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Original Research Article

“Classes beyond the walls” – A reexploring method of teaching in ayurveda education over conventional approach

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ABSTRACT

Background: Gurukula system of Ayurveda education is a complete comprehensive approach. Institutionalization of this traditional system of education has its own limitations. Though the Ayurveda education is been institutionalized, some part of it deliberately needs to be learnt in real platform, in an integrated way to make learning process more engaging and relevant. Conventional method of teaching (CMT) has its own limitations and adoption of innovative methods is need of the hour.

Methods: Study was conducted on II Professional BAMS students in two groups: classes beyond the walls (CBW) group and CMT group. Integrated collaborative CBW teaching in medicinal plant garden and CMT in regular classrooms of institutional set up were conducted. Comparative learning experience was assessed based on open ended questionnaire. The effectiveness of CBW teaching was evaluated using five-point likert scale. Pre and Post tests were conducted using a google forms comprising of ten subject related questions to compare learning outcomes. Analysis of statistical parameters were done using SPSS software (Between the groups Mann - Whitney U test and within the groups Wilcoxon matched pairs signed rank test).

Results: The learning significance within the both groups are demonstrated by the statistical findings based on the pre and posttest scores. Pretest scores between the groups are not significant with a P value 0.76, however the posttest results between the groups demonstrate a substantial learning improvement with a P value of < 0.0001.

Conclusion: This demonstrates learning beyond the class is an important supportive component along with conventional method.

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1. Introduction

Education in Ayurveda since its inception is a complete comprehensive approach rather than mere teaching and learning in an artificial set up of classrooms. This can be substantiated with the age old, time tested and efficient methods of teaching and learning mentioned in Ayurveda. It was imparted by “Gurukula” system of education. ‘Guru’ or efficient guide [1] for learning used to live with his family in a place called as “Gurukula” which was amidst of nature and trained the aspires of Ayurveda with flawless concepts (Siddhanta), experiments (Yogya karma) [2] and discussion forums (Parishads) [3]. This, surrounding nature was the real platform to

learn Ayurvedic proficiency in its whole. Here the raw materials for the preparation of Ayurvedic medicines were familiarized with their identification, collection, preparation and uses. But, this traditional system of education is also not an exception to get institutionalized and restricted its learning platform with available infrastructure, educators and modern technological tools. Though the Ayurveda education is been institutionalized based on present needs, some part of it deliberately needs to be learnt with the nature. To meet the desired levels of learning, teaching theoretically within four walls is not sufficient.

Learning does not only take place within the four walls of the classroom. As a matter of fact, learning can also occur with the nature. This can help students to actively involve in the leaning activity which in turn will enhance their knowledge and change their attitude towards learning. This will lead to further personal development and greater self-esteem.

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To make students to understand and learn, it is very important to create interest for learning in them. Student's involvement means the degree of attention, focus, interest, confidence and desire that students show while learning or being taught. Normal attention span of students during the lecture is about 10–15 min. Initially the concentration will be at high and after 15 min it substantially declines, which was evident from the past research work [4]. When students are engaged with the lesson in a real learning environment, they involve actively, they learn more and retain more [5]. Students who are engaged in the work tend to persist more and find joy in completing the work. J Narayan also emphasized, if the teaching is real platform (hospital/clinical) oriented, then students remember well, which eventually leads to better outcome [6].

Ayurveda graduates being in professional course need to be much involved in the learning. But many times, due to present disruptive technologies or monotonous lectures or any other reason students tend to loose interest thereby they fail to understand the concepts or fail to learn the skills even in practical classes [7]. This is observed in conventional closed wall teaching where students are passive. On the contrary if the students are involved and made an active learner then they will learn with great interest and enthusiasm. That's why teaching must include innovative practices that fulfil all three domains (Cognitive, Psychomotor and Affective) of learning.

Finding innovative methods of teaching is a crucial task. 'Classes beyond the walls' (CBW) is one such innovative method practiced on trial basis for II Professional BAMS students.

2. Objectives

2.1. Primary objectives

To develop teaching method, which includes, skillful activities and multisensory interaction in a real platform to enhance learning outcome at graduate level of Ayurveda education.

2.2. Secondary objective

To compare learning outcomes of CBW method of teaching with Conventional method of teaching (CMT).

3. Materials & methods

CBW of teaching and CMT were experimentally trialed in two groups: CBW and CMT respectively. Population for this exercise were the students of second professional Bachelor of Ayurvedic Medicine and Surgery (BAMS) The participants were randomized and grouped into two equal groups of 50 students each. Random sampling by lottery method was used to select and assign the participants in two groups. The study sites were Medicinal plant garden, Bumbarga and Institutional teaching set up; KAHAR's Shri B.M. Kankanawadi Ayurveda Mahavidyalaya, Belagavi

respectively. The whole exercise was carried out by four subject experts: two from *Dravyaguna* and two from *Rasashastra* and *Bhaishajya kalpana* department with two supporting staffs on a scheduled day.

3.1. Teaching methods

CBW is an innovative methodology developed by interdepartmental collaboration for a new syllabus topic not covered in regular schedule. It differs from customary outdoor demonstrations or workshops that are often carried out independently by each department. Like *Rasashastra* and *Bhaishajya Kalpana* department conducts routine practical or pharmacy visits, and *Dravyaguna* department conducts field trips or herbal garden visits. The teaching here is integrated within and between the departments. The chosen topics were dealt one after the other immediately, which otherwise dealt by two departments in their own pace (Unitized Syllabus) and Pattern (Theory/Practical) without any link within (Theory and Practical) and between (Drug collection and Drug preparation) the departmental topics. Within the department conventional method makes the learner feel new to the learnt theory topic at practical or demonstration time. Between the departments lacks with continuity of topics and outcome. But, integrated teaching method helps the learners for proper application of learnt knowledge of one subject to understand its relevance in another subject for a better end outcome. Thus CBW method blends two departmental topics in all three domains of learning in a real platform on same day of teaching learning exercise. Designing of CBW was done by discussion with faculty members, stakeholders and peers. Execution of the same was done after approval from Department of Ayurveda Medical Education (DAME) and head of the Institute. This innovative teaching methodology was compared with CMT to know effectiveness between them.

3.1.1. Classes beyond the walls (CBW)

CBW group of students were taken to the 12 acres Bumbarga medicinal plant garden on the scheduled day. The garden is located 15 km from the teaching facility. Large-scale medicinal plant cultivation is done in this garden in order to supply the institutional teaching pharmacy that produces Ayurvedic medicines. The garden has the fundamental infrastructure, while other necessary materials were carried to the site. After arriving, the students joined in the scheduled activities (Table 1). Two subject experts from each department led the entire exercise. The CBW activity began with icebreaking into five teams of 10 students (Fig. 1). Students were instructed to continually call out one to five digits, and those who called similar numbers were categorized into individual group.

3.1.2. Drug collection

Dravyaguna experts briefed the lecture on the concept of collecting raw drugs, technique and safety measures. An activity including coordinated hand movements that represented the seasons for the seasonal collection of various medicinal plant portions

Table 1
Showing CBW schedule.

Duration	Schedule	Methods
30 Minutes	Ice breaking, team formation	Group Activity
30 Minutes	Drug collection	Theory
30 Minutes	Depiction of seasons	Group Activity
02 Hours	Raw material identification and collection	Hands on training
30 Minutes	Drug Preparation	Theory
02 Hours	<i>Kwatha</i> (Decoction) and <i>Ksheerapaka</i> (Milk based decoction) preparation	Hands on training
30 Minutes	Role play of therapeutic application of prepared medicines	Group Activity
30 Minutes	Feedback and Group Discussion	



Fig. 1. Icebreaking for team formation and Plant worshipping

helped to better familiarize the students with this subject topic. The learnt knowledge was applied with the skills of drug collection for the specified drugs: like stem of *Guduchi* (*Tinospora cordifolia* Linn), root of *Rasna* (*Alpinia calcarata* Roscoe) (Fig. 2), rhizomes of *Shatavari* (*Asparagus racemosus* Willd.) and barks of *Nimba* (*Azadiracta indica* A. Juss Pennel) and *Ashwatthha* (*Ficus religiosa* Linn.) (Fig. 2) by five individual teams respectively.

3.1.3. Drug preparation

The second class, which began after lunch, was about using the gathered raw ingredients to make medicines. It started with a theoretical overview of the *Kwatha* (decoction) and its *upakalpana* (Similar subset of preparations) by a subject expert in *Rasashastra* and *Bhaishajya Kalpana*, with reference to drug proportion, method of preparation, *siddha lakshana* (end points), dose, *anupana* (adjuvant), and therapeutic application. Each of the five teams individually participated, by hands-on expertise using *Guduchi Kwatha* (Decoction) and *Shatavari Ksheerapaka* (Milk-based Decoction) (Fig. 3). Following this, group wise role

play activities were conducted by doctor patient scenario to assess the ability of students to advise the method of drug preparation and dose of medicine. This activity helped to evaluate their communication skills and ability to apply practical knowledge gained.

3.1.4. Conventional method of teaching (CMT)

CMT group of students were engaged with regular pattern of class room teaching followed by practical sessions in institutional herbal garden and department practical lab as per the schedule (Table 2). In this, the 50 students were again divided into two batches (Batch 1 and Batch 2). Batch 1 students were engaged by *Dravyaguna* department for 1-h theory class followed by 2 h demonstration in the herbal garden on drug collection. Simultaneously Batch 2 students were engaged by *Rasashastra* and *Bhaishajya kalpana* department for 1-h theory class followed by 2 h practical demonstration on *kwatha* and *ksheerapaka kalpana* in the morning session. The same schedule by both the departments was reversed between the batches in the afternoon session. This



Fig. 2. Team wise activities and Bark collection demonstration

inhouse teaching exercise was conducted by two subject experts from each department.

3.2. Assessment

The whole exercise was assessed on different parameters like learning experience, teaching method and learning outcome. The comparative learning experience was noted based on open ended questionnaire. It comprises of ten questions based on difference in learning experience, teaching schedule, personal involvement, learning environment, learning facilities, learning activities, knowledge gain, skill and attitude development. The innovative teaching method (CBW) success was assessed by structured feedback back questionnaire on five-point likert scale designed by feedback cell of Department of Ayurveda Medical Education (DAME), which is identified as one of the teachers training center by National Council for Indian System of Medicine (NCISM). In which, assertive forms of sentences based on plan of exercise and student satisfaction were given to the CBW participants in a

google form to tick appropriate options like strongly agree, agree, neutral, disagree and strongly disagree. Comparative learning gain was calculated by using pre-test and post-test google form containing ten questions specific to learnt aspects framed on knowledge, skill and attitude levels of learning domains. These tests were taken before and after both the teaching exercises. All statistical parameters were analyzed by using SPSS software. To assess the learning significance based on individual student score, between the groups Mann–Whitney U test was applied and within the groups Wilcoxon Matched Pairs Sign Rank Test was applied.

4. Observations and results

The responses of open-ended questionnaire are depicted in Table 3 can be summarized as CMT is more of compulsive, strict schedule based, monotonous, difficult to concentrate and understand. CBW teaching method was real scenario based, more inter-active, skillful, joyful, easy to understand and application oriented.



Fig. 3. Root Collection and Medicine Preparation

Table 2

Showing schedule of CMT.

Dravyaguna Vijnana Department		Rasashastra and Bhaishajya kalpana Department	
Theory (Classroom) 1 h	Practical (Herbal garden) 2 h	Theory (Classroom) 1 h	Practical- Lab 2 h
Topic	Batch	Topic	Batch
Principles and Methods of Drug collection	Batch 1 (Morning session) Batch 2 (Afternoon session)	Kwatha Kalpana and its upakalpana with their application	Batch 2 (Morning session) Batch 1 (Afternoon session)

The structured feedback questionnaire responses as depicted in Table 4 show the activity was framed with clear objectives which was evident by 98% agreement by the respondents in the feedback. It shows clear conceptualization of the activity. The roles and responsibilities of the participants were well defined with 96% agreement. This emphasizes the students were actually active learners, involved completely in the learning activity. Adequate participation in the activity was defined with 98%. This was evident

by their opinion of enthusiastic learning. Adequate cross functional participation was agreed with 88.2% and 9.8% neutral response. As team wise activities restricted the cross functional participation but cross functional observations and discussion helped to understand the practical difficulties faced by other team members. Maintenance of activity timings were agreed 94.2% with 2% disagreement because of exceeded times for hands on experience. Understanding of the concepts dealt in CBW was agreed with 100%. This is because

Table 3
Showing learning experience in open ended questionnaire on CBW and Conventional method.

Sl. No.	Open ended questionnaire	CBW Group	CMT Group
1.	How was your learning experience	Joyful and active	Learning with compulsion, No flexibility
2.	What is your opinion about teaching methods	Includes live examples, Fun and Learn activities	Monotonous limited activities
3.	What difference you experienced with your involvement in learning	Interesting, keeps the learning attitude open	Feels hectic, over burdened
4.	What is your opinion about learning environment	Refreshing, entirely different and enthusiastic learning	Strict and Compulsive
5.	What is your opinion about learning facilities	Optimum but comfortable with learning	Appropriate but not so comfortable with learning
6.	What is your opinion about integrated and conventional approach of teaching schedule	Synchronized theory and practical's help for better understanding	Theory and Practical classes learnt asynchronously
7.	Which method facilitates better knowledge gain	CBW—As concentration, acquisition and imagination are high	Maintaining concentration, throughout class is very difficult
8.	Which method facilitates better skill development	CBW—As activity-based learning makes the topic interesting and easier to understand	Very boring, sleepy and difficult to retain.
9.	Which method facilitates better learning attitude	CBW—As interaction is friendly and more scope to express	Hesitate to interact and less scope to express
10.	What is the impact of different learning activities conducted	Helps to learn leadership, team building qualities along with subject	Individual learning

Table 4
Showing structured feedback questionnaire and response of the CBW group participants.

Sl. No	Structured Questions	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1.	Objectives for this activity clearly defined	54.9	43.1	02	00	00
2.	The roles and responsibilities of group leaders/participants briefed in prior	37.3	58.8	3.9	00	00
3.	Able to participate adequately in the activity	60.8	37.3	1.9	00	00
4.	There has been adequate cross functional participation among the groups	33.3	54.9	9.8	02	00
5.	Schedules of different activities ran efficiently and effectively	37.3	56.9	2.8	02	00
6.	All activities helped you to understand the concepts clearly	58.8	41.2	00	00	00
7.	Activities gave you sufficient time for exchange of the ideas.	43.1	49	06	1.9	00
8.	Activities enhanced your critical thinking of the subject to apply it clinically	52.9	47.1	00	00	00
9.	All the activities were enough to clear your doubts and mis concepts regarding the learnt subject	51	47.1	1.9	00	00
10.	Venue and facilities for the activity were optimum	54.9	41.2	3.9	00	00

*Note: Responses are expressed in percentage (%).

of ideal blend of different teaching methods to cater diverse learners for the same topic.

Sufficient time for exchange of the ideas was defined with 92% agreement, 6% neutral response and 2% disagreement. This could be because of lead taken by some of team members during interaction. Critical thinking and practical application of the topic was agreed with 100%. This clearly states the objectives of this exercise were attained almost. Clearance of doubts and mis concepts in the dealt subject was efficient with 98.1% agreement by the respondents. This substantiates synchronous theory and practical is the better way of teaching. Lastly the venue and facilities provided for the activity were defined with 96.1% agreement as the sitting arrangements, drug preparation facilities were very basic and it was difficult to have all well set facilities at satellite farm 15 km away from teaching institution for a first time trail.

The scores of Pre-test and Post-test assessment of CBW and CMT are depicted in the Table 5. The summary of learning significance was depicted in the Table 5. In assessment of Pre-test between the groups, both the groups have not shown any significance. In assessment of Pre-test and Post-test within CBW group, it has shown significant result with P value < 0.0001. Even in assessment of Pre-test and Post-test within CMT group, also has shown significant result with P value < 0.0001. But, in assessment of Post-test between the groups, CBW group has shown significant result with P value < 0.0001 as depicted in Table 6.

5. Discussion

Traditional *Ayurveda* education was imparted initially by *Gurukula* system, which was perfect blend of theoretical and skill-based methodologies in a real surrounding nature. Due to modernization, traditional system of education got institutionalized into four walls. Mushrooming of substandard institutes, lack of efficient teachers and passive way learning by the students led to dilution of the quality of education. Now the governing bodies and experts in the field are encouraging improvements in the quality of education by comprehensive syllabus framing and strict monitoring of adherence to new teaching and learning methods. In this regard various

Table 5
Comparison between CBW and CMT before and after teaching.

Question No.	CBW		CMT	
	Pre-test	Post-test	Pre-test	Post-test
1.	17	50	16	40
2.	21	50	23	40
3.	21	49	22	42
4.	38	50	38	47
5.	21	47	20	33
6.	16	46	19	28
7.	17	47	19	28
8.	20	48	15	30
9.	23	48	21	30
10.	06	41	16	19

Table 6

Comparison between CBW and CMT before and after teaching.

Group	Pre-test Mean \pm SD	Between group difference (p value) ^M	Post-test Mean \pm SD	Between group difference (p value) ^W	Within group difference (p value) ^W
CBW	3.96 (1.4)	-0.16 (0.76)	9.48 (0.9)	2.74 (< 0.0001)	-5.52 (< 0.0001)
CMT	4.12 (1.9)		6.74 (1.7)		-2.62 (< 0.0001)

* CBW - Classes beyond the walls, CMT - Conventional method of teaching

M - Mann Whitney U test for between the group comparison

W - Wilcoxon matched pairs signed rank test for within the group comparison

teaching learning activities were planned and implemented by the higher education institutes.

Amongst that, as truly pointed by Pearson ML et al., inclusive learning can be well utilized in educational programs. Responsibility for this, however, shifting from students, who are expected to make unique connections between the coursework in different disciplines and between the classroom and real-world experiences to instructors and teaching institutions [8]. So, the curriculum design and development strategies of teaching institutions can plan such horizontal and vertical integration within and between the institution and different disciplines respectively for better learning outcomes in professional courses. In the same lines 'Ayurveda biomedicine Integration' in the subject of *Kriya Sharira*, where Joshi H. et al. says "Integration" is actually seen as a strategy for making educational experience coherent, relevant and engaging to facilitate higher order of learning [9].

It is also briefed by Kuh G. et al. in a Higher Education Report series that, any institution can improve student learning by using its existing resources more effectively. They further brief the main tasks for overcoming the artificial boundaries between in-class and out-of-class learning experiences as (a) removing barriers between different units (e.g., academic departments, administrative services, student affairs) and (b) creating situations in which students understand the connections between their studies and life outside the classroom and to apply what they are learning [10].

With this background, present study was carried out in two groups to compare innovative-integrated, CBW teaching method with CMT. In CBW group, method of teaching and learning was carried out using various methods of teaching like interactive real platform theory classes, fun learn activity, hands on experience, role play and group discussion. The entire sessions as per the schedule were enjoyed by the students. In CMT group, regular theory and practical classes were conducted as a routine schedule. Observations and results based on learning experience, teaching method and learning outcome justify that integrated real platform (CBW) teaching method was more beneficial than conventional method. Similar results were found in a research study; where out-of-class learning on 62 respondents was made to attend a conference at the parliament to experience first-hand how policies are enacted and to expose them to communication methods used at a conference. This method states that real environment, is essential to increase concentration or learning. This highlights that out-of-class learning is an important aspect in increasing student concentration, quality and satisfaction towards learning [11].

Another reported work of an education class on literacy, to illustrate the power of service learning as a humanizing, democratizing and participatory pedagogy that moves students beyond campus walls. This activity demonstrated growth of passion of their belief in what they are learning about themselves and their education. This makes to understand the bridging gap between the student posture and that of a professional [12]. The results of this study are also comparable with the present work.

6. Conclusion

This activity of CBW, with the focus of innovative teaching learning was learner centric and a fruitful exercise in comparison to CMT and learning as evident by the open-ended questionnaire. The statistical analysis based on the scores of Pre and Posttest also shows significant learning outcome in CBW group compared to CMT group with P value < 0.0001. It can be concluded that education not only occurs within the walls of classroom but occurs more efficiently in realistic scenario, as adopted in the CBW group. By going beyond the walls of classroom student get into the reality of their professionalism and understand their responsibilities efficiently. This demonstrates learning beyond the class is an important supportive component along with conventional method for at least some topics of the syllabus.

7. Limitation and scope for further study

In present study, CBW method was carried out on trial basis using limited facilities in medicinal plant farm for only one group. The similar type of Interdepartmental teaching schedules can be planned with proper establishment of demonstration room at medicinal farm for selected topics of syllabus regularly for all the students.

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Declaration of competing interest

No conflicts of interest.

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