

## **Student Perception on Learning Environment and Its Impact on Academic Performance in Medical and Allied Health Science Undergraduates: A Systematic Review**

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### **Abstract**

Learning environment consists of resources, technology, modes of process and connections to societal and global contexts used in the teaching-learning process. Further, it extends beyond the physical environment up to human behavioral and cultural dimensions, emotion in learning and the roles of teachers and students. Literature indicates that students' perception on the education environment directly or indirectly influences the behavior and the academic performance of the student. The purpose of this review is to assess the student perception on learning environment and to evaluate the effect of learning environment on the academic performance of medical and allied health students by using a systematic review process. An electronic database (in PubMed, MEDLINE and Timelit) search was carried out using key terms (learning environment OR study environment OR education environment AND academic performance\* OR student performance AND undergraduate). In this search, review articles, case presentations and qualitative studies were excluded. Two reviewers screened all the selected articles according to the PRISMA guidelines. Altogether 559 articles were retrieved from all databases and among them 23 were preliminary selected considering the inclusion and exclusion criteria. Finally 10 full text journal articles were selected for the systematic review. Seven studies had assessed student perception of learning environment and academic performance among medical students. Two studies among occupational therapist students and only one study among nursing undergraduates were among the extracted articles. Almost all the studies have shown that the participants had positive perception of learning environment. Further, most of the studies (n=08) revealed that there was a significant effect ( $p<0.05$ ) of learning environment on their academic performance and two studies did not find any correlation. Selected studies revealed that students who perceived favorable educational climate facilitate the students to achieve higher academic success and learning environment has a significant impact on students' academic performance.

**Keywords:** *Academic Performance, Health Science Students, Learning Environment, Students' Perception, Systematic Review*

## **Introduction**

Learning environment is the place where people learn which encompasses learning resources, technology, means of teaching, modes of learning and connections to societal and global contexts (Warger & Dobbin, 2009). It also includes human behavioral and cultural dimensions which consist of several component that influence students' learning process. These components compromise human resources, teaching materials, technical tools, learning resources, curriculum, training, instructions and physical learning space etc (Warger & Dobbin, 2009). People who are involved in the teaching-learning process contribute directly or indirectly to success in their career pathway. These educational leaders should provide effective physical and cultural environment which may vary from context to context. Teachers can impact the learning environment in many ways such as by improving physical, psychological and instructional settings. There are several types of learning environments which differ according to the way the students learn and interact with each other such as learner-centered, knowledge-centered, assessment-centered and community-centered. The learning environment also can directly impact either positively or negatively on student confidence, academic achievements, social skills, relationships and problem solving skills.

The concept of learning environment has become a more attentive area in health professional education over the last few decades around the globe. The research findings relevant to this particular area will be useful to develop new programmes, curricula and other necessary measures to improve the learning environment of the professional healthcare undergraduates.

## **Objectives**

This systematic review was conducted to evaluate the students' perceptions on the learning environment and to assess the effects of learning environment on the academic performances of medical and allied health science undergraduates.

## **Materials and Methods**

The search of the literature was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Electronic databases used for searching included MEDLINE, PubMed and Timelit with the search terms of "Student perception" AND "Learning environment" OR "Learning climate" OR "study environment" AND "Academic performance" OR "Achievement" AND "Medical and allied health undergraduates". The initial search was restricted to the title and abstract. Full texts of articles were read to further screen the literature for the review. Results were restricted to the English language publications during last ten years to obtain the most current studies in the area of the review.

The articles based on the original studies focused on impact/effect/association/influence of learning environment on academic performances (measured objectively using overall GPA/semester GPA) and student perception on learning environment that were quantitatively evaluated in Medical and allied health undergraduates were considered as inclusion criteria. The titles and abstracts were screened for relevance before reviewing the full texts of articles. Systematic review, meta-analysis, case reports, commentaries and articles published in other languages were excluded. The search process is illustrated in the PRISMA Chart (Figure 1). Databases were searched by one investigator and all the eligible studies were verified with other investigators. Every article was thoroughly read by authors before extracting the data. Data were extracted from finalized articles including authors, year of publication and country, study design, data collection instruments, results, and conclusion or recommendations (Table 1). A constant (same) comparison strategy was used to compare the findings of each article as they emerged and find major themes among the data extracted.

## **Results**

The initial database search yielded 559 articles after applying filters based on the selection criteria: medical and allied health students in quantitative studies, published as full texts in peer review journals from 2013 to 2023. Figure 1 shows the number of references yielded during the initial database search and subsequent stages of the review. Following this identification, the number of articles was reduced to 343 after the removal of duplicates, articles in languages other than English, non-peer reviewed journal articles and articles published before 2013. Appraisal of titles and abstracts excluded the articles that did not have student academic or learning outcomes as a dependent variable or statistically analyzed changes in measures of achievements. Among 23 articles undergoing full-text review, only 10 made the final analysis.

### ***Tools Used to Assess the Students' Perception on Learning Environment***

Perception of the educational environment is how students perceive the climate of an institution and the education process. There were several validated tools used to assess the students' perception of learning environment. Dundee Ready Education Environment Measure (DREEM) was used to measure students' perception of the educational environment in most of the reviewed studies (Nouh et al., 2016; Ahmed et al., 2018; Negash et al., 2022). The DREEM is an internationally validated 50-statement closed question questionnaire. These 50 items fall into one of the following five subscales: Students' perception of learning (12 items); Students' perceptions of teachers (11 items); Students' academic self-perceptions (8 items); Students' perceptions of atmosphere (12 items) and Students' social self-perceptions (7 items). Each of the 50 statements is scored on a five-point scale, with the

following labels: “strongly agree” (4), “Agree” (3), “Unsure” (2), “Disagree” (1) and “strongly disagree” (0). Reverse coding was used for 9 items. Thus, higher scores indicate a more positive evaluation. The DREEM has a maximum score of 200, representing an ideal educational environment.

Another tool was used in a Norwegian study as extended Course Experience Questionnaire (CEQ) which consists of 37 items distributed onto six scales: clear goals and standards, emphasis on Independence, good teaching, appropriate workload, appropriate assessment, and generic skills. In addition, one item assessed the students’ general satisfaction with the course. The scales indicate that the respondent perceived the course to have (1) clearly established and disseminated goals; (2) high levels of student autonomy and independence; (3) teaching that engages and involves the students; (4) an appropriate workload; and (5) assessment forms that promote and support learning.

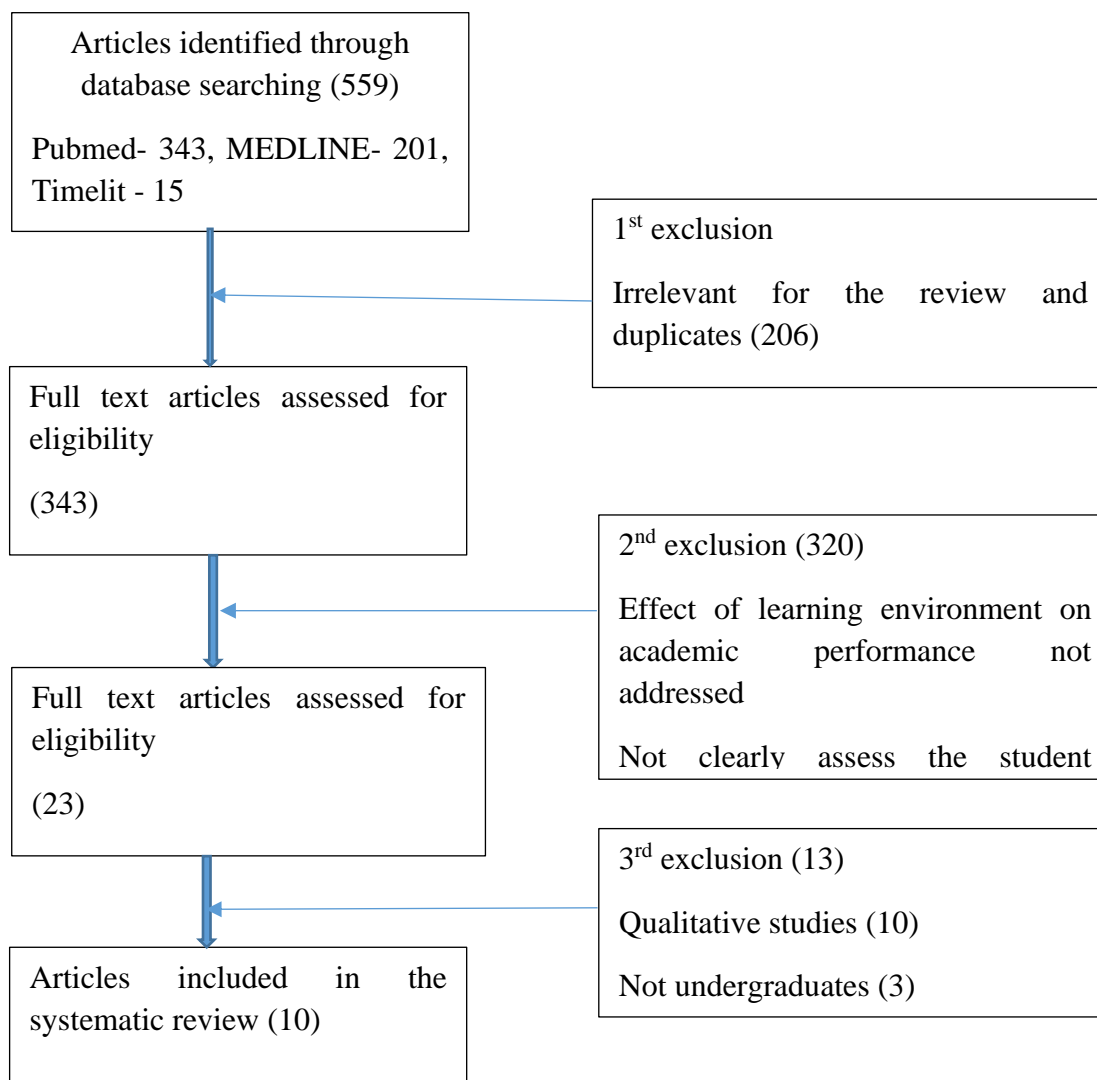
The 28-item Johns Hopkins Learning Environment Survey (JHLES) was the other tool that was used to evaluate the perceptions of learning environment. Each 28 item has graded their perceptions from day 1 of medical school to the present based on a 1-5 Likert scale. Average item scores for each domain and then sum of these scores across the 7 domains resulted in a possible range of 1-35 with higher values indicating more positive endorsement. Summing average domain scores allowed to treat each domain equally since the number of items varied by domain.

### ***Tools of Academic Performance/ Achievements***

Academic performances were presented in these studies in several ways such as students’ grade point average (GPA) (Nouh et al., 2016), summative assessments of particular semester (OSCE, MCQs, CBA) (Schrempft et al., 2020). Also one particular study has evaluated the academic performance using validated scale such as academic achievement scale (Gu and Sok, 2021).

### ***Student Perceptions on Learning Environment***

All of the studies presented–positive perceptions towards the learning environment according to the scores of the tools that they used to evaluate the perception on learning environment. Some of the studies revealed that students have more positive perception for some specific sub domains of the DREEM tool such as perception of teachers, students’ academic self- perception and students’ social self –perception (Kasemy et al., 2016; Negash et al., 2022). Further, one study conducted among private and public medical college students has revealed that public institute students have significantly higher positive scores when compared to private institutions in India (Chelliyar et al., 2023). One study conducted in Korea among nursing undergraduates who had experience in flipped simulation environment predicted that their experience at flipped learning simulation environment was a very influential factor affecting their academic performances (Gu and Sok, 2021).



**Figure 1:** PRISMA Flow Chart

### ***Impact of Learning Environment on Academic Performances***

When the findings of the reviewed articles of this systematic review are considered, only two studies did not show the significant association between students' perception of learning environment and academic performances (Bonsaksen et al., 2021; Dalomba et al., 2021). Majority (80%) of the studies have indicated significant ( $p < 0.05$ ) positive impact of learning environment on academic performances (Table 1). Among health professional undergraduates which includes in this review (medical, nursing and occupational therapist), medical and nursing undergraduates have a positive significant ( $p < 0.05$ ) association between their academic performance and learning environment whereas occupational therapist have not seen any association between learning environment and academic achievement. The study conducted in Egypt revealed that the educational environment was a significant predictor of academic achievement; also, the results showed a significant difference between high and low academic achievers ( $\beta = 1.21$ , CI95%: 0.23–2.19,  $P = 0.015$ ).

Further, this study explored the relationship between the two types of education system (traditional and integrated) and perception of education environment, emotional intelligence (EI), motivation, and learning strategies. Perception of the learning environment had improved because of the integrated student-centered system, which fosters motivation and EI, optimal learning, and educational outcomes according to this study findings. Dalomba et al. (2021) had found that perceptions of learning, perceptions of teachers, academic self-perceptions were significantly positive predictors of Egypt medical students' high academic achievements ( $\beta = 0.14$ , CI 95%:0.13–0.15,  $P < 0.001$ ) (Dalomba et al., 2021). Another study conducted in Switzerland revealed that the perceived educational environment positively predicted CBA performance ( $\beta = 0.02$ ,  $p = 0.011$ ) (Schrempft et al., 2020). All the studies which presented the association between student perception of learning environment and academic performances show positive association and proved that students with higher academic achievements had more positive perceptions regarding their education environment (Ahmed et al., 2018).

## **Discussion**

This review was conducted with the intention of realizing the impact of students' perception of leaning environment on their academic performance among medical and allied health undergraduates. All the students included in this review had a positive perception regarding the learning environment and majority of the reviewed studies (n=8, 80%) observed that learning environment has positive association with academic performances and achievement while other two studies have not observed any association.

The learning environment is an important factor in enriching students' learning because it plays a central role in learning and contributes positively to students' achievement, satisfaction and success. Understanding the institution's atmosphere and its prime determinants can help in many aspects of improvement in the students' performance. Therefore, measuring the strengths and weaknesses of the teaching style, educational atmosphere, and limitations of the curriculum with tools standardized tools such as DREEM is more helpful. Further, development of educational process occurs in physical, social, cultural and psychological environments which implies that adequate environment is very important for fruitful learning that can be done afterwards. An excellent learning environment is reflective of a quality curriculum in various aspects while the teaching and learning methodologies and assessments are upto the standards while providing adequate support for their learning and progression with innovative and healthy approaches. This is utmost important for nursing and allied health undergraduates as they are created to fill the gaps in global healthcare system.

**Table 1:** Summary of the Research Studies and their Findings in the Review (n=10)

No.	Author, Year and country	Study population and sample size	Study design	Measuring instruments on student perception on learning environment	Academic performance measurement	Findings (Perception and Impact)
1.	Bonsaksen et al. (2021) Norway	1 <sup>st</sup> year Occupational therapy students (n=305)	Longitudinal study	Course experience questionnaire (CEQ)	Exam grade scores- GPA	Positive perception on study environment No significant association between learning environment and academic performance.
2.	Dolomba E et al. (2021) Norway	1 <sup>st</sup> year, 2 <sup>nd</sup> year & 3 <sup>rd</sup> year Occupational therapy students (n=305)	Longitudinal study	Course experience questionnaire (CEQ)	Exam grade scores- GPA	Positive perception on study environment No significant association between learning environment and academic performance.
3.	Negash et al. (2022) Ethiopia	3 <sup>rd</sup> & 4 <sup>th</sup> year anesthesia students (n=123)	Comparative cross-sectional study	The Dundee Ready Educational Environment Measure (DREEM) tool	CGPA, MCQ exam results	Positive perception on learning environment. Students' perception of teachers, students' academic self- perception and students' social self –perception were positively associated with their academic achievement.
4.	Jorie M. Colbert-Getz et al. (2016) USA	2 <sup>nd</sup> & 3 <sup>rd</sup> year medical students (n=350)	Cross-sectional study	Johns Hopkins Learning Environment Survey (JHLES)	2 <sup>nd</sup> year & 3 <sup>rd</sup> year total scores	Only 3 <sup>rd</sup> year students, academic performance was significantly related to JHLES scores.
5.	Chelliyan VG et al. (2023) India	Public and private Medical students (n=415)	Cross-sectional study	DREEM questionnaire	Recently passed examination results	The public institute students' perceptions were significantly higher positive scores when compared to private institutions. There was a significant difference in students' perception of learning, between the fourth year and interns.

6.	Nouh T et al. (2016) Saudi Arabia	Four college students (n=193)	Cross-sectional study	DREEM questionnaire	GPA	Low, yet positive correlation between perceptions about learning environment. academic Performance in the form of GPA indicated that improvement in the learning environment enhance the academic performance of medical students. Students have more positive perception Towards the learning environment. Three components of the educational environment (DREEM scale) were significantly positive predictors of students' high academic achievement (perceptions of learning, perceptions of teachers, academic self-perceptions)
7.	Kasemy, et al. (2022) Egypt	Undergraduate medical students from three medical schools (n=3384 )	Cross-sectional study	DREEM questionnaire	Previous year exam results Emotional intelligence	Independent and interactive positive effects of the perceived educational environment in relation to medical students' performance at the end of the third year.
8.	S. Schrempf et al. (2020) Switzerland	3 <sup>rd</sup> year medical students (n=268)	Part of a Cohort study	DREEM questionnaire	Scores of computer-based written exams (CBAs), and Objective Structured Clinical Exams (OSCEs).	The most influential factors affecting the academic achievement of nursing college students were self-efficacy, gender, flipped learning education experience, learning satisfaction, age, and the analysis ability of the flipped learning class
9.	Gu M and Sok S (2021) South Korea	Nursing students who had experience of a flipped learning simulation practice in a nursing college in South Korea (n=160)	Descriptive cross-sectional study	The self-directed learning preparation scale self-efficacy scale learning satisfaction scale	Korean version of the academic achievement scale	Positive perception on education environment. Significant association were found between perception of learning environment and academic achievement.
10	Ahmed et al. (2018) Sudan	Students from the second, sixth and tenth semesters at the Faculty of Medicine Gezira University, Sudan (n=638)	Descriptive cross-sectional study	DREEM questionnaire	Cumulative grade point average (CGPA)	



We have identified several studies conducted in Sri Lankan context which assessed the student perception on learning environment but not evaluated the impact of it on their academic performances (Chandana & Hettiarachchi, 2013; Jayaweera et al., 2021). Further, some of these local articles were not able to find in the electronic databases and only could be detected in manual searching. However, this systematic review did not include studies conducted in Sri Lanka as those studies were not compatible with inclusion criteria. Further, we did not include the studies with qualitative nature which may give more precise data on students' perception. It was one of the major limitations of this review as we considered only the objectively measured students perception and academic performance. Also, in the current review, the outcomes of academic performance were measured using routine academic performance with GPA like objective measures; however, it would be good to explore the possibility of standardization of outcome measurement that would give more meaningful outcome of the review. Therefore, we recommend that a future review of this nature would also be more productive if we could expand the search strategies including qualitative studies, interventional studies and studies with follow-ups while keeping the standardized outcome measure as the reference.

However this review emphasizes the importance of learning environment especially for the healthcare professional undergraduates as it has impacts on many aspects of healthcare education. It is indeed important to pay attention not only the academic environment but also on their clinical environment and future studies should be carried out to evaluate the clinical education environment more focusing on their professional skills development using validated standard effective time saving tools.

## **Conclusions**

Findings of the previous studies revealed that students who perceived favorable educational climate achieve higher academic success and as a result learning environment significantly affect students' academic performance. Use of tools such as DREEM is promising to assess the context that include wide aspects of learning environment including Students' perception of learning, teachers, themselves, atmosphere, social aspects etc. Therefore, it is more suitable to assess the health professional educational environment under few subscales. Educational achievement is likely to be determined by the idealness of the learning environment among medical and allied health undergraduates. The student's feedback regarding their educational environment is, therefore, essential to achieve the objective of imparting high-quality health professional education to achieve goals of the degree programmes and produce productive healthcare professionals.

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