



Perception of students and faculty toward a new curriculum based on SPICES model for dental interns

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Abstract

Clinical dental training of interns is crucial in an undergraduate program to prepare the graduates to manage patients in real-time situations. Traditional training in the 4 years of undergraduation and council regulated examinations do not facilitate learning in the intended manner. Competency-oriented education for health-care training by evaluating the trainee in all dimensions apart from just procedural skills has resulted in favorable outcomes. SPICES guidelines by Dr. RM Harden in 1984 have outlined the educational strategies for curriculum planning. The primary investigator has implemented a hybrid model of curriculum for the dental interns after approval from the ethics committee and board of studies. The curriculum was in place from the year 2017 to 2019 for the regular and supplementary batch interns of the institution. Before implementation of the curriculum and after implementation of the curriculum, two validated measurement tools were used to check the strategy of curriculum from the traditional to the SPICES approach. One was SPICES to traditional continuum and the another was a questionnaire with the SPICES components built in it. The results showed a definite shift of the components of SPICES such as student centeredness, problem based, community based, electives, and systematic. Integrated showed least change from the SPICES component. It was concluded that all the SPICES components were appreciated by the facilitators and students. Implementation challenges were mainly due to lack of trained faculty, inadequate human resources, additional time required for planning, training, and evaluation for interns group who do not have council mandated formal training and assessments.

Introduction

Dental curriculum in India needs to focus on clinical training of the students in workplace. With the rise of outcome-based education, competency-oriented systematic training with a multidimensional evaluation happens to be the need of the hour. The institutions and regulatory bodies should shift the focus of examination-oriented preparation of students to clinical-oriented training and evaluation.^[1] Dr. RM Harden way back in 1984 has identified the strategies to impart training in workplace and equip the students with necessary skills to be a good decision maker and an effective clinician.^[2] He has differentiated traditional approach to his approach by recommending a necessary shift needed from teacher centeredness to student centeredness, discipline based to integrated, information gathering to

problem-solving, hospital based to community based, standard to elective, and opportunistic to systematic. In the literature, we see lot of deliberations on such strategies.^[3-6] However, in the Indian scenario, we find that traditional system of education is still in practice. Owing to the economic situation, students may not have an exposure of rendering a better treatment plan which may be expensive. The student may choose a compromised plan with the limitations. Some institutions have implemented comprehensive clinical training of students. SPICES guidelines as proposed by Dr. RM Harden was used in the construction of curriculum for dental interns in an institution in India to evaluate the outcomes by the primary investigator. The time of intervention was from the year 2017 to 2018 for the regular and supplementary batches.

The purpose of this article is to analyze the perception of students and faculty toward the new curriculum developed for the dental interns for an institution in Puducherry.

Methods

The curriculum was developed after approval from the institutional ethics committee and board of studies. After the standard 1-year period of internship, the responses were collected in the form of consensus agreement on the SPICES strategy and questionnaire from the students. A total of 146 students participated to give the responses to the questionnaire (n = 65 control and n = 81 in experimental group). Control group is those students who were not exposed to the intervention. The experimental group is those students who received the intervention. Both the regular and additional batch of students were involved in the study from both the groups. The curriculum was approved by the institutional ethics committee and board of studies for implementation. The conceptual framework of the curriculum was a hybrid approach using SPICES strategy and a competency-driven curriculum. After implementation and before implementation, opinions were asked from the faculty and students in a structured format with the following methods.

1. The alignment of the curriculum to the SPICES guidelines from the faculty point of view was checked using the strategies outlined by Dr. RM Harden, and the facilitators were asked to think about their curriculum and were asked to position their place in the traditional to SPICES continuum on the score of one to five. A score of one is given when the approach is totally traditional and a score of 5 is given when the curriculum is completely SPICES. A set of criteria outlined by Changiz *et al.* was used to position the strategy in the SPICES to traditional strategy^[3] Before the new curriculum was implemented, the faculty who were in charge of dental interns were asked their opinion on their position on the continuum. The same exercise was conducted with the same assessors to evaluate their position on the continuum. The results were plotted on a chart on the SPICES to traditional continuum for various departments.
2. The alignment of curriculum to the SPICES guidelines from the students point of view was evaluated by pre-validated questionnaire by the same author Changiz *et al.* Tests for

content, construct validity and reliability was done to validate the questionnaire. The questionnaire was distributed among the students with consent to participate. The questionnaire had thirty questions which could be scored on a Likert scale of 1–5. (Strongly disagree to strongly agree) there were four negative scoring questions which were recorded for statistical analysis. All the questionnaires were administered to the students at the end of their course to comment on their perception on questions which indicated the six components of SPICES guidelines.

Results

Traditional to SPICES continuum: Table 1 shows the average opinion of the faculty from all the disciplines in the traditional to SPICES continuum before and after intervention of the new curriculum.

Results of questionnaire responses

The response rate of the questionnaire was 80%. The mean scores were obtained for each component before and after the intervention of the curriculum. The Score changes was significant for the ‘systemic approach component’ and ‘student centeredness’. Problem based and community based and community based and electives scored next. The integrated aspect scored the least change of mean score [Table 1].

Discussion

The overall impression of the outcomes revealed that there is a shift of the overall components toward the SPICES spectrum [Table 2]. Integration did not show much of a change in all the disciplines which may be due to lack of communication between disciplines, lack of additional time, and workforce required. The period of internship is just a mandate by the council without any assessment or training structure. The result is similar to one other workshop conducted among many Mediterranean countries on the SPICES evaluation.^[7]

In the present study, the community department carried out community-based training for students. However, there was no structured training nor assessment pattern. The institution had a strong structure of syllabus developed by the department, which

Table 1: SPICES to traditional continuum table for all six components for nine departments in dentistry

Score	Student centered	Problem based	Integrated	Community based	Electives	Systematic
5						
4				I I	I	I
3	1 III	IV		II	III	1 IV
2	1 III	6 III	3 VI	3 III	1	1 II
1	7 III	3 II	6 IV	5 III	8 IV	7 II
	Teacher centered	Knowledge based	Discipline	Hospital based	Standard posting	Opportunistic

No of disciplines denoted by Arabic numerals before intervention and Roman numerals after intervention

Table 2: Mean score of conventional batch and experimental batch and change in scores based on the results of the questionnaire study

SPICES components	Conventional	Experimental	Change
SC – Student centered	15.82	19.33	3.51
PB – Problem based	20.98	23.10	2.12
I – Integrated	13.61	15.30	1.69
CB – Community based	15.18	17.72	2.53
E – Electives	8.84	11.12	2.28
SY – Systematic	21.00	25.64	4.64

denotes a set of exercises to be completed by the students which includes family dental health plan, tobacco cessation counseling, and organization of camps apart from community service.

Electives were carried out by three departments on areas such as dental implant training for single-tooth replacements, advanced diagnostic imaging for identification of simple oral and maxillofacial lesions, and computer-aided cephalometric treatment planning for patients needing orthodontic interventions. There was difficulty reported by the other departments to organize and supervise the electives. Other departments did not provide a structured elective that could be the reason of low scores before and after intervention.

The entire course of internship had a structured protocol which was presented to all faculties with sensitization and conceptual framework of practice. The interests of the students were taken into consideration, and the skill sets were developed to be trained in a systematic manner. In the other course evaluation programs, internship training in medical schools reported that systematic training was not possible because of administrative reasons.^[7] Problem-based learning in the present curricular design may not be applicable as the 4 years of learning was traditional, and the students had preexisting knowledge of all the subjects. The application of the knowledge was trained through problem-solving classes based on the first two levels of Barrow's Taxonomy of case-based or modified case-based lectures.^[8] These classes were incorporated in the curriculum as lecture sessions conducted periodically for the interns.

It was seen in the literature that there was no ideal curricular model which exists that can be common and acceptable to all.^[9] The curriculum needs to be tailor-made to suit the needs of the students relevant to culture, health needs and educational background, and program objectives. Many programs in India and other countries believe in teacher-centered curriculum as they feel that the students are not mature enough to be involved in decision-making, planning the objectives of the program, or to choose the method of training and self-evaluation.^[7] Many traditionally educated teachers would like to have control over students.

It was also seen in the literature that more we move to the right end of the spectrum that is SPICES, the more interesting and involvement of students can be seen. All the evidence in literature support the right side of the spectrum even though

none of the medical schools have reported to be in the right end of the spectrum.^[7] There is no evidence in the literature from the dental fraternity adapting to this model. This study and the course evaluation to check the strategy can be told as first of its kind to adapt the curriculum and evaluate it in the Indian institution. Some evaluation tools take into consideration the activities and the number of hours along with the scoring in the SPICES spectrum to give a clearer picture to evaluate any curriculum.^[5] As lectures, clinical training, discussions, community training, research, or for that matter any activity should have all the elements of SPICES incorporated into it. It was also mentioned in the literature that higher SPICES score does not mean a better curriculum. There are many other learning strategies which may not be identified by the scoring patterns suggested by various authors.^[3] The ability of teachers, training underwent by teachers, lack of human resources, and inadequate infrastructure play a role in ineffective training. The identification of factors which cause deficiency of learning outcomes is more important.

The questionnaire had questions which addressed the components of the SPICES guidelines. The students were instructed to answer them based on the experiences during internship alone. They were also informed that there would be some questions which need to be reverse scored as it had negative scoring pattern. The literature has stated different approaches to check the SPICES components.^[3,5,7] The students are not mature enough to have a discussion on the educational strategies and their influence on the curriculum. Instead, the outcome indicators for each were asked of the students to rate on a Likert scale of 1–5. The set of questions which are used in the current study to analyze the strategy are from a validated questionnaire tool developed for the specific purpose. Amidst many disadvantages pointed out in the validation study, this questionnaire tool developed by the author was considered to be the only validated tool to be used for evaluation of SPICES curriculum.^[3]

However, the outcomes did not reflect the overall shift to the SPICES end of the spectrum. This may be attributed to practical difficulty of implementing student centeredness, problem-based learning, integration, and community-based training. Electives and systematic aspects are entirely in the hands of the faculty. A faculty with traditional ideologies can easily understand and impart it. Problem-based learning needs a very dynamic faculty who is trained in education technology and moderate problem-oriented learning sessions.^[10] The other side was that the curriculum was only introduced during the internship. The 4 years of training were traditional which made it impractical to apply pure problem-based learning strategy. Problem-solving classes and integrated classes were taking only as theoretical sessions. Integration as explained by Harden's integration ladder can be considered as a meticulous work up of the integration process.^[11] However, it needs lot of time spent by the faculty in developing integration across disciplines. For undergraduation, the training can be integrated and delivered by a very sensible and wise teacher

who can integrate and deliver the concepts. The particular teacher can share their lesson plans to ensure no overlaps.^[12] This could be a more practical manner of achieving integration. The attendance of the students to such classes was not 100%. Compliance to such intensive sessions by the students cannot be expected as the evaluation and systematic training are not mandated by the dental council. These challenges would be faced by any institution during internship. The absence of training also cannot be accepted as the students do not learn in depth unless and until he approaches the problem with critical thinking, problem based, and integrated approach.

In a conventional program, 4 years of examination-oriented preparation do not prepare the students to handle clinical cases. SPICES guidelines can be used to enrich the curriculum and make the learning more engaging and enjoyable experience. The challenges that Web 2–3 generation face in learning was felt as early in 1984 by Dr. RM Harden. The active learning principles harnessed in the SPICES components make it engaging and seeking relevance to clinical situations.^[13] Understanding of an institute's position in the SPICES to traditional approach would enable them to improve on the methods which could be incorporated in their curricular structure, to push toward the SPICES spectrum. Limitations should be identified, analyzed and be sought as challenges to be handled or overcome.

Conclusions

Within limitations, the following conclusions can be drawn

1. Both results from students and teachers showed a definite shift from traditional to the new curriculum based on SPICES model
2. The curricular model showed improvement from teacher centeredness toward student centeredness
3. The approach showed a shift from its earlier opportunistic approach toward more systematic approach
4. Integration showed the least change in mean score from the questionnaire and also the educational strategy exercise
5. Electives, problem-based learning, and community-based learning showed a moderate shift toward the SPICES curriculum.

SPICES educational strategy exercise, questionnaire for students along with interview or feedbacks can be done to triangulate the results to validate how far the SPICES guidelines are followed.

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