

Medical Education Terminologies: Do These Really Percolate to the Level of Medical Students? A Survey

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ABSTRACT

Introduction: In Medical Education Technology, many terminologies are embodied in faculty training programs; used by teachers in daily practice like learning objectives, curriculum, and domains, formative and summative assessments. The awareness and knowledge of students regarding these terminologies, is questionable.

Aim: To assess the awareness and knowledge of the students of all phases of MBBS - regarding terminologies in medical education.

Materials and Methods: The study was questionnaire based survey at a private medical college in rural setting. Participants were the students from first, second, third Part I and third part II MBBS. Sample size included 175, 161, 150 and 162 participants of first, second, third Part I and third Part II MBBS respectively. The questionnaire included 10 closed and one open ended questions which included the themes in educational spiral like: learning objectives, teaching-learning and assessment.

Statistical data analysis was done by using descriptive and inferential statistics (Chi-square test) and $p < 0.05$ was considered as level of significance. Qualitative data was analysed using coding and categorization.

Results: Percentage of students participated for first, second, third Part I and third Part II MBBS were 87.5%, 80.09%, 93.16% and 90% respectively. The students were aware of some terms like learning objectives, its importance, curriculum; but knowledge component was missing. For some terms like cognitive, psychomotor, affective domain, simulation, formative, summative assessment; awareness as well as knowledge was missing. The methods suggested by students regarding the terminologies ranged from explanation of importance of these terms to its application.

Conclusion: Efforts should be made in the direction to increase the awareness and knowledge of the basic terminologies used in medical education technology.

Keywords: Formative, Knowledge, Qualitative, Summative

INTRODUCTION

It is expected that there would be a pragmatic change in medical education system in India, as a result of innovations in teaching-learning methodologies. The planners have realized that the implementation of these changes at the required level will require proper training [1,2].

In Medical Education Technology, there are many terminologies and concepts, which are used by teachers routinely like learning objectives, curriculum, domains, integrated teaching, problem based learning, formative and summative assessments.

But the awareness and knowledge of students regarding these terminologies, a phase where they are "actually implemented" is questionable as there is no published literature on the knowledge and awareness of the medical students regarding these terminologies.

Hence, this study was undertaken with the research question "whether the terminologies and concepts used in medical education technology are percolating to the level of end-users- our learners?"

MATERIALS AND METHODS

The study was approved from the Institutional Ethics Committee. The study was conducted in Jawaharlal Nehru Medical College, Sawangi (Meghe), Wardha, Maharashtra, India. Study duration was six months from February 2015 to July 2015. The study design was cross-sectional study. Data collection method was survey and the tool used was questionnaire. Study participants were students from first MBBS, second MBBS, third Part I MBBS and third Part II MBBS. Sample size was: 175 in first MBBS, 161 in second MBBS, 150 in third Part I and 162 in third part II. It was a convenience sampling and all students present on the day of survey were included. After

obtaining the written informed consent from the heads of various departments and the students, questionnaire was administered. In first year, the repeater students could not be included as they had separate teaching-learning sessions. In all other phases from second year to third Part II, repeater students were also included. The questionnaire was administered only once. The students who were absent were not considered again.

Questionnaire: The questionnaire was certified by the faculty of School of Health Professions Education and Research and validated by a pilot study with 20 students, the necessary corrections and suggestions were incorporated. The reliability score was 78.78%.

The questionnaire included both quantitative and qualitative questions. The questionnaire included 10 closed and one open ended questions.

Quantitative questions included the terms in educational spiral like educational objectives, teaching-learning activities and assessment [3].

While preparing the master chart, questions were divided into two parts for e.g., Q2 as Q2a and Q2 b. Q2a dealt with awareness and Q2b dealt with knowledge.

For e.g., Q2a dealt with questioning the awareness of the term 'cognitive domain' (closed ended question in the form of yes/no) and Q2b was to explain the term cognitive domain (open ended question). If the student had knowledge about what is cognitive domain only then he/she could write about it.

Qualitative question included the open ended responses which dealt with the measures to orient the students to these terminologies if they were not aware.

STATISTICAL ANALYSIS

Quantitative data: In analysis of quantitative data, the data was coded as:

In the awareness section, YES/NO.

In the knowledge component, the students were asked to explain the term asked in the awareness section. It was coded as:

1. If the student had ticked 'no', and so there was no explanation; it was coded as 0;
2. If the student had ticked 'yes' but did not write the explanation; it was coded as 1;
3. If the student had ticked 'yes' but wrote incorrect explanation; it was coded as 2;
4. If the student has ticked 'yes' but wrote partially correct explanation; it was coded as 3.
5. If the student has ticked 'yes' and wrote fully correct explanation; it was coded as 4.

Quantitative data: Statistical analysis of data was done by using descriptive statistics using percentages and inferential statistics using Chi-square test. The software used in the analysis was Statistical Package for the Social Sciences (SPSS) 17.0 version and $p < 0.05$ was considered as level of significance.

Qualitative data was analysed using coding and categorization.

RESULTS

In this study, percentage of students participated were 87.5%, 80.09%, 93.16% and 90% respectively from first MBBS, second MBBS, and third MBBS Part I and third MBBS Part II [Table/Fig-1].

The present study showed that the awareness level regarding the learning objectives, importance of learning objectives, curriculum was high for all the phases. Majority of the students were not aware

Phase of MBBS	Number of students in the study/ Total number of students	Percentage of class strength
First MBBS	175/200	87.5%
Second MBBS	161/201	80.09%
Third Part I	150/161	93.16%
Third Part II	162/180	90%

[Table/Fig-1]: Distribution of study participants phase wise with percentage of class strength.

Terminologies	First MBBS		Second MBBS		Third part I		Third part II		χ^2 -value	p-value
	Yes	No	Yes	No	Yes	No	Yes	No		
Learning objectives	171 (97.71%)	4 (2.29%)	152 (94.41%)	9 (5.59%)	138 (92%)	12 (8%)	158 (97.53%)	4 (2.47%)	6.28	0.09 NS, $p > 0.05$
Importance of learning objectives	163 (93.14%)	12 (6.86%)	139 (86.34%)	22 (13.66%)	130 (86.67%)	20 (13.33%)	149 (91.98%)	13 (8.02%)	3.93	0.26 NS, $p > 0.05$
Cognitive domain	62 (35.43%)	113 (64.57%)	50 (31.06%)	111 (68.94%)	24 (16%)	126 (84%)	58 (35.80%)	104 (64.20%)	12.36	0.006 $S, p < 0.05$
Psychomotor domain	26 (14.86%)	149 (85.14%)	27 (16.77%)	134 (83.23%)	13 (8.67%)	137 (91.33%)	42 (25.93%)	120 (74.07%)	10.67	0.013 $S, p < 0.05$
Affective domain	20 (11.43%)	155 (88.57%)	16 (9.94%)	145 (90.06%)	26 (17.33%)	124 (82.67%)	31 (19.14%)	131 (80.86%)	4.80	0.18 NS, $p > 0.05$
Curriculum	132 (75.43%)	43 (24.57%)	102 (63.35%)	59 (36.65%)	97 (64.67%)	53 (35.33%)	119 (73.46%)	43 (26.54%)	4.86	0.18 NS, $p > 0.05$
Self directed learning	71 (40.57%)	104 (59.43%)	77 (47.83%)	84 (52.17%)	64 (42.67%)	86 (57.33%)	65 (40.12%)	97 (59.88%)	1.55	0.67 NS, $p > 0.05$
Simulation	43 (24.57%)	132 (75.43%)	45 (27.95%)	116 (72.05%)	31 (21.99%)	110 (78.01%)	34 (20.99%)	128 (79.01%)	1.64	0.64 NS, $p > 0.05$
Formative assessment	81 (46.29%)	94 (53.71%)	56 (34.78%)	105 (65.22%)	25 (16.67%)	125 (83.33%)	25 (15.43%)	137 (84.57%)	32.70	$p < 0.0001$ S
Summative assessment	86 (49.14%)	89 (50.86%)	56 (34.78%)	105 (65.22%)	29 (19.33%)	121 (80.67%)	27 (16.67%)	135 (83.33%)	32.19	$p < 0.0001$ S

[Table/Fig-2]: Awareness of the terminologies in medical education technology.

of the terms cognitive domain, psychomotor domain, affective domain, self directed learning, simulation, formative and summative assessment in all phases [Table/Fig-2].

In this study, the actual knowledge regarding learning objectives and domains when assessed in all phases, fully correct responses were few [Table/Fig-3].

The present study also showed few fully correct responses regarding the knowledge about curriculum, self directed learning, simulation, formative assessment and summative assessment [Table/Fig-4].

Phase of MBBS	Knowledge score: yes component				χ^2 -value	p-value
	4= Cor-rect	3= partially correct	2= incor-rect	1= not written		
What are learning objectives?						
First MBBS	2(1.17%)	10(5.85%)	144(84.21%)	15(8.77%)	13.29	0.022 $S, p < 0.05$
Second MBBS	5(3.29%)	14(9.21%)	113(74.34%)	20(13.16%)		
Third MBBS-I	2(1.45%)	18(13.04%)	82(59.42%)	36(26.09%)		
Third MBBS-II	1(0.63%)	12(7.59%)	120(75.95%)	25(15.82%)		
What is the importance of learning objectives?						
First MBBS	5(3.07%)	18(11.04%)	119(73.01%)	21(12.88%)	31.35	0.0003 $S, p < 0.05$
Second MBBS	0(0%)	20(14.39%)	88(63.31%)	31(22.30%)		
Third MBBS-I	0(0%)	30(23.08%)	54(41.54%)	46(35.38%)		
Third MBBS-II	5(3.36%)	16(10.74%)	92(61.74%)	36(24.16%)		
Explain the term 'Cognitive Domain'						
First MBBS	1(1.61%)	1(1.61%)	50(80.65%)	10(16.13%)	75.29	<0.001 $S, p < 0.05$
Second MBBS	0(0%)	7(14%)	26(52%)	17(34%)		
Third MBBS-I	0(0%)	1(4.17%)	10(41.67%)	13(54.17%)		
Third MBBS-II	5(8.62%)	9(15.52%)	26(44.83%)	18(31.03%)		
Explain the term 'Psychomotor Domain'						
1st MBBS	2(7.69%)	6(23.08%)	11(42.31%)	7(26.92%)	120.60	<0.001 $S, p < 0.05$
Second MBBS	3(11.11%)	7(25.93%)	10(37.04%)	7(25.93%)		
Third MBBS-I	0(0%)	0(0%)	1(7.69%)	12(92.31%)		
Third MBBS-II	3(7.14%)	7(16.67%)	15(35.71%)	17(40.49%)		
Explain the term 'Affective Domain'						
First MBBS	0(0%)	0(0%)	9(45%)	11(55%)	49.80	<0.001 $S, p < 0.05$
Second MBBS	1(6.25%)	1(6.25%)	5(31.25%)	9(56.25%)		
Third MBBS-I	0(0%)	1(3.85%)	3(11.54%)	22(84.62%)		
Third MBBS-II	1(3.23%)	3(9.68%)	9(29.03%)	18(58.06%)		

[Table/Fig-3]: Knowledge regarding these terminologies (learning objectives and domains) in medical education technology

Phase of MBBS	Knowledge score: yes component				χ^2 -value	p-value
	4= Correct	3= partially correct	2= incorrect	1= not written		
Explain the term 'curriculum'						
First MBBS	0(0%)	105(79.55%)	11(8.33%)	16(12.12%)	28.28	<0.001 S,p<0.05
Second MBBS	0(0%)	77(75.49%)	3(2.94%)	22(21.57%)		
Third MBBS-I	0(0%)	49(50.52%)	7(7.22%)	41(42.27%)		
Third MBBS-II	0(0%)	75(63.03%)	9(7.56%)	35(29.41%)		
Explain the term 'self-directed learning'						
First MBBS	0(0%)	37(52.11%)	16(22.54%)	18(25.35%)	66.37	<0.001 S,p<0.05
Second MBBS	0(0%)	55(71.43%)	2(2.60%)	20(25.97%)		
Third MBBS-I	0(0%)	19(29.69%)	4(6.25%)	41(64.06%)		
Third MBBS-II	0(0%)	37(56.92%)	6(9.23%)	22(33.85%)		
Explain the term 'simulation'						
First MBBS	0(0%)	10(23.26%)	27(62.79%)	6(13.95%)	65.14	<0.001 S,p<0.05
Second MBBS	2(4.44%)	16(35.56%)	12(26.67%)	15(33.33%)		
Third MBBS-I	0(0%)	8(25.81%)	8(25.81%)	15(48.39%)		
Third MBBS-II	0(0%)	9(26.47%)	9(26.47%)	16(47.06%)		
Explain the term 'formative assessment'						
First MBBS	0(0%)	0(0%)	71(87.65%)	10(12.35%)	107.30	<0.001 S,p<0.05
Second MBBS	0(0%)	1(1.79%)	32(57.14%)	23(41.07%)		
Third MBBS-I	0(0%)	0(0%)	5(20%)	20(80%)		
Third MBBS-II	0(0%)	1(4%)	10(40%)	14(56%)		
Explain the term 'summative assessment'						
First MBBS	0(0%)	9(10.47%)	64(74.42%)	13(15.12%)	80.94	<0.001 S,p<0.05
Second MBBS	3(5.36%)	3(5.36%)	28(50%)	22(39.29%)		
Third MBBS-I	0(0%)	0(0%)	9(31.03%)	20(68.97%)		
Third MBBS-II	0(0%)	2(7.41%)	11(40.74%)	14(51.85%)		

[Table/Fig-4]: Knowledge regarding these terminologies (included in teaching-learning and assessment) in medical education technology.

In this present study, the measures suggested by the students to orient to these terminologies were coded and categorized which ranged from explanation of importance of these terms, improvised induction programs, provision of booklets and brochures, arrangement of interactive lectures, teacher-student interaction, interaction with senior peers and its application in day-to-day life [Table/Fig-5].

DISCUSSION

In the section of learning objectives, it showed that students though were aware of the term 'learning objectives' as they are used frequently in classrooms, they did not have the knowledge what it actually means. The students have mentioned 'learning objectives' as just 'headings', 'points of lecture, basically index'.

Majority of the students from all phases were aware of the importance of learning objectives, but when the knowledge regarding the importance of learning objectives was assessed, the fully correct responses ranged from 3.07% in first MBBS, 0% in second MBBS, 0% in third Part I MBBS, 3.36% in third part II MBBS, the differences being statistically significant. This showed that students blindly followed the term, without appreciating the importance.

Cognitive domain is concerned mainly with description of learning designed to acquire or recognize knowledge and development of intellectual abilities and skills of the students. This is also referred to as the domain of intellectual skills [3,4]. Majority of the students from all the phases were not aware of the term 'cognitive domain' the differences being statistically significant. The knowledge when compared for those who were aware for cognitive domain, fully correct responses were few.

Psychomotor domain means acquiring neuromuscular coordination or skills for manipulation of objects [5,6]. Majority of the students

from all phases were unaware of the term, the difference being statistically significant. But in the knowledge component of the students who were aware, there were very few who were partially correct or fully correct, the results being statistically significant.

The appreciation of values, attitudes and change in the interest of learning is included under affective domain. This is often referred to as 'domain of communication skills' as it mainly deals with interpersonal relationships [5,6]. Here too, majority of the students from all phases were unaware. Though they were aware, there were very few who were partially correct or fully correct, the results being statistically significant.

Recently there has been an extension in knowledge and with improvement in information communication technology; knowledge has become easily accessible which promotes self directed learning. Reflection has become an important component in self directed learning [7].

In self directed learning, the initiative is taken by the student. The learner may or may not take the help of others in identifying his/her learning needs, goals, choosing appropriate resources for learning including the strategies. The student may also take a decision on the evaluation of his/her outcome of learning [8]. More than 50% students had no awareness regarding the term, though the results are not statistically significant. For those who were aware, none of them were fully correct. Students just perceived self-directed learning as a mere "self study".

Sometimes, a real life situation is artificially created to provide experiential learning under controlled situation which are safe for both the learner and patient thus bridging the gap between 'knowing' and 'doing'. This is called as 'simulation' [9,10]. This reduces risk to patients and in turn it would reduce the cost in healthcare.

Category	Responses
Explanation of importance of the terms	"Teachers should not think that students know and so I should not explain. Teachers should explain all these terms while they are putting it to use" "tell us the importance of these terms" "these terminologies should be better explained with their importance to students"
Improvised induction programs	"induction programs should be strengthened as part of early exposure for medical students towards these terminologies" "induction program should be used in a better way to sensitize the students to such terminologies" "terminologies can be discussed in orientation to students"
Provision of booklets/brochures	"a small pocketsize booklet should be provided to the students for the better understanding of these topics and to be more familiar with the given terms" "the terms can be put in a hard copy format for whenever the student wants to review these terms later on"
Arrangement of interactive lectures/seminars	"taking interactive lectures on all these terminologies" "rather than introducing these terms as new phrases to be learnt, they ought to be used frequently during lectures" "seminars can be arranged and should be specific" "seminars during initial days of college for new comers"
Teacher-student interaction	"a better interaction with the teachers on 'how' they teach along with 'what' they are teaching" "friendly relationship between teacher and students"
Interaction with senior peers	"more interaction with seniors can help in better way" "more and more interaction with seniors"
Application of the terms in medical education	"there must be focus on applied aspects and co-relating it with theory part" "there should be more focus on applied aspects ie. Teaching about its relation to the surroundings" "by giving examples in day-to-day scenarios, one can enhance our knowledge, by making it interesting"
Miscellaneous	"to take activity programs so that through activities we should come to know about these words clearly" "library hours could be made compulsory or of greater importance so that students could visit and read the desired topics in that time" "include in website"

[Table/Fig-5]: Measures suggested to orient the students to these terminologies in medical education technology.

Simulation also enhances confidence and the competence of the learners towards patient care [9]. Majority of the students were unaware of the term. For those who were aware, very few had fully correct responses.

Curriculum is an educational plan that spells out which goals and objectives should be achieved, which topics should be covered and which methods are to be used for learning, teaching and evaluation [11]. Majority of the students were aware of the term curriculum, the difference being statistically insignificant. Though they were aware, fully correct responses were nil, the difference being statistically significant. Curriculum is a complete educational experience and activities, where the students just responded curriculum as "syllabus".

Formative assessment with the hallmark of providing feedback to learners is an ongoing process of teaching and learning, for improvement in learning [11]. It is of great help in detection of learning difficulties which can be corrected by counselling to modify learning methods or activities [6]. Majority of the students were unaware of the term, the difference being statistically significant. For those who were aware, the partially correct responses were few and fully correct were nil, the results being statistically significant.

Summative assessment deals with testing the learner at the end of the course or a term. This provides with information about the learning that took place during the course by the learner and also provides information about the way of teaching the content [11]. Majority were unaware of the term, the results being statistically significant. For those who were aware, there were very few partially correct and fully correct responses. [Table/Fig-5] shows the analysis of the open ended responses which were categorized. Students responded that they should be explained about the importance of the terms, which should then be included in either induction programs in a better way or as lectures/seminars. They also suggested that a pocketbook be handed over to them. Interaction with teachers and seniors were also stressed. The important point to be highlighted was

the application of these terms in day-to-day practice. Our results cannot be compared against the literature as no such study is conducted so far.

LIMITATION

This study involved only those students who were present during the survey. The study is limited to one institute.

RECOMMENDATIONS

The students should be made aware of the various terms used in medical education technology before incorporating them routinely during their course.

CONCLUSION

This study showed that the terminologies do not percolate at the level of medical students as desired. They blindly follow the terms used in their study career without appreciating their importance and hence, efforts have to be made in this direction to increase awareness and knowledge regarding these terminologies. Explanation of importance of these terminologies, provisions of booklets, application of the terms was some of the modalities suggested by the students to augment the process of understanding these terminologies.

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Date of Submission: **Jan 05, 2017**
Date of Peer Review: **Mar 10, 2017**
Date of Acceptance: **Jun 23, 2017**
Date of Publishing: **Sep 01, 2017**

FINANCIAL OR OTHER COMPETING INTERESTS: None.