

An Innovative Framework for Evaluating Dental Specialization Training Programs: A Local Endodontics Residency Training Program

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Abstract

Objectives: Planning and evaluation are highly interrelated in the cycle of ongoing improvements in dental specialization programs. The aim of this study is to look at the Saudi Board of Endodontics (SBE) program to see if it might benefit from applying an evaluation framework specifying processes and outcomes, identifying measures, and developing an appropriate description for the program.

Methods: Stufflebeam's context, inputs, process and product (CIPP) evaluation model, a management-oriented approach, was applied.

Results: The CIPP model indicates what may be key components for assessing the processes and contents of the program under study, and for making pedagogical improvements. The framework consists of a program's rationale, evaluation questions, codes of behavior, evaluation models, and possible issues for evaluation.

Conclusion: The systematic use of the CIPP evaluation framework highlights a number of challenges that may put the sustainability of programs at risk. It also provides suggestions to overcome any ongoing issues accompanying the process of implementation. Utilizing such versatile models may be of benefit to similar training programs, and should be considered by policymakers.

Keywords: Curriculum, Program Evaluation, Endodontics, Dental Education

Introduction

Planning for medical, dental or other allied health sciences programs is a complex process that involves several phases. Evaluation is an integral part of the process, and both planning and evaluation are highly interrelated in the cycle of ongoing improvement (Figure 1). The methods used for curriculum development are essentially the same as for evaluation, whether in specifying target processes and outcomes, developing or identifying measures, or developing program descriptions; therefore, it is expected that program developers and educators constantly evaluate their products as an ongoing process for optimum outcome obtainment [1]. However, to carry out a robust evaluation, its main purposes first need to be determined.



Figure 1: The Health Education Cycle (Adopted from LIU Brooklyn)

[Ref: LIU Brooklyn. MPH 740: Program Planning, Implementation and Evaluation: at: <http://liu.brooklyn.libguides.com/mph740>. 2017.]

Many studies have presented different reasons to undertake evaluations. Vedung (2009) suggested that evaluation can render judgments about the merit of certain programs, policies or products [2]. Worthen (2004) referred to the power of evaluation in assisting policymakers to change their structures, initiate new programs, or keep on as before [3]. Torres and co-workers stated the influence of evaluation on improving overall performance by instilling new insights and meanings into ways of thinking [4]. Braverman, et al. (2004) focused on the impact of evaluation processes on societies, where they can foster justice and equality, the alleviation of social problems, and the meeting of human needs, achieving “social betterment” [5]. The purpose of the current evaluation is to demonstrate in a local context how dental specialty training programs may benefit from applying evaluation frameworks.

Methods

Selecting a Unique Case Study and Choosing a Suitable Evaluation Framework

The Saudi Board of Endodontics (SBE) program, also known as The Saudi Specialty Certificate in Endodontics or SSC-Dent (Endo), was selected as a case study to apply Stufflebeam’s CIPP evaluation model (Figure 2) [6]. The SBE is a postgraduate dental specialty, a clinical residency program concerned with the morphology, physiology and pathology of human dental pulp and related periradicular tissues. Its studies and practice cover the basic clinical sciences, including the biology of normal pulp and the etiology, diagnosis, prevention and treatment of diseases and injuries of the pulp and associated periradicular conditions. The program requires four years of full-time candidature; i.e., from R1 to R4; and has been designed to satisfy the needs of those aiming for an accredited specialization in clinical endodontics. The program structure includes participation in formal lectures and seminars, and book and literature reviews [7]. The educational sponsorship and setting involve institutions that have overall administrative control and responsibility for conducting the program. A governmental or private training center can only offer training after being accredited by the Saudi Commission for Health Specialties (SCHS). A brief outlining recognition procedures and rules are published on the SBE website. The SBE is one of several clinical residency programs offered and recognized by the SCHS, and is promoted by the Saudi Endodontic Society [7].

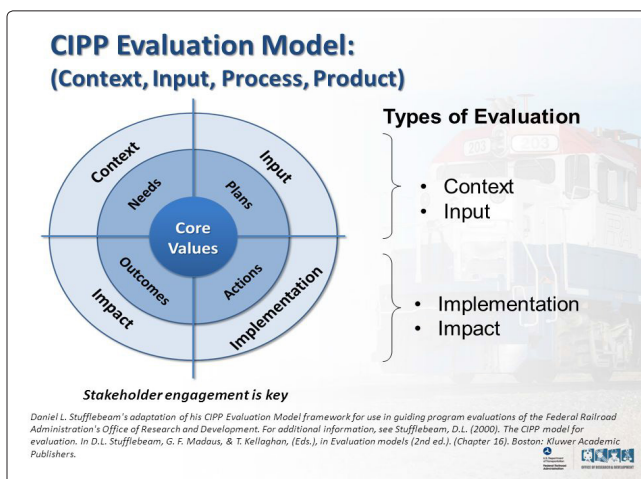


Figure 2: The CIPP Evaluation Model

[Ref: Stufflebeam, DL. The CIPP model for evaluation. In: Evaluation models: Springer; 2000.]

With regard to which framework to apply, it was difficult to prioritize one over another, but a final decision was made after comparing and contrasting evaluation approaches discussed in the literature. Generally, five categories of approach are defined by Morell (2013): the objective-oriented, management or decision-oriented, consumer-oriented, participatory-oriented, and expertise-oriented approaches. The authors hoped to achieve maximum educational benefits from the method chosen to evaluate the SBE program, and opted for a management-oriented approach, originally developed mainly for educational evaluation, the primary reason for conducting this research [8]. The CIPP framework, one such management-oriented approach, offers valuable advantages over other methods. The CIPP model is logical, practical and widely applicable [9]. Specifically, it names key components to be used to assess a program’s process and content and to indicate room for pedagogical improvements. The CIPP model was applied to the SBE program as a study case, and is presented here under five topics: rationale, evaluation questions, codes of behavior, evaluation models, and possible issues for evaluation.

Rationale

Context Evaluation

The SBE program was founded in 2006, designed for graduate dentists who intend to specialize in endodontic treatment. It is a four-year, full-time program. The board’s scientific committee initially intended to review the program’s outcomes annually, but no analysis has been made public to date. As it is now twelve years old and has produced a number of certified postgraduates, applying an innovative framework that offers continuous assessment may assist the committee in determining the effectiveness of the program and identifying areas where improvement is desirable.

Inputs Evaluation

The training and assessment of SBE trainees is undertaken by governmental institutions and private training centers that have been accredited by the SCHS [7]. Accreditation is based on specific standards that must be reached by each candidate, and ideally, annual assessment of how well the training centers teach to these standards would be undertaken. Candidate selection is governed by general criteria established by the scientific committee, and includes certification, registration of the dentist at the SCHS, and passing program enrolment tests and interviews [7]. Until June 2018, No data available about the exact number of applicants or certified Endodontists in Saudi Arabia; this is also true for the number of dentists who apply, accepted, or graduated from the program each year. The selection process could benefit from more transparency, and the provision of guidelines to applicants about the selection criteria before they apply.

Process Evaluation

The SBE program includes compulsory participation in formal lectures, seminars, book and literature reviews, incorporated with intensive clinical training and practice [7]. The theoretical segments expose trainees to a variety of basic sciences related to endodontics, but the intended learning outcomes related to these activities and how they may be beneficial is not clearly disclosed. This may be in part due to the broad nature of the program and the unspecified focus of the curriculum for each year. In contrast, the practical part is considered by many the more powerful component. The objectives and technicalities of this component are better described and clearly specified in the official documents and on the SCHS webpage.

Preclinical sessions take place in the first month of the program, followed by rapidly elevated and intensified clinical training under supervision until graduation.

Nominated endodontic supervisors play a major role in observing and evaluating trainees. The cases presented by the trainees, the quality of their performances, their familiarity with treatment options, and related theoretical information are taken into account in a process of continuous assessment. This type of assessment is formative. A second form is more summative, and comprises the annual comprehensive oral and written examinations in basic science and various field subjects held at the end of each year. In addition, a Part I (or Promotion) exam is held after the first year and each candidate requires the approval of the program scientific committee in order to progress. Part II (or the Graduation Exam) is held after the completion of four years of training, fulfilling the pre-specified clinical requirements and also requiring final approval from the program scientific committee [7]. In between, it is only logical to demand continuous monitoring, evaluation and quality assurance measures for these assessment methods in order to improve and strengthen the final outcomes of the program.

Products Evaluation

The short-term outcomes of attending the SBE program are four: providing sufficient content understanding to develop proficiency in clinical endodontics; providing each candidate with opportunities to present, discuss and argue their treatment modalities; providing a deep understanding of the basic/ biomedical sciences relevant to the theory and practice of endodontics; and clarifying the fundamentals of conducting research, critiquing and publishing [7]. Appropriate evaluation is required to determine the extent to which these objectives are being met.

The golden objective of the program is to develop skillful clinicians capable of delivering advanced and complex endodontic care at a high level of quality and sophistication [7]. Providing safe and effective treatment for different endodontic complications, and confident management of medically compromised patients are also non-negotiable endpoints. In addition, the program is intended to improve trainees' ability to understand and undertake fundamental research skills, and provide them with opportunities to teach undergraduate and graduate students. It is important to assess the skills and knowledge acquired by course graduates in relation to current and future needs [10]. Although a focus on clinical training may provide more technical experience for candidates, care must be taken to fulfil other important standards, such as meeting the needs of the local community and paying attention to patient centered outcomes [11]. Collectively, these require more robust investigation to clarify their relative value and to measure the ways they are evaluated.

Defining the Evaluation Questions

A central part of the evaluation framework is to formulate questions under each component of the CIPP model: context, inputs, process and products. For the SBE program, Table 1 lists questions developed according to the four components of the CIPP model. Evaluation questions related to context can be answered by graduated candidates through questionnaires or focus groups, by program directors through interviews and by reviewing archived documents. Questions related to inputs can be obtained from interviews with program directors and documents archive at the SCHS. Those related process can

be addressed by trainees' feedback and focus group discussion of their clinical sessions, and by reviewing the summative assessments provided by examination papers. Questions related to products may be answered by contacting alumni, conducting patient interviews or questionnaires, and reviewing current program databases.

Table 1: Proposed Questions under Each Component of the CIPP Framework for Evaluating the SBE Program

Context (C) Evaluation	Inputs (I) Evaluation
Is the program relevant to the needs of the job?	Is the program content clearly defined?
Is the training time adequate to achieve the objectives of the program?	Is the content relevant to endodontic problems?
What important external factors have a major influence on the program?	What are the degrees of knowledge and clinical competence needed for dentists to be accepted into the program?
	What qualification do supervisors need to help students with skills acquisition?
	How many trainees are enrolled in the program?
	How many supervisors participate in the training, and how many supervisors does each student require?
	How many hospitals and institutions participate in the training?
	What are the accreditation affiliations for private centers?
Process (P) Evaluation	Products (P) Evaluation
Are supervision and training continuously evaluated?	How many trainees qualify each year and are they enough for the market?
What is the workload of trainees?	Is the quality of the endodontic treatment performed by the trainees satisfying?
Are there any problems related to supervision or training?	Are there compensatory exams for failed trainees?
What theory versus practice examination is required for graduation?	

Codes of Behavior

As part of their role and considering the power they may have, evaluators should consider codes of conduct for the evaluation, which should be negotiated with the policy makers and agreed to by both the clients and the evaluators before undertaking the evaluation [12]. As "evaluation should construct activities, descriptions, and judgments in ways that encourage participants to rediscover, reinterpret, or revise their understanding and behaviors," [13]. To discuss the codes, the next sections will cover the systematic enquiry, competence, honesty and integrity, respect for people, and responsibilities for general and public welfare.

Systematic Enquiry

Evaluators should follow a systematic method of evaluation. They should ensure the accuracy and credibility of the information collected and provided to clients. Evaluators should test and negotiate the evaluation questions beforehand to ensure that answers are understandable, and present their methodology in a way that allows others to understand and critique it [14].

Competence

The evaluators should possess skills and qualifications that give them credibility to undertake the task. For example, each might be an active member in the community of practice, with relevant qualifications, and be up to date with current research. The evaluation team is expected to demonstrate cultural competence by using appropriate strategies that work with different cultural groups. Finally, evaluators should seek assistance from field experts when needed [14].

Honesty and Integrity

The evaluators should demonstrate honesty and integrity in their behavior and for the entire evaluation in the matters of process and results' negotiation and expected limitations; they must disclose and address any conflicts of interest before starting an evaluation. They should also be explicit about the values and interests of the various groups involved in the evaluation and outcomes. They should prevent any misuse of evaluation information. If unexpected results are encountered, the evaluators should intervene to alter the evaluation or even cease the process or contact people in charge for information and clarification [14].

Respect for People

Evaluators should take into consideration contextual factors including geographic location, timing, and political and social climates. They should "abide by current professional ethics, standards, and regulations regarding confidentiality, informed consent, and potential risks or harms to participants," and seek to maximize the benefits of evaluation and reduce any harm [14]. They need to communicate with stakeholders by respecting their dignity and self-worth. Evaluation should foster social equity like, for example, matters of gender differences [14].

Responsibility for General and Public Welfare

Evaluators should include relevant perspectives of stakeholders. They should consider a whole picture of the evaluation, not just of the outcomes, be open to contradictory views, interests and benefits; they should allow stakeholders to access the evaluative information by presenting it in an understandable format. Lastly, the public interest and the welfare of the society should be taken into account [14].

Evaluation Models (Study Type)

In order to obtain a robust evaluation for the SBE program, in order to improve its structure and implementation, the recommended approaches are either mixed-method or decision- and accountability-oriented [6]. Utilizing a mixed-method study will provide opportunities for the board committee to improve the program improvement processes as it evolves and can be used to assess the program's effectiveness after the program it is evaluating has had time to produce proper formative evaluation results. Alternatively, accountability oriented studies are useful for determining the value of the results produced, by providing timely relevant information to

assist with decision-making. They can also produce accountability records and allow the production of appropriate summative evaluations.

Possible Issues for an Evaluation

Before conducting an evaluation, a few issues that might affect the authenticity and accuracy of the results should be managed or at least taken into account. One of these may be compatibility with a naturalistic evaluation or conflict in applying Educational Evaluation Standards in naturalistic or qualitative approaches. The Joint Committee on Standards for Educational Evaluation describe these standards as utility, feasibility, propriety, and accuracy [13]. Popham argues that some researchers have claimed these standards as incompatible with qualitative studies; but Popham has reported that the fundamental differences between the Evaluation Standards and the criteria of a naturalistic evaluation are few [15].

Another possible issue in evaluation is the political context. The problem here is to determine the vested interests that will be affected by the delivery of the evaluation or its findings. In order to cope with political realities, the evaluators should anticipate that the quality appraisal is not the only main factor involved in educational decisions, and should try to detect and describe the nature of the implemented vested interests by detecting the chief partisan forces in the educational milieu [15]. The U.S. education reform in 2010 that was originally adopted and supported by the U.S. political force has been addressed by opposition parties and unfortunately failed [16]. Although the new system adopted what is called "Common Core" standards and "standardized tests", oppositions claimed that this change initiates a threatening of students' privacy and undermining teachers' autonomy that can put the U.S. schooling at risk. Evaluators need to consider and expect the expanded influence of politics on evaluation.

Third, an ethical issue might arise during the evaluation. This involves the surreptitious invasion of people's privacy for the purpose of improving the quality of the program. After meeting ethics standards, to counter that, the evaluators need to engage themselves in a moral suitability analysis and solicit colleagues' feedback [15]. Other aspects that are crucial in delivering this evaluation include detecting anything that might affect evaluators' objectivity in making decisions, leading to biased behavior, specifying qualified and well trained professional evaluators, determining the degree of interaction between the evaluation team and the client, and finally, considering the human impact of the evaluation, as some people may be affected negatively by the results [15].

Discussion

This report constitutes a unique attempt to form an innovative application of the CIPP framework for the purpose of evaluating a local dental specialty program. Although no pilot study has been conducted, the framework serves as a starting point from which leaders in various decision-making positions can apply for both short- and long term evaluations of different dental specialty programs. An example could be revisiting decisions on the impact of cost effectiveness, accountability and merit of the program [17-19].

AIKathami et al. in 2012 used the CIPP approach to form a practical framework for evaluating the Saudi Diploma of Family Medicine (SDFM) program, finding overall student satisfaction with the training objectives and teaching methods [19]. The SDFM is a

two years full-time course and is being described thoroughly by the curriculum organisers in the SCHS website [20]. However, is shorter in duration when compared with the SBE that presents different outcomes. In 2016, another study assessed the SDFM program using the satisfaction of trainees as the tool for evaluation [21]. This study supported the results of Al-Khathami (2012), in that participating trainees were less than satisfied with the timing of their specialty training rotations. In-depth analyses of the findings from both studies suggest that the same issue persisted from the time of the first report until the time of the second one four years later. The persistence of a problem should motivate program directors to take steps for improvement. In this particular case, one suggestion is to extend the survey to involve the supervisory team and the medical administration, in order to look deeper into the rotation problem. In the proposed application of the CIPP framework in the current study, the main concern was the fundamental and constructive components of the program as a whole.

With regard to the application of the evaluation tool proposed here, gathering retrospective information as well as revising the current curriculum should be considered. In the proposed design of the framework, the evaluation covers different aspects related to each component of the CIPP model, i.e. context, inputs, process and products, using case-specific questions. This will ultimately aid in more effective recommendations and avoid unnecessary repetition, as occurred in the SDFM studies [19,21].

Conclusion

Dental specialty training programs are complex, important for society, and in need of continuous monitoring and evaluation in order to ensure they sustain quality and outcome. Applying a versatile evaluation framework such as the CIPP model should render the evaluation process more effective and long-sighted. The SBE program was selected as a local case study to represent potential needs and possibilities, and a brief review of the program was provided to assist with general understanding of the program. The rationale for choosing the CIPP model was outlined, followed by specific questions designed for each of its sections to apply to the SBE evaluation. The guiding principles and codes of behavior within the framework were outlined, and likely models for future evaluations were presented. Finally, possible issues that might affect the evaluation, and some solutions, were discussed.

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