

Assessment of Undergraduate Pharmacy Students' Preferences of Learning Approaches with Their Perceptions of Educational Environment: Does it Matter?

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Abstract

Aim: The aim of this study is to assess undergraduate pharmacy students learning approaches preferences within a traditional curriculum and how they perceive their educational environment across different academic years. **Methodology:** From February to March 2024, we conducted a cross-sectional study among all 189 Bachelor of Pharmacy (B.Pharm) students across all four years at Kannur Medical College and Post Graduate Research Institute, Kerala. We evaluated the students' learning approaches using the Approaches and Study Skills Inventory for Students (ASSIST) short-form questionnaire and assessed the educational environment using the Dundee Ready Educational Environment Measure (DREEM). **Results:** Fourth-year students used a relatively lower level of deep approach (Mean \pm SD 23.11 \pm 3.62) compared to first-year students (Mean \pm SD 24.52 \pm 3.52), which indicates poor quality of learning outcomes over time. Though there are areas for improvement, the study reveals that the total mean DREEM score for B Pharm students about their educational environment was 117 out of 200 (58.6%), which means that students have a positive perception of B. Pharm courses. **Conclusion:** The results from ASSIST and DREEM questionnaires provided valuable insights in identifying areas where educational improvement can be made both in teaching strategies as well as curriculum design aspects. This will help to improve academic performance as well as professional competence of B. Pharm students.

Key words: Pharmacy students, learning approaches, surface approach, deep approach, strategic approach, perception, cross-sectional study, educational environment, ASSIST questionnaire, DREEM questionnaire

1. Introduction

The role of pharmacy education is to transform competent human beings into professional carers for their patients. Knowledge about students learning approaches as well as their perception of the educational environment serves as the basis for enhancing teaching objectives. However, it is found that there is only modest literature available on these factors among undergraduate pharmacy students in Kerala.

Learning approach evaluation reveals how students engage with learning tasks at intellectual and behavioural levels to improve motivation and outcomes [1]. The ASSIST questionnaire divides deep, strategic and surface learning approaches [2-4]. Furthermore, the DREEM questionnaire captures the students' perception of the educational environment [5-7].

Therefore, the aim of this pilot study is to assess the learning approaches preferences and the perceptions of the educational environment among undergraduate pharmacy students using ASSIST and DREEM questionnaires.

2. Materials and methods

2.1. Study design and setting

This was a cross-sectional, questionnaire-based descriptive study conducted between February and March 2024 in Kannur Medical College and Postgraduate Research Institute, Anjarakady Integrated Campus, Kannur, Kerala.

2.2. Participants

The target population consisted of 189 B. Pharm students from all four years. All the students who agreed to participate and filled out the questionnaire were included for the study. Respondents who have studied in the institution for less than 6 months and those who refused to participate or did not fill out the questionnaires were excluded from the study.

2.3. Ethical considerations

Each participant provided written informed consent after getting permission from the institute's ethics committee.

2.4. Data collection

In order to minimize the bias, data was collected through self-administered, anonymous questionnaires, from students through Google Forms, where the presence of faculty did not influence the students' responses. The participants completed a demographic questionnaire that included features such as gender, the year of study and discipline.

2.5. Assessment tools

The 18-item Approaches and Study Skills Inventory for Students (ASSIST) short-form questionnaire was used to measure the learning approach across deep, strategic and surface approaches with six questions in each of the three scales. A subscale describes the content of the items below it. The deep approach is defined as the extent to which the student monitors the development of his understanding. The majority of the learning is memorization of information rather than comprehension in the surface approach resulting in superficial retention of knowledge. Students with this approach are interested in acquiring the qualification instead of understanding the concept and subject. In a strategic approach, the focus of learners is to ensure high grades in assessment by organizing their work and time management [2-4]. Items in this instrument are rated using a 5-point Likert scale, where a score of 5= agree, 4= agreesomewhat, 3=unsure, 2 = disagree somewhat, 1 = disagree. Scores on the three main approaches will be created by summing the sub-scales that contribute to each approach. Scoring is usually done by computer using a software program such as the Statical Package for Social Sciences (SPSS). Each item is set to a variable and a scale total is produced by creating a new variable by summing up the items. The highest mean will be taken to indicate the predominant learning approach in student.

The 50-item Dundee Ready Educational Environment Measure (DREEM) was used to evaluate the educational environment across 5 subscales: a feedback questionnaire that covers five reliable and valid dimensions: Students' Perception of Learning (12 items), Students' Perception of Teachers (11 items), Students' Academic Self-Perceptions (8 items), Students' Perception of Atmosphere (12 items) and Students' Social Self-Perception (7 items).

Domain	No. of Items	Maximum Score	Satisfactory Score
Students' Perception of Learning (SPL)	12	48	48
Students' Perception of Teachers (SPT)	11	44	22
Students' Academic Self-Perceptions (SASP)	8	32	16
Students' Perception of Atmosphere (SPA)	12	48	24
Students' Social Self-Perception (SSS)	7	28	14

The questionnaires were also rated based on a 5-point Likert scale. The Likert scale is used to measure all the items except nine. The system scores these nine negative statements (items 4, 8, 9, 17, 25, 35, 39, 48, and 50) in reverse order, indicating disagreement with the negative statement and a positive result. The questionnaire

generates an overall score for the course. The higher the total scores, the better the environment. DREEM gives a global score (maximum score out of 200) for the 50 items. DREEM facilitates comparisons between different courses, as well as within a single course [5-7].

2.6. Statistical analysis

Data were collected in MS Excel and then analysed using the statistical tool SPSS version 24. Mean and standard deviations were used for measuring the central tendency of continuous variables and Chi-square test was used, while proportions and percentages were used for categorical variables. An unpaired t-test was performed to test the differences in means across the study years. We considered the $p < 0.05$ study as statistically significant.

3. Results

The study used a sample of 189 Bachelor of Pharmacy (B. Pharm) students and the data collected served as the foundation for the analysis. The learning approaches of 189 B. Pharm. students were analysed using the ASSIST short-form questionnaire. The results (Table 1) showed slight variations between years.

Learning approaches	1 st year (n= 43) (mean ±	2 nd year (n=56) (mean ±	3 rd year (n=45) (mean ±	4 th year (n=45) (mean ±	p-value ^b
Deep approach:					
<i>Seeking meaning</i>	4.42±0.95	4.41±0.68	4.09±1.20	4.09±1.04	0.232
<i>Interest in ideas</i>	3.61±1.28	3.15±1.36	2.82±1.49	3.46±1.29	0.063
<i>Relating ideas</i>	8.23±1.28	7.37±1.76	7.84±1.56	8.03±1.72	0.110
<i>Use of evidence</i>	8.26±1.36	7.80±1.91	8.02±2.24	7.54±1.66	0.440
Strategic approach:					
<i>Time management</i>	8.03±1.95	7.11±2.11	7.87±2.28	8.31±1.30	0.042
<i>Alert to</i>	3.81±1.25	3.39±1.58	3.09±1.45	3.03±1.31	0.102
<i>Achieving</i>	8.45±1.63	7.13±2.02	7.96±2.13	7.51±2.21	0.035
<i>Organized studying</i>	3.90±0.94	3.59±1.48	3.80±1.25	3.71±1.01	0.709
Surface approach:					
<i>Lack of purpose</i>	3.87±0.99	4.11±0.90	3.87±1.01	4.00±0.90	0.601
<i>Syllabus bound</i>	3.00±1.39	3.83±1.14	3.49±1.19	3.60±1.24	0.040
<i>Unrelated</i>	7.10±1.81	7.72±1.51	7.58±1.67	7.66±1.73	0.411
<i>Fear of failure</i>	7.03±1.76	7.43±1.47	7.02±2.01	7.40±1.66	0.571

Table 1: Distribution of learning approaches among B. Pharm students

a: Data are presented as number (%) b: mean \pm standard deviation (SD)

From the first to the second year, the deep approach score decreased from 24 to 23 (Table 1), with (p values = 0.23) for seeking meaning and (p = 0.06) for interest in ideas; there were no significant differences in subscales. By the fourth year, the strategic approach also demonstrated good time management (p = 0.04). The second year showed a significant increase in the surface approach when using syllabus-bound learning (p = 0.04) (Table 2).

An analysis of the DREEM score (Table 3) showed significant differences in the students' perceptions over four years by decreasing the total DREEM score from 131.81 in the first year to 109.11 in the fourth year (p < 0.001). Declines were observed in the mean scores for students' perception of learning (p < 0.001), perception of atmosphere (p < 0.001) and perception of teachers (p < 0.001). However, students' social self-perception remained constant across the years (p = 0.652).

Table 2: Mean(\pm SD) of sub scale scores of learning approaches among B. Pharm students

Learning approaches	1 st year (n=43)(22.8%) Mean \pm SD	2 nd year (n=56)(29.6%) Mean \pm SD	3 rd year (n=45)(23.8%) Mean \pm SD	4 th year (n=45)(23.8%) Mean \pm SD	Total (n=189) Mean \pm SD
Deep approach	24.52 \pm 3.52	22.74 \pm 4.55	22.78 \pm 4.74	23.11 \pm 3.62	23.18 \pm 4.24
Strategic approach	24.13 \pm 3.91	21.80 \pm 4.45	22.49 \pm 4.82	22.40 \pm 3.72	22.59 \pm 4.34
Surface approach	21.00 \pm 4.09	23.09 \pm 3.25	21.96 \pm 3.89	22.66 \pm 3.71	22.25 \pm 3.75

a: Data are presented as mean \pm standard deviation (SD) b: $p < 0.05$ was considered statistically significant

Table 3: Comparison of mean DREEM scores of B. Pharm students across academic years

Domains	1 st year Mean \pm	2 nd year Mean \pm	3 rd year Mean \pm	4 th year Mean \pm	Average means	p- value
Students'	33.05 \pm 3.9	26.96 \pm 6.1	28.16 \pm 5.8	26.00 \pm 7.3	28.40 \pm 6.5	<0.00
Students'	28.40 \pm 3.4	25.13 \pm 4.05	23.04 \pm 5.1	22.89 \pm 6.2	24.84 \pm 5.2	<0.00
Students'	20.53 \pm 4.0	17.79 \pm 4.22	18.91 \pm 4.26	18.93 \pm 5.3	18.95 \pm 4.5	0.030
Students'	32.30 \pm 4.4	26.68 \pm 6.7	28.56 \pm 5.9	24.24 \pm 7.5	27.83 \pm 6.9	<0.00
Students' social	17.53 \pm 3.21	16.77 \pm 2.89	17.42 \pm 2.6	17.04 \pm 4.4	17.16 \pm 3.33	0.652
Total	131.81 \pm 13.7	113.32 \pm 20.	116.08 \pm 18.	109.11 \pm 26.	117.18 \pm 21.	<0.00

a: Data are presented as mean \pm standard deviation (SD) b: $p < 0.05$ was considered statistically significant

Table 4: Individual item analysis with mean(\pm SD) of sub scale scores of learning approaches among B. Pharm students

Domains	1 st year (n=43) Mean \pm SD ^a	2 nd year (n=56) Mean \pm SD	3 rd year (n=45) Mean \pm SD	4 th year (n=45) Mean \pm SD
<i>1) Students perception of learning</i>				
<i>Items:</i>				
1.I am encouraged to participate in class	3.02 \pm 0.55	2.86 \pm 0.72	3.04 \pm 0.8	2.64 \pm 1.0
7.The teaching is often stimulating	3.02 \pm 0.7	2.09 \pm 0.85	2.60 \pm 0.6	2.11 \pm 0.85
13.The teaching is student-centred	2.72 \pm 0.6	2.34 \pm 0.92	2.31 \pm 0.97	2.02 \pm 1.01
16.The teaching is sufficiently concerned to	2.98 \pm 0.7	1.84 \pm 1.02	2.33 \pm 0.73	1.89 \pm 1.02
20.The teaching is well focused	3.07 \pm 0.6	2.05 \pm 0.92	2.11 \pm 0.93	2.13 \pm 1.07
22. The teaching is sufficiently concerned to develop my confidence	2.77 \pm 0.8	1.88 \pm 0.97	2.24 \pm 0.9	1.98 \pm 1.07
24. The teaching time is put to good use	3.05 \pm 0.53	2.54 \pm 0.80	2.47 \pm 0.8	2.18 \pm 1.07
25 The teaching over-emphasizes factual	2.30 \pm 0.7	2.32 \pm 0.63	2.11 \pm 0.85	1.76 \pm 0.95

38.I am clear about the learning objectives of	2.91±0.57	2.50±0.78	2.60±0.8	2.60±0.9
44. The teaching encourages me to be an	2.81±0.82	1.75±0.89	1.98±1.07	1.93±1.09
47. Long-term learning is emphasized over	2.37±0.9	2.54±0.80	2.24±1.04	2.42±1.09
48. The teaching is too teacher-centred	2.02±0.8	2.27±0.86	2.11±1.00	2.33±1.26
<i>II)Students' perception of teachers</i>				
2.The teachers are knowledgeable	3.28±0.5	2.79±0.68	2.84±0.8	2.62±0.9
6. The teachers are patient with patients	2.84±0.61	2.30±0.78	2.09±0.8	2.42±1.07
8. The teachers ridicule the students	1.49±0.82	2.41±0.94	1.89±0.9	2.00±0.9
9. The teachers are authoritarian	2.42±0.9	2.23±0.80	2.31±1.06	1.91±0.87
18. The teachers have good communications	3.02±0.6	2.23±0.85	2.20±1.01	2.20±1.10
29. The teachers are good at providing	2.86±0.71	1.98±0.96	1.69±0.9	2.07±1.19
32.The teachers provide constructive criticism here	2.26±0.9	2.36±0.94	1.89±0.9	1.58±0.8
37.The teachers give clear examples	3.21±0.60	2.23±0.91	2.40±0.9	2.04±1.0
39.the teachers get angry in class	2.65±0.9	3.04±0.76	2.04±1.18	2.11±0.93
40. The teachers are well prepared for their	3.12±0.58	1.82±1.11	2.18±1.17	2.24±1.06
50. The students irritate the teachers	1.26±1.07	1.73±1.13	1.51±1.10	1.69±1.10
<i>III)Students' academic self-perception</i>				
5. Learning strategies which worked for me	2.35±0.75	1.93±1.02	2.40±0.9	2.40±1.0
10. I am confident about my passing this	2.88±0.8	2.36±0.84	2.33±0.9	2.67±1.24
21. I feel I am being well prepared for my	2.72±0.7	2.57±1.02	2.73±0.8	2.51±1.05
26.Last year's work has been a good	2.37±0.8	2.25±0.97	2.27±0.8	2.36±1.04
27. I am able to memorize all I need	2.26±1.04	1.89±0.96	1.96±0.9	1.84±1.14
31.I have learned a lot about empathy in my	2.86±0.8	2.50±0.71	2.49±0.7	2.42±0.9
41. My problem-solving skills are being well	2.56±0.8	2.16±0.98	2.51±1.03	2.42±1.17
45. Much of what I have to learn seems	2.53±0.6	2.13±0.78	2.22±0.8	2.31±0.87
<i>IV)Students' perception of atmosphere</i>				
11. The atmosphere is relaxed during the	2.65±0.7	2.23±0.99	2.64±0.7	1.98±0.8
12. This school is well time-tabled	3.16±0.75	1.89±1.07	1.58±1.11	1.49±1.07
17. Cheating is a problem in this school	2.58±1.15	2.59±1.17	2.49±1.19	2.13±1.16

23. The atmosphere is relaxed during the	2.93±0.6	2.04±1.15	2.62±0.9	2.11±1.15
30. There are opportunities for me to	2.67±0.8	2.07±1.17	1.89±1.07	1.44±1.09
33. I feel comfortable in class socially	2.70±0.8	2.55±1.02	3.00±0.7	2.42±1.09
34. The atmosphere is relaxed during	2.88±0.8	2.55±0.95	2.69±0.9	2.18±1.26
35. I find the experience disappointing	2.05±0.9	2.29±0.92	2.27±0.91	2.07±0.9
36. I am able to concentrate well	2.81±0.69	2.14±1.06	2.49±1.10	1.84±0.9
42. The enjoyment outweighs the stress of	2.53±0.9	2.09±1.03	2.13±1.01	2.31±1.24
43. The atmosphere motivates me as a	2.65±0.8	2.07±1.00	2.13±0.91	2.02±1.15
49. I feel able to ask the questions I want	2.67±0.9	2.16±1.02	2.62±1.00	2.24±1.02
<i>V)Students' social self-perception</i>				
3. There is a good support system for	2.77±0.71	1.39±0.92	1.58±1.05	1.64±1.09
4. I am too tired to enjoy this course	2.09±1.08	2.71±0.96	2.40±1.13	2.42±1.15
14. I am rarely bored on this course	1.91±1.01	2.25±1.24	2.07±1.17	2.16±1.29
15. I have good friends in this school	3.12±0.93	3.18±1.01	3.42±0.6	3.42±1.01
19. My social life is good	2.79±0.91	2.36±1.08	3.02±0.7	2.60±1.15
28. I seldom feel lonely	1.95±1.23	1.88±1.20	1.69±1.12	2.07±0.9
46. My accommodation is pleasant	2.91±0.75	3.00±0.95	3.24±0.6	2.73±1.35

a: Data are presented as mean \pm standard deviation (SD)

Item analysis from (Table 4) indicated there were some significant trends. In the first year, students were encouraged to take part in class discussions (Item 1), but this encouragement greatly decreased in the fourth year ($p < 0.05$). A decline in teaching stimulation (Item 7) also reflected the decline in engagement. Students gave high ratings on teachers' knowledge (Item 2), but perceptions of patience (Item 6) fell over time. The overall measure of teachers' perceptions, (Item 50), did not show any significant change in perceptions over time. Items 10 and 21 in terms of academic self-perception reflected statistically significant differences between the years ($p < 0.05$). Significant differences ($p < 0.05$) were found in Item 34 ("The atmosphere is relaxed during the seminar/tutorials") was not permitted to contribute to the perception of the atmosphere. Support for stress management (Item 3) strongly decreased after the first year. Table 4 also highlights the patterns of the year's strengths and weaknesses. First-year students identified ten strengths, including 'active participation in class (Item 1), while the fourth year only identified one (Item 15). The 4th year continued to list the

most common weaknesses (14 items), particularly regarding the learning atmosphere (Item 13) and teaching method (Item 11). Stress and communication, such as (Items 42 and 49), are still important and continue to be areas to improve.

Table 5: Total results of DREEM score with interpretation

Dream scores and subscales	Maximum score of the	Mean (SD)	Percentage of	Interpretation [6]
Students Perception of	48	28.40	59.17%	A more positive
Students' perception of	44	24.84	56.45%	Moving in the right
Students' academic self-	32	18.95	59.22%	Feeling more on the
Students' perception of	48	27.83	57.98%	A more positive
Student's social self-	28	17.16	61.29%	Not too bad
Total DREEM score	200	117.18	58.59%	More positive than

Table 5 shows the mean score of the DREEM inventory from the present study, indicating a positive overall education environment with 117/200 students (58.6%). Students had the highest confidence in how much they perceived themselves to be social (61.3%) and the lowest confidence in how they perceived their teachers (56.5%).

4. Discussion

Literature shows that quality of learning is associated with approaches to study; the deep approach is associated with better quality learning and the surface approach is associated with poor quality learning outcomes [8, 9]. The educational environment (EE) can have a long-term implication on students' motivation, knowledge, critical thinking and even social life [10, 11]. Results based on the ASSIST short-form and DREEM questionnaire show significant changes in the learning approaches and perspectives of the B. Pharm students across the years of the academic program. The primary findings show that students in their early years adopted deep and more strategic learning approaches. However, this study observed a shift towards a more surface level approach as they progressed through their studies. This could be probably due to increased academic pressure. More appropriate and effective learning strategies were observed as students advanced to their 4th year of study. Such findings implies that students require continuous support throughout their entire academic program to help maintain effective learning strategies (Table 1).

A notable observation was that, while deep learning remains relatively stable, strategic and surface learning approaches tend to change more significantly. However, when students are in their fourth year, they once again concentrate and learn better. With their educational ladder going up, they are able to cope with academic pressure during exam preparation, possess skills in syllabus bound learning and time management (Table 2).

The factors of educational environment include the curriculum design, the teaching methods, behaviour of the teacher towards students, the atmosphere during teaching sessions, social and academic environments as well as support systems in times of stress, all of which affect the educational organization [12]. Analysis of results using the DREEM questionnaire indicated a decline in students' perceptions of their learning as they progressed through the course (Table 3). Possible cause of this decline could be an increased workload, a lack of interest in repetitive classroom content, or ineffective teaching methods. The findings reveal (Table 4) that not only did students have negative attitudes towards their teachers, but also the relations between them and their teachers became worse over time due to different teaching methods. For this perception to improve, it is necessary, therefore, to maintain consistent support and interaction between teacher and student. There was a significant decrease in Students' Academic Self Perception. The results suggest that students lose confidence in their learning abilities as the course progresses. Increased academic difficulties, beliefs one may have regarding one's ability, or lack of sufficient positive feedback, maybe the causes for these perceptions. This finding necessitates for strategies and continuous feedback, to build students' confidence throughout their academic years. Student's perception of the atmosphere also significantly dropped, particularly concerning stress management support systems (Item 3). This implies that mental health services must take key positions in institutions. However, students' social self-perception of their environment remained relatively stable, despite these challenges. The social experience, with which students maintain a sense of community, is influenced by peer relationships and extracurricular activities positively. Mean scores on Item 14 and Item 15 show an increase over the year, further confirming the possibilities of improving overall student satisfaction with strengthened social and academic interactions.

Item analysis (Table 4) has some important insights. It was seen that perception about student-centered teaching (Item 13) decreased over the period, which, as it seems, may indicate a move toward teacher-oriented approaches. Teachers were also viewed as initially strong in setting an example (Item 37), but this then became less important over time, making all other aspects of clarity in teaching as less important as the course progressed.

These findings indicate the need for regular assessment and feedback should be part of the process for identifying areas needing improvement in the learning environment B. Pharm students. Across all years (Table 4), most items fall within the range indicating areas that need improvement (mean = 2-3). However, this consistent trend indicates that although there are no critical issues, there is a need to enhance almost all aspects of the educational environment. Therefore, analysis of the present study can be considered a mirror of the present curriculum standard and thereby used to identify areas that need to be refined.

According to McAleer and Roff through the inventory, one can readily compare areas of strength and weakness [11]. A total DREEM global score of 200 is an ideal condition about the educational environment [7,13]. The DREEM helps to find out the strengths and weaknesses of a particular educational setting so that teaching and learning standard can be improved to meet the learner, the main stakeholder in a teaching and learning environment, who is the primary stakeholder in a teaching/learning environment [7,14]. In the present study, the overall mean score of the DREEM inventory was 117/200 (Table 5) indicating a general decline in students' impressions of their learning environment. These findings are in alignment with some other studies as one study by Jawaid et al. [15] also reported an overall mean score of 114.4/200, and another study conducted in the public and private medical colleges shows a slightly higher mean score of 125.7/200 and a study conducted in a private medical college shows mean score of 125/200 in comparison to the present study [16-18]. An overall mean DREEM score ranged between 104 and 118 in studies from other Asian countries [19-21]. Thus, it reflects that the DREEM score has decreased in general which demands a good deal of improvement especially in learning, teaching and atmosphere.

5. Limitations:

This is a cross-sectional study, therefore, it does not follow change over time and can only be a snapshot of students' experiences at different levels of an undergraduate pharmacy program. Moreover, the research only examines the circumstances of one institution and of one academic program, the results of which cannot be compared with other disciplines. Further research based on a longitudinal approach will be relevant to represent students' learning approaches and perceptions in terms of changing over time, throughout their whole academic course.

6. Conclusions

The present study implies that, while there is a shift towards more teacher-centered teaching, students' confidence and perceptions of their environment decline drastically, which emphasize the need to incorporate active and supportive teaching approaches, clear communication and stress management support systems in the institutions. Regular assessment of the educational environment with timely intervention would help get a good learning outcome.

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Ethical approval

This study received approval from Kannur Medical College Institutional review board (Dated:15/12/2023, Number:11/2023) after which informed consent was taken from the participants.

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