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Knowledge and Awareness Regarding Flipped Classroom among Undergraduate Dental Students in Khammam

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ABSTRACT

The flipped classroom is an innovative teaching model that shifts direct instruction outside the classroom through videos or readings, allowing in-class time for active learning and collaboration. This approach promotes student engagement, deeper understanding, and self-paced learning. Research indicates that the flipped model can improve academic performance and critical thinking skills, though challenges such as technology access and adaptation remain. Overall, the flipped classroom enhances modern education by fostering interactive and student-centered learning.

Aim: The aim of the study is to evaluate the knowledge and awareness about flipped classroom among undergraduate dental students in khammam.

Objectives

1. Promote Active Learning: Shift from passive lectures to interactive, discussion-based, and hands-on activities.

2. Enhance Student Engagement: Increase participation and motivation through collaborative and problem-solving tasks.

3. Improve Knowledge Retention: Allow students to review materials at their own pace, reinforcing understanding.

4. Develop Critical Thinking Skills: Encourage deeper analysis, questioning, and application of concepts.

Method

A cross-sectional survey was conducted among 240 dental students, comprising 132 male (55%) and 108 female(48%), including 15 first-year BDS students,30 second-year BDS students, 27 third-year BDS students, 64 final year BDS students and 104 interns. The survey included 13 questions exploring Knowledge and awareness on flipped classrooms among dental students.

Responses were analysed based on gender and year of study using chi-square test, P-value to identify statistical significant differences.

Keywords: Blended Learning, Constructivist Approach, Higher-order thinking, Video lectures.

Introduction

The flipped classroom is an innovative teaching approach that reverses the traditional learning model by delivering instructional content outside the classroom, often through videos, readings, or online resources. This shift allows classroom time to be used for active learning, discussions, problem-solving, and collaborative activities.

Rooted in constructivist and active learning theories, the flipped classroom aims to enhance student engagement, critical thinking, and deeper understanding of concepts. By allowing students to learn at their own pace before class, they come prepared to engage in meaningful interactions and hands-on activities with peers and instructors.

This method has gained popularity in various educational settings, from K-12 schools to higher education and professional training programs. Research suggests that the flipped model can improve student performance, motivation, and retention of knowledge. However, successful implementation requires access to technology, proper instructional design, and student adaptability.

Overall, the flipped classroom represents a shift toward a more student-centered and interactive learning environment, addressing the limitations of traditional lecture-based teaching while fostering a more engaging and effective educational experience.

Methodology

A) **Study design and area:** A cross-sectional study was carried out at tertiary care teaching hospital Khammam.

B) **Study Population:** The health care students including those of I year, II year, III year, IV year and Interns who responded to the offline paper print questionnaire survey.

C) **Study Instrument:** A self-administered questionnaire was designed based on knowledge attitude and awareness on hand hygiene practices had total 13 questions .Each participant has to fill their demographic data like Name, age, and year of study. Participant has to select one option from the answers provided against questions. The questions were based on knowledge attitude and practice among dental students.

D) **Pilot Study:** A pilot study was conducted on a group of students to assess the validity and reliability of study.

E) **Sampling Method:** The sampling method used is convenience method.

F) **Inclusion criteria:** The students who were interested in study and who are willing to participate.

G) **Exclusion criteria:** students who are not willing to participate are excluded.

H) **Organizing the study:** The study was designed in a paper-based version of the self-administered questionnaire of 13 questions focusing on knowledge, attitude, practice.

Includes the sections of demographic data: Name, Age, Sex and Year of study demographic information and asked to answer all questions by selecting one option from the provided answers.

Statistical analysis: Data from the filled questionnaire was conducted in a tabular form in an excel worksheet and evaluated for analysis. The analysis was performed by SSPS version 29.

Result

A total of 240 students took part in this with female (45%) and male of (55%). Age of the participants ranging from 19-25 years. In this study males were more likely to demonstrate awareness of flipped classroom than females. Significantly II BDS (12.5%), IBDS (6.3%), III BDS (11.3%), INTERS (43.3%), IV BDS (26.7%).

Showed greater response on hand hygiene practices.

	No of Responses	Minimum	Maximum	Mean	Std. Deviation
Age	240	19	50	23.29	3.076

Gender	Frequency	Percentage
Male	132	55.0%
Female	108	45.0%
Total	240	100.00%

Item	Response	Males		Females		Chi-Square value	P value
		N	%	n	%		
Q1	1	32	58.2	23	41.8	0.623	0.435
	2	67	50.8	54	44.6		
	3	33	51.6	31	48.4		
	4	0	0	0	0		
Q2	1	47	52.8	42	47.2	8.173	0.85
	2	32	46.4	37	53.6		
	3	22	62.9	13	37.1		
	4	15	55.6	12	44.4		
Q3	1	50	45.9	59	54.1	13.200	**0.004***
	2	38	53.5	33	46.5		
	3	30	78.9	8	21.1		
	4	14	63.6	8	36.4		
Q4	1	51	53.7	44	46.3	0.296	0.961
	2	42	55.3	34	44.7		
	3	31	55.4	25	44.6		
	4	8	61.5	5	38.5		
Q5	1	50	61.7	31	38.3	15.863	**0.01***

	2	28	63.6	16	36.4		
	3	38	60.3	25	39.7		
	4	16	30.8	36	69.2		
Q6	1	7	64	4	36	11.752	**0.038***
	2	12	52	11	48		
	3	21	66	11	34		
	4	50	60	33	40		
Q7	1	91	53.8	78	46.2	11.848	**0.008***
	2	31	67.4	15	32.6		
	3	8	66.7	4	33.3		
	4	2	15.4	11	84.6		
Q8	1	65	61.9	40	38.1	21.504	**0.001***
	2	47	66.2	24	33.8		
	3	16	28.6	40	71.4		
	4	4	50	4	50		
Q9	1	41	56.9	31	43.1	0.363	0.948
	2	60	54.1	51	45.9		
	3	22	56.4	17	43.6		
	4	9	50	9	50		
Q10	1	38	66.7	19	33.3	8.740	**0.033***
	2	72	51.8	67	48.2		
	3	16	64	9	36		
	4	6	31.6	13	68.4		
Q11	1	85	57	63	43	13.635	**0.03***
	2	26	52	24	48		
	3	19	70	8	30		

	4	2	13	13	87		
Q12	1	63	62	39	38	17.912	**0.001***
	2	46	66	24	34		
	3	20	36	36	64		
	4	3	25	9	75		
Q13	1	31	61	20	39	1.948	0.583
	2	67	55	56	45		
	3	24	56	19	44		
	4	10	44	13	56		

Year of Study	Frequency	Percentage
I BDS	15	6.3%
II BDS	30	12.5%
III BDS	27	11.3%
IV BDS	64	26.7%
INTERNS	104	43.3%
TOTAL	240	100.00%

Distribution and comparison of responses based on year of study

Item	Response	I BDS		II BDS		III BDS		IV BDS		INTERN		Chi-Value	P-Value
		n	%	n	%	n	%	n	%	n	%		
Q1	1	3	5.5	6	10.9	7	12.7	11	2	28	50.9	39.582	**0.001***
	2	12	9.9	22	18.2	18	14.9	37	30.6	32	26.4		
	3	0	0	2	3.1	12	3.1	16	25	44	68.8		
	4	0	0	0	0	0	0	0	0	0	0		
Q2	1	2	2.2	4	4.5	6	6.7	28	31.5	49	55.1	41.722	**0.001***

	2	5	7.2	8	11.6	6	8.7	22	31.9	28	40.6		
	3	4	11.4	11	31.4	7	20	6	17.1	7	20		
	4	3	11.1	2	7.4	6	22.2	5	18.5	11	40.7		
Q3	1	5	4.6	10	9.2	6	5.5	28	25.7	60	55	24.923	**0.015***
	2	5	7	12	16.9	12	16.9	22	31	20	28.2		
	3	5	13.2	5	13.2	4	10.5	11	28.9	13	34.2		
	4	0	0	3	13.6	5	18.5	3	13.6	11	50		
Q4	1	4	4.2	12	12.6	6	6.3	24	25.3	49	51.6	10.549	0.568
	2	4	5.3	9	11.8	13	17.1	22	28.9	28	36.8		
	3	6	10.7	8	14.3	6	10.7	15	26.8	21	37.5		
	4	1	7.7	1	7.7	2	15.4	3	23.1	6	46.2		
Q5	1	3	3.7	5	6.2	8	9.9	21	25.9	44	54.3	24.393	**0.018***
	2	4	9.1	11	25	7	15.9	13	29.5	9	20.5		
	3	6	9.5	11	17.5	6	9.5	16	25.4	24	38.1		
	4	2	3.8	3	5.8	6	11.5	14	26.9	27	51.9		
Q6	1	0	0	2	18.2	1	9.1	2	18.2	6	54.5	46.163	**0.001***
	2	3	13	6	26.1	5	21.7	5	21.7	4	17.4		
	3	4	12.5	7	21.9	6	18.8	5	15.6	10	31.2		
	4	6	7.2	8	9.6	8	9.6	33	39.8	28	33.7		
Q7	1	7	4.1	15	8.9	12	7.1	51	30.2	84	49.7	50.454	**0.001***
	2	6	13	13	28.3	8	17.4	9	19.6	10	21.7		
	3	1	8.3	2	16.7	6	50	0	0	3	25		
	4	1	7.7	0	0	1	7.7	4	30.8	7	53.8		
Q8	1	5	4.8	13	12.4	10	9.5	29	27.6	48	45.7	9.426	0.666
	2	4	5.6	13	18.3	10	14.1	19	26.8	25	35.2		
	3	6	10.7	3	5.4	6	10.7	14	25	27	48.2		

	4	0	0	1	12.5	1	12.5	2	25	4	50		
Q9	1	4	5.6	5	6.9	8	11.1	16	22.2	39	54.2	14.065	0.297
	2	9	8.1	20	18	9	8.1	31	27.9	42	37.8		
	3	1	2.6	4	10.3	6	15.4	12	30.8	16	41		
	4	1	5.6	1	5.6	4	22.2	5	27.8	7	38.9		
Q10	1	3	5.3	3	10.5	6	10.5	11	19.8	34	59.6	12.668	0.394
	2	10	7.2	20	10.8	7	10.8	42	30.2	52	37.4		
	3	2	8	3	12	30	11.1	7	28	10	40		
	4	0	0	4	15.8	3	15.8	4	21.1	8	42.1		
Q11	1	8	5.4	17	11.5	15	10.1	39	26.4	69	46.6	6.718	0.876
	2	5	10	7	14	7	14	15	30	16	32		
	3	1	3.7	5	18.5	4	14.8	6	22.2	11	40.7		
	4	1	6.7	1	6.7	1	6.7	4	26.7	8	53.3		
Q12	1	4	3.9	17	16.7	8	7.8	26	25.5	47	46.1	17.195	0.142
	2	7	10	10	14.3	12	17.1	18	25.7	23	32.9		
	3	4	7.1	3	5.4	5	8.9	18	32.1	26	46.4		
	4	0	0	0	0	2	16.7	2	16.7	8	66.7		
Q13	1	5	9.8	2	3.9	4	7.8	14	27.5	26	51	10.170	0.601
	2	8	6.5	17	13.8	15	12.2	32	26	51	41.5		
	3	2	4.7	8	18.6	5	11.6	13	30.2	15	34.9		
	4	0	0	3	13	3	13	5	21.7	12	2.2		

P≤0.05 is statistically significant

Discussion

The flipped classroom model has emerged as an innovative approach to teaching, shifting traditional lectures outside the classroom through videos, readings, or online resources, while using class time for active learning, discussions, and problem-solving. This method enhances student engagement by encouraging interactive participation and self-paced learning. Research suggests that it improves concept retention, critical thinking, and teacher-student interactions, as instructors can focus on personalized guidance rather than passive lectures. However, the model also presents challenges, such as the need for

reliable technology access, student adaptation to self-directed learning, and increased preparation time for educators.

Additionally, assessing the effectiveness of active learning compared to traditional methods can be complex. Despite these challenges, the flipped classroom continues to gain popularity across educational levels, as it fosters deeper understanding and prepares students for real-world problem-solving. Future advancements, including AI-driven personalized learning, may further refine its implementation and effectiveness. Overall, while the flipped classroom is not a universal solution, it represents a significant step toward more dynamic, student-centered education.

Conclusion

The flipped classroom is a student-centered approach that enhances engagement, critical thinking, and learning retention by shifting instruction outside the classroom and focusing on active learning. While challenges like technology access and adaptation exist, proper implementation can make it an effective educational model. As education evolves, the flipped classroom remains a valuable strategy for improving student outcomes.

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