over a period of 6 weeks in the second semester covering several topics: introduction to adult learning principles, learning environment, teamwork, Feedback, communication skills, presentation skills and reflection. There was an on-campus workshop to enable students to apply presentation and communication skills they learned within the course.

- Course evaluations instruments:

A self-administered questionnaire was used as a pre-test and post-test composed of fifteen items. This questionnaire was introduced online through Google Forms before and after the implementation of the course. The questionnaire were designed to address the adult learning approaches, communication skills, presentation skills, feedback, learning environment and reflection. Content validity of the questionnaire was ensured by reviewing the items by medical education experts. As well as, the questionnaire was tested for reliability through assessing the internal consistency by testing Cronbach's alpha.

In addition, there were a variety of methods used to evaluate the students during and after the course. These methods included assignments, quiz, attendance, Checklist for the Evaluation of end-of-course teaching presentations. A SAT course evaluation form designed using Likert scale was used to evaluate students' satisfaction after delivering the course.

Ethical approval

This study was ethically approved by the Institutional Review Board of the Faculty of Medicine, Suez Canal University (Research 4706#). Written informed consent was obtained from all participants. This study was executed according to the code of ethics of the World Medical Association (Declaration of Helsinki) for studies on humans.

Statistical analysis

The collected data were introduced and statistically analyzed by utilizing the Statistical Package for Social Sciences (SPSS) version 20 for windows. Qualitative data were defined as numbers and percentages. Chi-Square test and Fisher's exact test were used for comparison between categorical variables as appropriate. Quantitative data were tested for normality by Kolmogorov-Smirnov test.

Normal distribution of variables was described as mean and standard deviation (SD), and Paired t-test was used for comparison between pre-test and post-test variables. P value ≤0.05 was considered to be statistically significant.

RESULTS

The sample size was 39 students who joined the SAT elective course at the start, but then 2 of them left the faculty. Thus, the total number of students became 37. Out of 37 students who completed the course 35 students succeeded and 2 students failed. Males were represented by 19 (48.7%) and females by 20 (51.3%). The difference between genders was non-significant as revealed by Chi-square test (**Figure 1**).
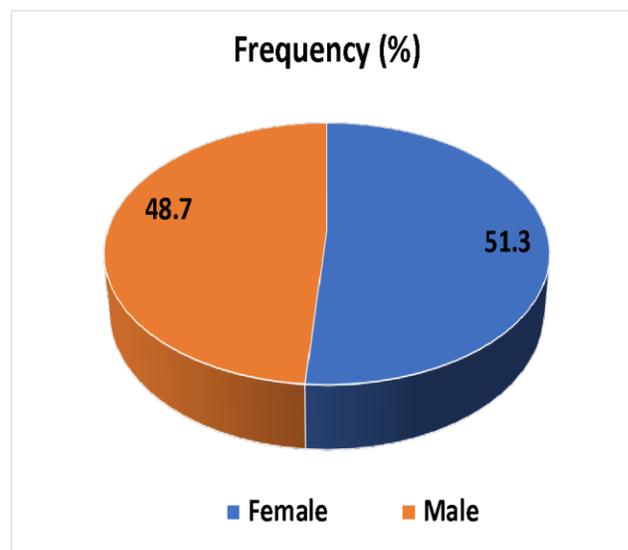

Figure (1). Pie chart presenting the distribution of the participating students according to Gender (N=39)

Table 1 shows that Student's Course Score of total 140 had an average of 109.7 (SD 21.2).

Table (1): Students' scores in the SAT elective course.

Assessment Methods	Mean Scores	SD
Test	29.7	7.2
Attendance	10.7	3.0
Learning Styles Assignment	13.9	0.4
Learning Environment & Teamwork Quiz	11.4	1.6
Reflection Assignment	14.0	0.6
Students' Presentation (Faculty Staff Members' Assessment)	24.6	2.1
Students' Presentation (Peers' Assessment)	13.9	1.0
Total Scores	109.7	21.2

SD: standard deviation

There was a statistically significant increase in the post-test scores' mean compared with the pre-test scores' mean where the total of 150 points of the Google form that equal 42 scores (**Table 2**).

Table (2): The scores of pre-test and post-test presented as mean and SD

Descriptive Statistics	Pre-test	Post-test
Mean	**21.49**	**29.66**
SD	5.94	7.18
N	39	37
Paired t-test	-6.27	
P-value	<0.001***	

There was 97.3 % of the participating students agreed and strongly agreed that the SAT elective course enriched their knowledge, skills and attitude about teaching (**Table 3**).

Table (3): Frequency distribution of students' satisfaction regarding the usefulness of the Student as Teacher (SAT) Elective Course (n= 37).

Items	Scale	N	%
The SAT Elective Course increased the student's interest in teaching	**Strongly Disagree**	**0**	**0.0**
	Disagree	**0**	**0.0**
	Neutral	**1**	**2.7**
	Agree	**8**	**21.6**
	Strongly Agree	**28**	**75.7**
The SAT Elective Course increased the student's self-confidence during teaching	**Strongly Disagree**	**0**	**0.0**
	Disagree	**0**	**0.0**
	Neutral	**3**	**8.1**
	Agree	**3**	**8.1**
	Strongly Agree	**31**	**83.8**
The SAT Elective Course increased the student's motivation regarding teaching	**Strongly Disagree**	**0**	**0.0**
	Disagree	**0**	**0.0**
	Neutral	**1**	**2.7**
	Agree	**13**	**35.1**
	Strongly Agree	**23**	**62.2**
The SAT Elective Course enriched the student's Knowledge, Skills and Attitude about teaching	**Strongly Disagree**	**0**	**0.0**
	Disagree	**0**	**0.0**
	Neutral	**1**	**2.7**
	Agree	**7**	**18.9**
	Strongly Agree	**29**	**78.4**
The SAT Elective Course increased your interest in medical education as a career	**Strongly Disagree**	**0**	**0.0**
	Disagree	**0**	**0.0**
	Neutral	**2**	**5.4**
	Agree	**9**	**24.3**
	Strongly Agree	**26**	**70.3**

There was 94.6 % of the students agreed and strongly agreed that the SAT elective course enriched their Knowledge, Skills and Attitude about adult-learning principles (**Table 4**).

Table (4): Frequency distribution of students' satisfaction regarding Self-Directed Learning (n= 37).

Items	Scale	N	%
The SAT Elective Course enriched the student's Knowledge, Skills and Attitude about adult-learning principles	Strongly Disagree	0	0.0
	Disagree	0	0.0
	Neutral	2	5.4
	Agree	9	24.3
	Strongly Agree	26	70.3
The SAT Elective Course helped the student to develop ways to give and receive feedback	Strongly Disagree	0	0.0
	Disagree	0	0.0
	Neutral	3	8.1
	Agree	6	16.2
	Strongly Agree	28	5.7

There was 93.9 % of the students agreed and strongly agreed that the Student as Teacher (SAT) Elective Course materials were available (**Table 5**).

Table (5): Frequency distribution of students' satisfaction regarding Resources of the SAT Elective Course (n= 37).

Items	Scale	N	%
The duration of the SAT Elective Course sessions	Strongly Disagree	0	0.0
	Disagree	1	2.7
	Neutral	2	5.4
	Agree	10	27.0
	Strongly Agree	24	64.9
The timing of the SAT Elective Course in relation to your schedule	Strongly Disagree	0	0.0
	Disagree	0	0.0
	Neutral	3	8.1
	Agree	8	21.6
	Strongly Agree	26	70.3
The student's attendance and participation in the SAT Elective Course virtually	Strongly Disagree	0	0.0
	Disagree	0	0.0
	Neutral	3	8.1
	Agree	8	21.6
	Strongly Agree	26	70.3
The Zoom application as a platform for implementing the SAT Elective Course	Strongly Disagree	0	0.0
	Disagree	0	0.0
	Neutral	6	16.2
	Agree	5	13.5
	Strongly Agree	26	70.3
The availability of the SAT Elective Course materials	Strongly Disagree	0	0.0
	Disagree	0	0.0
	Neutral	3	8.1
	Agree	8	21.6
	Strongly Agree	26	70.3

Our results revealed that 100 % of the participating students were satisfied (agreed or strongly agreed) about the SAT Elective Course (**Table 6**).

Table (6): Frequency distribution of students' overall satisfaction regarding the SAT Elective Course (n= 37).

Items	Scale	N	%
Student's overall Satisfaction about the SAT Elective Course	Strongly Disagree	0	0.0
	Disagree	0	0.0
	Neutral	0	0.0
	Agree	7	18.9
	Strongly Agree	30	81.1
The student believes that the SAT should be an obligatory course for all medical students' years	Strongly Disagree	1	2.7
	Disagree	1	2.7
	Neutral	5	13.5
	Agree	5	13.5
	Strongly Agree	25	67.6

DISCUSSION

Early on in their medical training, medical students get the chance to learn about educational pedagogy and practice teaching through a program called Student as Teacher (SAT) [6]. Although the importance of SAT programs has been documented in the literature, formal teaching of SAT programs was not existent in medical curricula in Egypt.

There was statistically significant increase in students' mean scores when comparing the results of post-test compared to the pre-test mean scores. Out of a total score 42 the students had an average of 21.3 (SD 6) then they were assessed after implementing the elective course with their scores had an average of 29.7 (SD 7.2). The difference between the pre- and post-tests was highly significant.

In accordance with our results, facilitators of FAIMER-Brazil designed a 'student-as-educator' training program to introduce the core knowledge and expertise of a medical educators as an early step in enhancing students' engagement throughout the educational continuum [1]. Also, in accordance with our results students had positive points of view about the end-of-course teaching presentation as they thought that it was an important vehicle for them to synthesize their new knowledge as **Pasquale and Pugnaire** mentioned [7]. In contrast to the results of the current study and the discussed previous studies, there is a study which declared that students' teaching has multiple weaknesses as they have no formal teaching qualifications which has the possibility of poor teaching occurrence that at the best situation will not provide benefits to students and at worst one may harm their learning [8]. Deficits of knowledge is another potential problem as student teachers have less knowledge and limited clinical experience than experts, so they struggle to accurately answer questions in depth. Also, student teachers may rely on their notes, diagrams

and explanations which may be poor resources for learning [8]. Regarding students' satisfaction with Self-Directed Learning, most of the participating students in the current study (94.6%) agreed and strongly agreed that the SAT elective course enriched their Knowledge, Skills and Attitude about adult-learning principles. Our results conform to the survey of medical students conducted at the University of Vermont, US that revealed that 90% of respondents would participate in a workshop about teaching skills and feedback prior to residency if workshops were available. All teaching workshops were highly rated by participants [9]. Regarding students' satisfaction about the nature of assignments, quiz and tasks used during the SAT Elective Course, the current study revealed that 91.9% were satisfied (Agreed and Strongly Agreed) regarding the assessment of the SAT elective course. These findings conform to the study conducted at Toronto University where there was an extracurricular SAT program for 20 second-year medical students developed, implemented and evaluated [6]. Regarding the students' satisfaction about the current SAT course, they wrote positive comments and the majority of their replies to items about their satisfaction to evaluate the course from their opinions were the highest ones on the Likert scale. There was 81.1% of the participating students agreed and strongly agreed that the SAT should be an obligatory course for all medical students' years. Also, in accordance with our results there was a narrative review on teaching medical students to teach was conducted, and the authors made recommendations for those curricula based on literature. They recommended that formal teaching skills training be implemented in undergraduate medical education and made mandatory whenever possible [5]. The teacher students' fear of losing their control of their colleagues during the educational sessions is a challenge that was faced during implementing a SAT course [10]. Another

challenge to implement a SAT course is that some students lack confidence in their own teaching skills [11].

LIMITATIONS
1. Small sample size was used as the SAT course was an elective one.
2. Exploratory Factor Analysis and Confirmatory Factor Analysis to validate the used tools could not be conducted due to the small sample size.

CONCLUSION
There is a need to include a "Student as Teacher" course in the undergraduate curriculum at the Faculty of Medicine, Suez Canal University as the "Student as Teacher" course improves the knowledge, skills and attitude of the first-year students regarding their teaching at the Faculty of Medicine, Suez Canal University after the implementation the "Student as Teacher" elective course as there is a significant difference between their scores in the pre and post-tests and they were satisfied with this course.

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