



METHODS USED BY PRECLINICAL AND CLINICAL MEDICAL STUDENTS TO LEARN AND STUDY: A CRITICAL REVIEW

Physiotherapy

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ABSTRACT

Background: Knowing more about the learning approaches and studying methods of preclinical and clinical learners of the medical field will assist the educators in planning, and delivering learning activities to enrich the quality of learning. The purpose of this review was to explore what is published about the learning approaches of medical students. **Method:** Electronic databases (Google Scholar, BioMed Central, Web of Science, Research Gate, PubMed) were searched using the keywords. English-language, primary research articles that investigated physiotherapy or medical learners' learning approaches and styles were sought. The content analysis method is used as criteria for research for literature review. **Results:** Fourteen articles were included in this review. The studies mostly reflected the learning approaches used by medical students. Outcome measures included questionnaires such as ASSIST, Revised 2F- SPQ, SPQ, SIAL and ALI. The study found that most students adopted a deep approach to learning followed by a strategic approach. **Conclusion:** While many studies discuss learning styles and the variables that influence them, none examine the learning approaches used by medical and physiotherapy students. Educators should consider their learning approaches when designing curricula and delivering instructional strategies.

KEYWORDS

Allied health, Learning approaches, Physiotherapy learners

INTRODUCTION

Learning is acquiring new understanding, knowledge, skills, values, and attitudes. A learning approach is the strategy that one adopts while seeking knowledge.¹ According to Entwistle et al., a student's approach to learning is an acquired trait that depends on the needs of the circumstance or the learning context.² If proper efforts are made to foster change, the ways of learning in a medical education program may evolve. Learning is influenced by a complex system that includes the learner's knowledge, abilities, preferred learning ways, the learning environment, methods, and evaluation of the teaching context. By analyzing learner activities and results, the model predicts academic success. Students learn by comprehension, rote memorization, and a combination of these processes to varied degrees. Three learning approaches have been identified, namely deep approach, surface approach, and strategic approach. The deep approach is a systematic and structured learning approach where the emphasis is placed on understanding the concepts and relating ideas to enhance the learning process. The desire for meaning extraction in the deep method leads to an active learning process that includes linking ideas and exploring principles and patterns (holistic viewpoint). The surface approach is characterized by superficial learning and rote memorization with a specific emphasis on syllabus-bound material. A strategic approach involves proper study organization and concentration on the subject matter and evaluation format which results in a fragmented understanding of the concept and leads to poor assimilation of the information.³

Recently, the trend in medical education has shifted from teacher-centered learning to student-centered learning.⁴ As a result, academicians must realize that learners' approaches to learning differ, and they must adjust instruction to the distinct ways in which learners prefer to study. Universities and higher education centers should review students' learning approaches and make educational policies to encourage desirable approaches.^{5,6} Understanding medical students' preferred learning approaches is crucial for educators to create a more favorable learning environment, enhancing their learning and preparing them for the future.⁷ It is imperative to broaden our processes and approaches to studying by including how we receive and process information. Neglecting this aspect can impede learning and academic success. Therefore, it is crucial to give due consideration to this matter.⁸

Multiple questionnaires have been developed to evaluate students' overall approaches to learning and perceptions of teaching-learning

environments, as well as associated aspects of students' attitudes and perspectives. Entwistle and McCune devised the ASSIST questionnaire to assess the learning approaches used by the students. It is an updated version of the Approaches to Studying Inventory. The respondent scores each question on a 5-point Likert scale (1-disagree to 5-agree). The first section of the questionnaire has six statements about the respondent's perception of learning. These 52 items were divided into 13 subscales of four items each, then divided into three primary scales: deep approach, strategic approach, and surface approach. The deep and surface approaches have four subscales, while the strategic approach has five subscales. The highest mean score determined the students' preferred approach to learning. The final section has eight statements that measure course type and teaching technique preferences.^{2,3} Other questionnaires to measure learning approaches are Revised 2 Factor- Study Processes Questionnaire (Revised 2F- SPQ), Study Processes Questionnaire (SPQ), Short Inventory of Approaches to Learning (SIAL), and Approaches to Learning Inventory (ALI).

Factors affecting learning approaches are quality of teaching and learning environment, perception of learning environment, assessment procedures, educational content, course schedules along with workload, methods used for teaching (lecture-based, flipped and blended teaching, etc), preparation for different types of examination at pre-university level (e.g. attending private tuition classes or coaching institutes), nature of medical school education, curriculum/syllabus, demographic characteristics, etc.^{4,9} Learning approaches especially deep and strategic approaches (i.e., driven to learn deeply and to perform well, respectively) correlate with examination and academic performance during medical education.¹⁰

MATERIAL AND METHODS

Study design and reporting standard

A literature review (narrative review) was conducted. This consists of a literature search, evaluation and descriptive synthesis of current research evidence for this topic, using the qualitative (content analysis) method. This review included: 1) identifying research questions; 2) identifying relevant studies; 3) study selection; 4) collecting the data; and 5) collating, summarising and reporting the results.

Research question

What is reported in the literature regarding learning approaches, learning approach outcome measures and different teaching and learning approaches for PTs? What are the demographics of the

included studies and what are the gaps in the literature?

Search strategy

Studies were searched from search engines and electronic databases. PubMed, Google Scholar, Research Gate BIOMED CENTRAL, Web of Science, Scopus, etc. were used for the review of the literature from November 2022 to April 2023. One reviewer searched these electronic databases, using key words and MESH terms as appropriate. No limits were set on publication date and country of origin.

Search terms

The keywords applied to the search included “learning approaches” AND (“Allied Health Occupations” OR “physio therapy” OR “physical therapy”)

Inclusion Criteria

English-language, primary research articles were sought. Observational studies were included that investigated the learning approaches in the medical and paramedical UG and PG medical students. There was no critical appraisal undertaken as well.

Data Extraction

Data was extracted into a purpose-built MS Word using the headings: Author (year), country; Article name; Sampling population; Participant characteristics; Outcome measures: Predominant learning approaches identified.

RESULTS

35 articles were identified as potentially relevant to the research question. After removing duplicates ($n = 3$) and excluding non-relevant studies ($n = 10$), 22 papers were screened for inclusion. Eight studies were excluded based on inclusion criteria and 14 articles were retained. The total no of participants included in this review was 3,588 from 13 studies. A qualitative (content analysis method) was used for article selection and inclusion. Studies were conducted between 2004 and 2022. Table 1 summarises the predominant learning approaches reported in the included studies as well as demographic details. One study didn't discuss the details of the participants. Most studies reflected undergraduate learners. Two studies reported on post-graduate students.^{14,15} Preclinical students included students in the first and second year. The most preferred learning approach was deep. The most common outcome measure is ASSIST shown in Table 1. Other outcome measures that were used in a few studies are Revised 2F-SPQ, Study Processes Questionnaire (SPQ), Short Inventory of Approaches to Learning (SIAL), Approaches to Learning Inventory (ALI), where Revised 2F-SPQ applied by two studies and rest were applied by one study each.^{11,13,18,19}

Table 1

Author (year)	Country	Sampling population and	Participant characteristics	Outcome Measures	Predominant Learning approach identified
Norman HH et al (2022) ⁹	Malaysia	UG (Preclinical students) MBBS	234 students, 176 were female and 58 were male	ASSIST	Deep approach
Ramezani et al (2021) ¹⁰	Iran	UG MBBS students	168 students, 73 were male and 95 were female	ASSIST	Deep approach, highest correlation with GPA
Piumatti et al (2020) ¹¹	Geneva	UG MBBS students	269 students, 158 were male and 111 were females	Revised 2F-SPQ	Deep approach (which tends to decline in last years)
Lee J et al (2020) ¹²	South Korea	UG students	244 students, 98 were female and 144 were male	Study Processes Questionnaire (SPQ)	Deep approach in initial years, surface approach in clinical years

Chonkar SP et al (2018) ⁷	Singapore	Clinical medical students with O&G rotations	238 participants, 96 males and 142 females	ASSIST	Strategic approach
Walankar PP et al (2018) ⁴	India	Preclinical and clinical Physiotherapy students	435 participants, 50 were male and 385 were female	ASSIST	Deep approach
Shah D et al (2016) ¹³	Nepal	Preclinical students of MBBS and BDS and first-year nursing students	372 respondents, 201 were male and 171 were female.	Revised 2F-SPQ	Deep approach
Samarkon L et al (2013) ¹⁴	Sri Lanka	UG and PG students	147 students, 77 were male and 70 were female	ASSIST	Strategic approach
Reid WA et al (2012) ⁵	UK	UG students (Preclinical students)	(didn't show participants details)	ASSIST	Deep approach
Wickramasinghe PD et al (2011) ¹⁵	Sri Lanka	Preclinical and clinical students and PG trainees in surgery	364 participants, 207 males and 157 females	ASSIST	Preclinical and PG trainees-deep approach Clinical – Surface
Ward PJ et al (2011) ¹⁶	United states	UG 1st and 2nd year students	497 participants, 49.7% (247) were female and 50.3% (250) were male	ASSIST	Deep approach
Smith FC et al (2010) ¹⁷	United Kingdom	UG (clinical students) MBBS students	248 students, (details not provided)	ASSIST	Deep approach
Abraham RR et al (2006) ¹⁸	India	UG physiology 1st year students	223 students, (details not provided)	Short Inventory of Approaches to Learning (SIAL)	Deep approach
Mayya S et al (2004) ¹⁹	India	UG physiotherapy students	149 students, (details not provided)	Approaches to Learning Inventory (ALI)	Deep approach

DISCUSSION

The subject matter to be taught, the course of study and its context, instructional techniques, the characteristics of the learning environment, and evaluation procedures have all been linked to learning approaches.⁴ The majority of medical students adopt a deep approach to learning, according to numerous studies that have examined the different approaches of learning used by students pursuing medical and related healthcare fields around the globe. This is primarily due to a paradigm change in education that has shifted away from traditional techniques and towards deeper, integrated problem-based learning.^{5,7} Academic achievement was also found to be significantly influenced by the deep learning approach.⁶ Thus, the internal motivation for professional and academic success is also a reason for deep learning.⁸

Variations in the methods of learning have significant effects on how well medical curricula are developed and how innovative teaching and learning techniques are implemented for medical students. Studies revealed that there is no “one-size-fits-all” approach to the education of medical students and allied health professionals.^{4,13} Preparation for various pre-university examinations and teaching strategies may have

an impact on the approaches to learning adopted by medical students throughout their preclinical years when they initially enter this sector with a broad syllabus and curriculum. With explanations related to their pre-university education and exam preparation, some students also adopted the strategic approach as their preferred approach to learning. Literature also reveals that gender was not significantly associated with the predominant learning approach.^{7,8} Research suggests medical students' willingness to embrace a deep approach increases and their surface approach decreases when they get problem-based learning and constructively linked in-class assignments and exams.

CONCLUSION

All studies concluded that the predominant learning approach of medical students and other allied health science students is the deep approach. The strategic and surface approach is used by few students especially in preclinical years due to didactic-based classroom lectures, preclinical curriculum, pre-university education, higher workload with increasingly tight course schedules, assessment-oriented learning, and need to compete for grades and written reports which are used as teaching methods.^{5,11} Thus, it was also concluded that learning approaches differ between preclinical and clinical students due to various factors. Deep learning is active learning that promotes long-term knowledge retention, understanding, and acquisition of skills. With the transformation of modern medicine, there are changing demands and expectations of the skills that doctors need to master, such as deeper thinking and critical analysis during unforeseen and unfamiliar situations or in research.¹⁸ These would require a good understanding of medical knowledge as well as the ability to apply these medical skills and knowledge to different scenarios, which is best brought about by a deep learning approach.⁷ To maximize students' learning, higher-quality learning outcomes, and high-quality teaching, medical educators should step in and use clinical methods for instruction with deep learning.³ As a result, such studies are required in light of the privilege of this profession and for continuing professional development.¹⁵ While many studies discuss learning styles and the variables that influence them, none examine the learning approaches used by medical and physiotherapy students.¹⁶ These studies are necessary to reflect the honor of this profession and the need for ongoing professional growth.

Limitations

The majority of study designs for this narrative review are primarily cross-sectional instead of longitudinal. As a result, differences in learning approaches were identified and proper judgments about how ways of learning have changed over time could not be made. Secondly, a little space has been given for guidelines to construct a curriculum that meets the needs of medical learners.

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