

Evaluation Of Integrated Teaching Method For Phase I MBBS, Using Kirkpatrick's Evaluation Method

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Abstract: Background: An integrated teaching allows students to engage in purposeful, relevant learning. We were conducting horizontal & vertical integrated teaching for the first year MBBS since last 5 years at our institute. We planned the evaluation of integrated teaching method; using Kirkpatrick's evaluation method to assess students' satisfaction, their learning and change in their behaviour as an impact of this method. Material and Methods: Kirkpatrick's model involves four levels of criteria – Reaction, Learning, Behaviour, and Results. In present study, the evaluation of integrated teaching method was done up to its 3rd level only. Standard questionnaire for students' feedback, pre and post tests scores for assessment of knowledge, and application of this knowledge assessed through university examination results; were the tools used for evaluation. Result: 75% – 90% of the students rated good, better, best, for their perception about teaching & learning by integrated teaching; while 10%-25% students rated poor & satisfactory for their perception about teaching & learning by integrated teaching. Students' performance was significantly raised in all the three post tests than those of the pre tests. ($p < 0.000$) Conclusion: This evaluation is helpful for us to ascertain achievement of intended objectives from the integrated teaching method.

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Key Words: Integrated teaching, Kirkpatrick's evaluation model.

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Introduction: Integration in education can be defined as coordination of different learning activities to ensure the harmonious functioning of educational process¹. An integrated approach permits students to explore, collect, process, refine and present information about topics they want to investigate without limitations imposed by conventional subject barriers" An integrated teaching allows students to engage in purposeful, relevant learning². This method simplifies basic sciences without needless details and taught along with clinical sciences.

To meet the requirements of undergraduate medical students and to stimulate their cognitive learning we were conducting horizontal & vertical integrated teaching for the first year MBBS since last 5 years (Since 2012-13) at our institute, Bharati Vidyapeeth (Deemed to be University) Medical College & Hospital, Sangli.

Faculties from department of Anatomy, Physiology, Biochemistry and Medicine were involved in this horizontal and vertical integrated teaching method to impart the knowledge with a holistic approach. What is deemed important is to evaluate this teaching method is to confirm the achievement of objectives set as per the curriculum. Evaluation is the core element in

designing and implementing any educational program, whether it is at national level or a course at college level. Good educational programs are dynamic in nature and should be regularly revised³. In this context we planned the evaluation of integrated teaching method in the year 2017-18; using Kirkpatrick's evaluation method and worked accordingly with the following objectives:

To assess the students' satisfaction for integrated teaching program which is the evaluation at first level of:

1. Kirkpatrick's model, using questionnaire based on DREEM.
2. To assess the learning of the students by integrated teaching method - evaluation at second level of Kirkpatrick's model. with the help of test questionnaire based on case based scenario.
3. To assess the change in the behaviour of students - evaluation at third level of Kirkpatrick's model, using their performances in formative and summative assessment.

Material and Methods:

- Study Design: Descriptive study.
- Study Duration: One Year

- Study Subjects: First year MBBS students
- Study Tool: Kirkpatrick's Evaluation Model⁵.
- Inclusion Criteria: First year MBBS Students willing to participate in the study with written consent.
- Study Place: The study was conducted at BVDUMC&H, Sangli, after taking the permission from IEC & informed consent from students.

Structure of the Program: Interdepartmental co-ordination committee was formed which included one professor and HOD from all the departments from basic sciences; along with a faculty from Medicine. Overall program was structured, organized, implemented and evaluated in coordination with all these departments.

The three topics and the schedule for Integrated teaching was as follows.

Date	Topic	Coordinator Dept.
31/01/2018	Coronary Circulation	Physiology
14/02/2018	Liver	Anatomy
28/02/2018	Pancreas	Biochemistry

This Program Organized In Two Steps:

- Didactic lectures by Anatomy, Physiology and Biochemistry in a same time frame.
- Presentation of case scenarios by the group of students, for the relevant topics followed by open discussion among the students and all the faculties including Anatomy, Physiology, Biochemistry and Medicine.

Pre test was conducted 3 days after the didactic lecture. Post test was conducted 3 days after integrated teaching.

Evaluation of Program: 1. Evaluation of Level 1- 'Reaction' was evaluated with the help of student's feedback with standard set of questionnaire based on DREEM⁴. Ranking for this

is based on the Likert's scale to know what students think about the integrated teaching method. This questionnaire also gives idea about the usefulness of the integrated teaching method for the students' learning.

2. Evaluation of Level 2 – 'Learning' by the students with the integrated teaching-learning was evaluated by the pre test and post test which includes questions based on relevant case scenarios for each topic. Comparison of the performance between these two tests will explore what student learnt. Total 20 marks tests were conducted.

3. Evaluation of Level 3- 'Behaviour' was evaluated by comparison of the performance of the students between formative and summative assessments. This gives information about change in the behaviour of students few months after the learning. Case scenario based questions, clinically relevant short questions were asked in summative examination.

During the phase I MBBS, evaluation of fourth level is not possible. In this context, we evaluated integrated teaching up to the first three levels only.

Feedback questionnaire was used to obtain faculty views about this integrated teaching program.

Statistical Analysis:

- For feedback - Positive and negative responses were evaluated from students' feedback - Five point Likert's scale, as percentage.
- For Comparison between marks achieved in the pre and post tests - Student's 't' test was used.
- Faculty feedback used to find out the acceptability and feasibility of the program; by using a five point Likert's scale, as percentage.

Results:

Gender Wise Distribution Of Students

Total no. of students	Male	Female
150	72	78

Table: 1 Shows Students' Perception about teaching & learning by integrated teaching - 75% – 90% of the students rated good, better, best (3, 4,5 respectively – Likert's scale) for their perception about teaching & learning by integrated teaching; while 10%-25% students rated poor & satisfactory (1,2 respectively- Likert's scale) for their perception about teaching & learning by integrated teaching.

Table: 2 Shows Students' perception about organization of integrated teaching program – 83% - 88% of the students rated good, better, best (3,4,5 respectively- Likert's scale) for organization of integrated teaching program; while 12% - 17% students rated poor &

satisfactory (1,2 respectively- Likert's scale) for their perception for organization of integrated teaching program

Table: 3 Shows Questionnaire for Faculty Feedback - 88 – 99% of the faculty rated good, better, best, (3, 4,5 respectively- Likert's scale) for the impact or effectiveness of integrated teaching on student learning.

Table: 4 Shows Students' performance was significantly raised in all the three post tests than those of the pre tests (p<0.000).

Table No. 1 - Students' Perception About Teaching & Learning By Integrated Teaching:

Q. No.	Question	Ranking (1+2)	Ranking (3+4+5)
1	I am encouraged to participate and learn in integrated teaching sessions	16%	84%
2	Integrated teaching is often stimulating	15%	85%
3	Integrated teaching helps to develop my competence	19%	81%
4	Integrated teaching is well focused	16%	84%
5	Integrated teaching helps to develop my confidence	16%	84%
6	Integrated teaching over emphasizes factual learning	18%	82%
7	Integrated teaching made me clear about the learning objectives of the topic	19%	81%
8	Integrated teaching encourages me to be an active learner	18%	82%
9	Long term learning is emphasized over short term learning	23%	77%
10	I am confident about passing	10%	90%
11	I feel I am being well prepared for my first year examination	15%	85%
12	I am able to memorize all I need	25%	75%
13	My problem solving skills are being well developed here	14%	86%
14	Much of what I have to learn seems relevant to a career in healthcare	12%	88%
15	I am now confident about my learning, understanding and application of basic sciences pertaining to related topics	13%	87%
16	I feel, I am able to apply concepts of basic sciences and integrate new scientific knowledge rationally to solve clinical problems presented by patients	17%	83%
17	I enjoyed the integrated learning	19%	81%
18	Integrated teaching is good to create an interest in the study	20%	80%
19	I enjoyed teamwork during preparation and presentation of a case study	13%	87%
20	I feel confident to communicate with my classmates and teachers because of this program	15%	85%

Ranking – 1 - Poor, 2 - Satisfactory, 3 - Good, 4 - Better And 5 - Excellent.

Table No. 2 - Students' Perception About Organization Of Integrated Teaching Program

Q. No.	Question	Ranking (1+2)	Ranking (3+4+5)
1	The teachers provided constructive criticism	17%	83%
2	The teachers gave clear examples	12%	88%

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3	The teachers were well prepared for their teaching sessions	16%	84%
4	The integrated teaching was well scheduled	14%	86%
5	Integrated teaching makes learning easier, when a topic taught at the same time by all three subjects, instead of at different times by different departments	13%	87%
6	Integrated teaching made the learning objectives clear and helped to explore the relevance of basic sciences	16%	84%

Ranking – 1 - Poor, 2 - Satisfactory, 3 - Good, 4 - Better And 5 - Excellent.

Table No. 3 - Questionnaire for Faculty Feedback

Q. No.	Question	Ranking (1+2)	Ranking (3+4+5)
1	Integrated teaching makes learning easier, when a topic taught at the same time by all three subjects instead of at different times by different departments	1%	99%
2	Integrated teaching makes the learning objectives clear and help to explore the relevance of basic sciences	3%	97%
3	Integrated teaching is well scheduled	1%	99%
4	Integrated teaching time is put to good use	10%	90%
5	Integrated teaching is good to create an interest in the study	4%	96%
6	Students felt confident to communicate with their classmates and teachers because of integrated program	12%	88%
7	Students were able to apply concepts of basic sciences and integrate knowledge to solve clinical problems after this program	1%	99%
8	Students were confident about learning, understanding and application of basic science principles after this program	5%	95%
9	Integrated assessment of students with case scenario based questionnaire was most useful	3%	97%
10	Co ordination and group activity during planning and implementation of integrated teaching program was appreciable.	2%	98%

Ranking – 1 - Poor, 2 - Satisfactory, 3 - Good, 4 - Better And 5 - Excellent.

Table 4 - Performance Of Students In Pre And Post Tests Of Three Topics Of Integrated Teaching

a) Coronary Circulation

Test	Mean Score ± SD	paired t	Significance
Pre test	7.61 ± 3.24	-11.914	0.000
Post test	10.16±3.23		

b) Liver

Test	Mean Score ± SD	paired t	Significance
Pre test	8.10 ± 2.53	-29.995	0.000
Post test	12.19 ± 2.64		

c) Pancreas

Test	Mean Score ± SD	paired t	Significance
Pre test	7.66 ± 2.89	-24.874	0.000
Post test	11.07 ± 3.52		

Open Feedback Of Students:

- The points which were not clear in classroom those were cleared during integrated teaching.
- Eye opener about clinical experience & importance of strengthening concepts of first MBBS.
- Great efforts by all teachers to guide us.
- Helps to grasp the knowledge fast, and cleared concepts.
- This does provide a better insight for learning but hospital visits along with this will be more helpful as visual memory makes learning clear.
- This program helped me in developing my speaking & presenting skills.

Discussion: Previously from last 5 years we were conducting horizontal and vertical integrated teaching for first year MBBS at our institute,

Bharati Vidyapeeth (Deemed to be University) Medical College and Hospital, Sangli. Responses from faculty as well as students were good for this program. But in order to achieve intended learning objectives, the evaluation is essential. Hence we evaluated the integrated teaching method by Kirkpatrick's evaluation model. Kirkpatrick's evaluation model is used for analyzing and evaluating the result of educational program. It is based on four levels of criteria.

Levels 1 Reaction: Measures how student reacts to the new teaching – learning method.

Level 2 Learning: Measures if the students learnt

Level 3 Behaviour: Gives idea about how students utilize what they learnt

Level 4 Results: Decides if the teaching learning have a positive impact on students²

Evaluation of Levels 1– Reaction – Table No.1 and 2 - Evaluation of this level was done with the help of students' feedback. Majority of students (75%) opined that integrated teaching is well focused, helpful for long term memorization. 87% students felt confident about their learning, understanding and application of basic sciences pertaining to related topics. 83% of students expressed that they were able to apply concepts of basic sciences, and integrate new scientific knowledge rationally to solve clinical case based problems. They studied in group, discussed about the questions and answers, related to the case scenarios of the three topics, during preparation and presentation of case scenarios. 85% of students enjoyed teamwork.

Participating actively in all these learning processes facilitated the development of the higher levels of cognitive domain. Development of the confidence and competence is due to the achievement of the higher levels of cognitive domain through these sessions. This may be the reason why students were satisfied with this teaching method. Ofoghi⁶ et al also observed the satisfaction of participants while evaluated learning method with this model.

Students opined positively for the organization of integrated teaching program. 83% to 89% of the students responded good to excellent, for this feedback. Students appreciated teachers' support. With this teaching method, students get clear or holistic approach towards their learning and their learning get facilitated. This may be the

reason for the positive response of students for the organization of the integrated teaching program.

The percentage of students who were scored 1; as per five point Likert's scale for both questionnaire 1) for perception of learning & satisfaction and 2) Perception of organization of integrated teaching program; was very less (16%) as compared to others. This may be because; these students have not participated actively in the integrated teaching. It was common decision of the three departments of basic sciences, that we did not allowed those students to participate in this program who joined college late, after Diwali vacation.

Evaluation of Level 2 – Learning – This level evaluated what the students learned from these sessions of integrated teaching; with the help of pre and post tests for each topic. Passive transmission of knowledge fails to involve students in learning process. Retention by seeing & hearing is only up to 30%. This may lead to lowered performance in pre tests for all three topics.

According to andragogy principles, adult students learn better when they know the relevance of what they learnt. Case scenario based questions and discussions stimulate students for learning, helped students to develop their higher levels of cognitive domain. During integrated teaching, students understood the relevance of basic sciences in the clinical context. With this program group discussions happened which may motivated them for self directed learning; resulting into deep and meaningful learning. Retention rate is also more when students are involved in learning process. Repeated learning may also be one of the factors for the improved performance of the students in post test. Hence students' performance was significantly raised in all the three post tests than those of the pre tests. ($p < 0.000$). Poujahromi⁷ et al used Kirkpatrick's evaluation model for a study and the results of their study are in line with our study.

Evaluation of Level 3 – Behaviour – This level of evaluation gives idea about how students utilize what they learnt. For evaluation of this level we used data from formative and summative assessments. The last session of integrated teaching from all the three, was five months

before the University examination. So the result of summative assessment gives the idea about the change in the behaviour regarding their knowledge and its application. There was a marked improvement in the performance of students and reduction in the number of failed students, in summative assessment than the formative assessment. Passing was improved for all the basic science subjects. Retention due to active learning and consequent memorization; the newly adopted method of learning i. e. self directed learning with group discussions may be helpful for them in preparation of the final examination and therefore their performance in summative assessment improved markedly. Heydrai⁸ et al also observed similar changes in his study, which support our results.

Evaluation of Level 4 - Results – At this level Kirkpatrick's evaluation model measures the application of knowledge at the time of actual working. We cannot evaluate this at first year MBBS. We evaluated integrated teaching program, up to the three levels of Kirkpatrick's model only.

Satisfaction of students as well as faculty for this teaching method; better learning by the students and significant change in the behaviour of the students; all these results of evaluation suggest that integrated teaching method is the suitable method to achieve learning objectives as per the new curriculum.

Faculty feedback – 99% of the faculty thought that this method made learning easier to the students when topic was taught at a time in all departments of basic sciences instead of indifferent bits at different time with unwanted repetition. 95% of the faculty opined that integrated teaching makes learning objectives clear to the students and helped to explore the relevance of basic sciences, session was well scheduled with a good interdepartmental discussions. 96% faculty felt that this teaching method is helpful to create interest in the studies of the students, problem based discussions during the session were most useful. 98% faculty expressed that the coordination & group activity during planning & implementation of integrated teaching program was appreciable. This feedback supported the continuation of such types of sessions in the future also. As this program was continued from last five years, faculty now

realized the advantages of this teaching method. So majority of faculties including Medicine department expressed positive responses for this program.

Conclusion: Integrated teaching for first year MBBS at our institute evaluated by Kirkpatrick's evaluation model gave the better idea about the students' satisfaction, their learning and their ability to apply what they learnt. Faculty feedback was also supportive for this teaching method. So this evaluation was helpful for us to ascertain achievement of intended objectives from the integrated teaching method. With this evaluation now we can effectively continue the integrated teaching as a routine teaching method. It proved importance of integrated teaching in medical education.

Limitations: Phase I MBBS students did not allowed for actual encounter with patient; integrated teaching was used to make them aware about the clinical application of basic sciences. At this stage of their education we also could not find out how they work at the time of actual practice as a clinician. So in this context, we evaluated integrated teaching up to first three levels. We did not evaluate the fourth level of Kirkpatrick's evaluation model.

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