



Research article

Studying the effectiveness of self-directed education in learning and teaching the otolaryngology module in an integrated-based curriculum

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ABSTRACT

Introduction: Self-learning is a learning process in which students harvest the enterprise, to express their learning goals, choose assets for learning, practice learning strategies, and assess the outcomes achieved. Many forms of self-learning were introduced in integrative medical curricula such as Team-based learning (TBL) and Problem-based learning (PBL). This study aims to evaluate self-learning in the otolaryngology module and determine the type of self-learning that students prefer and which of these types has a stronger impact on achieving the educational objectives of the module.

Material and methods: A cross-sectional study was done on the 270 students of studied the otolaryngology module in three consecutive years representing the whole class of the fifth-year medical students along three consecutive years. A Likert scale questionnaire was distributed to measure the students' satisfaction with the current teaching and learning.

Results: The obtained results revealed higher students' satisfaction with TBL than other modalities supported by high achievement in TBL-related questions. In addition, there is a significant difference between TBL and PBL ($p = .00044$). No significant differences were obtained either between TBL and CBL ($p = .16570$) or between TBL and Seminar presentation ($p = .16570$). In addition, no significant correlations were obtained between PBL and CBL ($p = .34677$), between PBL and seminar presentation ($p = .46496$), and between CBL and seminar ($p = .99967$).

Conclusion: The results showed that the highest students' satisfaction was towards TBL compared to other educational methods. These results encourage clinical educators to insert and implement TBL in most of the integrative curriculum modules, especially that of the clinical years.

1. Introduction

Self-directed learning (SDL) as defined by Charokar and Dulloo [1] is a learning process in which students harvest the enterprise, with or deprived of direction from others, to express their learning goals, choose assets for learning, practice learning strategies and assess the outcomes achieved. The learners are principally responsible for recognizing their learning needs and expressing learning objectives [2–5]. [6–9].

Since the concept of self-directed learning (SDL) was illustrated by Malcolm Knowles in 1975 [10], medical instructors have incorporated the ideologies of this student-centered method to permit physicians to take accountability for and drive their ongoing

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learning. Medical students are presumed to encourage the habits of SDL and upgrade lifelong learning skills at medical school. As Knowles defined it, "A self-directed learner takes obligation for their learning and has an internal motivation to develop, implement, and evaluate their approach to learning." Knowles labeled SDL as a learning contract between a learner and an instructor and a linear process comprising six major steps: (1) climate setting (creating an atmosphere of mutual respect and support); (2) diagnosing learning needs; (3) formulating learning goals; (4) identifying human and material resources for learning; (5) choosing and implementing appropriate learning strategies; and (6) evaluating learning outcomes.

Many methods can deliver SDL such as flipped classrooms, team-based learning, problem-based learning, case-based learning, small group discussion, seminars, journal clubs, open-book examinations, self-paced learning, controlled SDL, and Doughnut Rounds [11].

Doughnut Rounds activity permits the students to have an organized discussion with numerous people in a short time [12]. In this method, the students are asked to form two concentric circles opposite each other. The students interact on the assigned topic of discussion. When the tutor starts, the inner circle changes in a clockwise direction, and accordingly the peer partner vicissitudes for each. Additionally, the students currently discuss sights and views with the new one. Increasingly, with the repetition of these steps, each student will interact with all the participant students [6].

Another form of SDL is case-based scenarios and guides the students with applied questions, allowing them to give answers using suggested learning resources [7].

The self-paced learning approach can be achieved by using online courses, digital books, learning management system apps, research projects, and assignments [8].

Controlled self-learning permits learners to manage their learning according to their learning process by offering them guidance and support to ensure that their learning process is in the right manner [9].

The key elements to a controlled self-learning approach. Include giving the choice to learners to select their own learning goals and activities [13]. The instructor offers support and guidance to ensure effective learning progress [14]. Like other teaching modalities, this method includes affording textbooks, facilitators, logistic/teaching materials, and assessments. This method provides the learner with flexibility and adaptability according to their needs and improves the attainment of learning outcomes [15].

The advantages of SDL are to support in-depth learning and critical thinking, promote lifelong learning, and enhance retention of knowledge more than traditional learning processes [15].

However, despite the evident advantages of SDL over traditional teaching in medical situations, the insertion of SDL into undergraduate curricula has faced many arguments. Many have made it difficult to exactly define SDL and gadget the steps of SDL subtypes within the existing agenda of medical education [16–18].

The integrative curriculum at the Faculty of Medicine, Al-Baha University (FMBU) is divided into phases and levels. There are 3 phases: the preparatory phase, the basic phase, and the clinical phase. These three phases represent twelve levels, starting from the first level and ending with the twelfth level when the student has completed his academic studies [19–21]. During these levels, the integrative approach of the FMBU is based partially on self-learning through insertion of various types of self-learning, such as controlled SDL, team-based learning (TBL), problem-based learning (PBL), clinical-based learning (CBL), seminars, discussion sessions, tutorials, poster presentation [22–24] and journal club [25]. These activities represent about 40 % of the credit and contact hours scheduled for the program, by distributing them in different proportions among sixty-seven modules distributed vertically and horizontally, which together represent the program's integrated approach [26]. In addition, the curriculum of FMBU is a spiral curriculum in which the clinical skill sessions are inserted into early basic levels by a small percentage (10 %) to be increased gradually in upcoming modules to be highly represented (90 %) in clinical phase in which basic sciences are represented by 10 % [26].

OLM, like other modules, has a variety of teaching and learning modalities including teacher-centered tools such as lectures/practical sessions, bedside teaching, and student-centered learning such as SDL, PBL, CBL, TBL, seminars, and discussion sessions. These modalities are heavily implemented in all modules. In addition, the assessment of OLM like other modules in the program includes quizzes, a final written exam, an objective structural clinical exam (OSCE), and an assessment of students in PBL, TBL, CBL, and seminar sessions using well-formed rubric/checklist paper and continuous observation/discussion [27].

So, the main goal of this paper is to evaluate self-learning in the OLM and determine the type of self-learning that students prefer and which of these types has a stronger impact on achieving the educational objectives of the module.

2. Material and methods

Ethical approval

This research was done after taking the ethical approval from the ethics committee of Al-Baha Faculty of medicine (FMBU) under reference no REC/SUR/BU-FM/2023/80 on November 8, 2023.

2.1. Study sampling

A cross-sectional study was done on the 270 students who studied the OLM. This number represents the students of 5th, 6th and those of internship.

2.2. Study design

To achieve this study, a questionnaire was created by two educationalists in measurement and evaluation in cooperation with the Quality and Academic Accreditation committee of FMBU to measure the extent of student’s satisfaction with the education strategy in general, with a focus on measuring students’ satisfaction with SDL such as TBL, PBL, CBL, and others. This questionnaire has quantitative and qualitative parts. The quantitative part consists of seventy-eight questions, aimed to measure students’ satisfaction about integrated-based curriculum in general, conduction and implementation of OLM, evaluation of lecture as a form of teacher-based activity and SDL types. The questionnaire was formed initially by 90 questions; of these, twelve questions were excluded after testing regarding reliability and validity test to be seventy-eight-questions questionnaire. The reliability and validity of the questionnaire were confirmed by conducting a repeated short cohort study by distributing it to a selected group of students in two separate sessions. After verifying this, the questionnaire was distributed to respondents who had studied the module during the last 3 years. A Likert scale was used to estimate the degree of students’ satisfaction and was as follows: 1 mark for strongly dissatisfied, 2 marks for dissatisfied, 3 marks for neutral, 4 marks for satisfied, and 5 marks for strongly satisfied [28–31]. A flow chart representing the study design is represented in Fig. 1 (Fig. 1).

The questionnaire was distributed electronically via mail, and respondents were about 270 students (185 male and 85 female). Two exclusion criteria were applied; the student who did not fulfill the questionnaire completely or the students who did not join the OLM module. The personal data was completely anonymous. All the students were informed about the steps of filling in the questionnaire promptly and a written consent was taken by all participants to publish this work. The instructions were given to the students in the form of a short paragraph describing how to fill the questionnaire in addition to awareness of the students directly in the discussion room. Furthermore, a written informed consent was added that ended by two closed questions (yes, or no) asking for entering the study and publication process. The questionnaire used in the study to measure students’ satisfaction about self-directed learning is represented as a supplementary material at the end of manuscript (Supplementary 1).

2.3. Statistical analysis

Descriptive and inferential studies were used in this study. The descriptive studies were the mean, and standard deviation while the analysis of variance (ANOVA) test was used to assess the P-value among variables which was considered significant if less than 0.05. statistics work was done using SPSS version 29 (International Business Machine (IBM company, New York, USA). A flow chart describing the study design is represented in Fig. 1 (Fig. 1).

3. Results

Regarding OLM implementation, the students showed satisfaction (4.5 ± 0.2) about the module management regarding timing, preparation, resources, and teaching and learning modalities in OLM (results of questions 1–19). In general, the students’ satisfaction was higher for the student-centered activities (questions no. 20–26) than in traditional teacher-centered activities such as lectures with a significant p-value obtained <0.00001 . In addition, there were significant differences (p-value was <0.00001) in students’ satisfaction between lecture and TBL (questions no. 27–32) between lecture and PBL (questions 33–40) (p-value 0.00349), between lecture and CBL (question 41–48) ($p = .00000$), and between Lecture and seminar presentation (questions no. 49–56) ($p = .00000$). All these results are represented in Table 1 (Table 1), and Fig. 2 (Fig. 2).

Further analysis of the student-centered activities revealed that satisfaction was the highest for TBL with a significant correlation with other student-centered activities. On comparing the results of the students’ satisfaction with student-centered activities, we found the following: there is a significant difference between TBL and PBL (questions no. 57–60), ($p = .00044$). No significant differences were obtained either between TBL and CBL (questions no. 61–65) ($p = .16570$) or between TBL and Seminar presentation (questions no. 66–69) ($p = .16570$). In addition, no significant correlations were obtained between PBL and CBL (questions no. 70–72) ($p =$

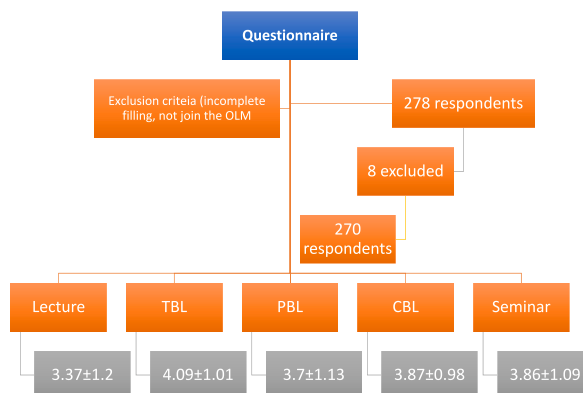


Fig. 1. A flow chart describes the study design and descriptive analysis for students’ satisfaction for each teaching and learning modalities.

Table 1

This table illustrates the degree of students' satisfaction with teaching and learning modalities used in the otolaryngology module.

Teaching and learning tools	Strongly Dissatisfied (1)	%	Dissatisfied (2)	%	Neutral (3)	%	Satisfied (4)	%	Strongly Satisfied (5)	%	Mean \pm SD
Lecture	26	9.6	27	10	107	39.6	42	15.5	68	25.2	3.37 \pm 1.2
TBL	8	2.96	12	4.4	43	15.9	92	34	115	42.6	4.09 \pm 1.01
PBL	15	5.6	24	8.8	64	23.7	90	33.3	77	28.5	3.7 \pm 1.13
CBL	12	4.4	7	2.6	57	21.1	120	44.4	74	27.4	3.87 \pm 0.98
Seminar	14	5.2	18	13.3	45	16.7	108	40	85	31.5	3.86 \pm 1.09

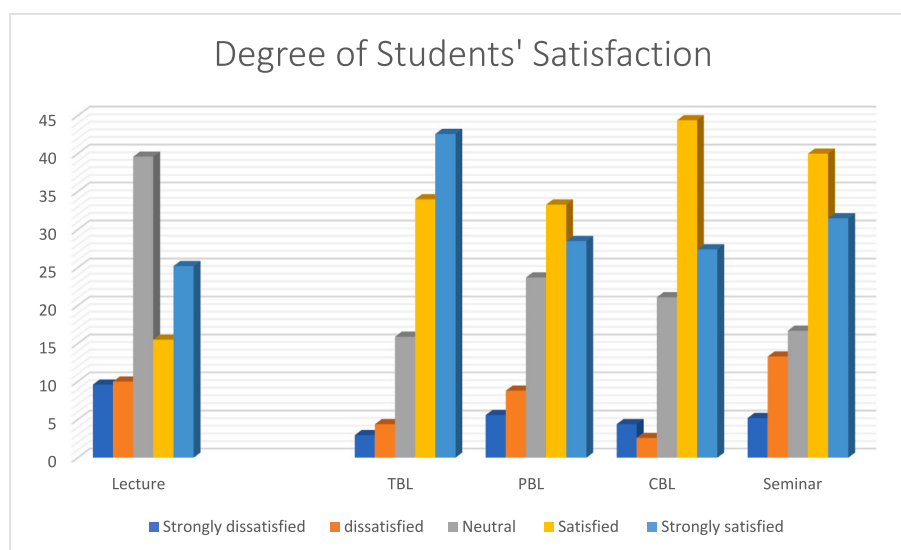


Fig. 2. A graph illustrates the degree of students' satisfaction among students with teaching and learning tools in the otolaryngology module.

.34677), between PBL and seminar presentation ($p = .46496$), (**questions no. 73–75**) and between CBL and seminar ($p = .99967$) (**questions 76–78**).

Regarding the qualitative part of the questionnaire, about 111 students (41 %) reported their satisfaction about self-learning and stated some issues about the current situation of self-learning for curricular reform. About 27 students (10 %) mentioned that the time specified for self-learning should be longer. Others, about 22 students (8.1 %) mentioned the importance of making all kinds of resources available, while others; 28 students (10.3 %) stressed the importance of multiple topics for self-learning in a way that is commensurate with scientific progress in this field. About 16 students (5.9 %) mentioned that there must be an expansion of subscriptions to international journals and medical websites of all types, including print, audio and video.

In addition, 18 students (6.7 %) called for increasing the TBL in the OLM while reducing the proportion of traditional lectures.

4. Discussion

In the current work, questionnaire is used as a main instrument to assess students' satisfaction, and this is compatible with many studies using questionnaires as main instrument in their work [32,33]. In addition, when the students feel free with no consequences, the results of questionnaire will be more reliable and valid.

Furthermore, the role of students in integrated-based education have been increased to be in closed distance with the faculty as suggested by Harden who described the medical student as assessor, information processor, curriculum collaborator, facilitator of learning, scholar, professional, and teacher. Accordingly, the students can give their feedback freely without any pressure. So, the questionnaire is considered valuable if it is conducted well [34].

The results of this study showed that students prefer student-centered learning to teacher-based learning such as lecture with a significant difference obtained ($p < .00001$). Careful investigation of learning activities found that TBL has the highest preference among students with a mean level of satisfaction of about 4.09 ± 1.01 .

These results are largely consistent with what was dealt with in previous studies that discussed the importance of TBL in integrative

medical curricula [35,36]. This coincides with the study of Burgess et al. [37] which revealed that students advanced many phases of the TBL process, involving the pre-class performance, the in-class primary tests with immediate direct feedback, and the problem-solving conducts.

In the present study we found students' preference for TBL more than PBL. This coincides with Burgess et al. [37] who reported that students observed the benefits of TBL over PBL such as better and faster engagement in the learning process, more critical thinking of literature, a sense of accountability towards teammates, and a deeper understanding of ethics, thoughts, and concepts [37]. Also, this observation agrees with Burgess et al. [38] who found that TBL has a students' preference over PBL in addition to advantages of TBL such as greater participation, discussion and collaboration, immediate feedback, acquisition of knowledge, and cognitive skills knowledge application and retention, development of critical competencies and critical thinking skills.

Also, the obtained results agree with that of Dunaway [36] who found that the TBL was respected by the students and tutors and reported that students strongly believed that the team-learning session enhanced the level and value of their participation in the classroom.

Also, our results agree with the study of Sim et al. [39] who recommended the use of a team-based SDL model with a maximum of 5–7 students in each group to give better achievement. Also, they found that the TBL-SDL model advocates individualistic and competitive learning, provides social support for students, and improves their communication and interpersonal skills.

In contrast with the study of Dolmans et al. [40] who found no difference between TBL and PBL in educational strategy except that the TBL needs one teacher who can run and monitor large student groups, in contrast with PBL which needs one tutor for each small group which ranges from 5 to 12 students.

In the present study, we found high students' satisfaction towards SDL in achieving the learning outcomes. This coincides with the results of Hunt et al. [41] which revealed that students did well on all written tasks and assessments, indicating accomplishment and achievement of learning objectives as well as a high level of student commitment in the classroom.

Furthermore, our results coincide with that of Conway et al. [42] who introduced a modified form of TBL into a lecture-based integrated cardiovascular module, resulting in enhanced student and faculty satisfaction with the module without adverse effects on student achievement.

TBL presents an innovative method for student-centered learning, aiding the flipped classroom process of healthcare learning [43]. The TBL activities propose an interactive, practice-led instruction session that breaks a large number of students into several small groups to work separately to harness content to peculiar problems [43].

The advantages of TBL over other self-learning approaches include the following: 1) it enhances interpersonal skills and problem-solving, 2) it needs pre- and post-session assessments, 3) providing the pre-discussion tasks and material, the students prepare the pre-discussion work individually and then enter in a small group for discussing and completing the assignments, 4) TBL needs fewer tutors than PBL as one tutor can monitor multiple groups and their attendances are not necessary during discussion phase, 5) peer evaluation is highly stressed, tutors who are rich in this area of knowledge are preferred. 6) peer monitoring encourages the whole learning process [39,44].

In the present study, about 111 students (41 %) expressed their perspectives about SDL types and some issues about the current situation of self-learning are in need for curricular reform such as time management, more availability of resources and logistic materials, updating topics, more subscriptions to international journals and medical websites of all types, including print, audio and video and increasing the TBL in the OLM while reducing the proportion of traditional lectures. Exploring these issues and introduction of the proper management by module committee is considered a powerful landmark for the importance of research in learning modalities.

4.1. Limitations of the study

TBL was studied extensively in other courses, but little or no previous literature studied the TBL in the OLM and this current study may be the first study done on the OLM. So, the comparison with other studies is somewhat difficult to obtain.

5. Conclusion

Multiple teaching and learning modalities were used in studying the otolaryngology module. The results of the current study showed the extent of students' satisfaction with TBL compared to other educational methods. These results strengthen the results of previous studies and create motivation to implement TBL in most of the integrative curriculum modules, especially in the clinical years' modules. In addition, identification of the student's experiences with SDL along with continuous evaluation and monitoring of the current situation is very important in detecting the gaps early, and introducing an action management plan early will help in achieving the desired goals.

Authorship criteria

The author stated that all steps of this review article such as Concept and design of study or acquisition of data or analysis and interpretation of data; Drafting the article or revising it critically for important intellectual content are done by the author himself and accept the final approval of the version to be published.

Ethical approval

This research was done after taking the ethical approval from the ethics committee of Al-Baha Faculty of medicine (FMBU) under reference no REC/SUR/BU-FM/2023/80 on November 8, 2023.

Data availability statement

All data of this study are included in this work.

CRediT authorship contribution statement

Rajab Alzahrani: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2024.e36010>.

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