

A Professional Development Program for Dental Medical Educators in Kuwait: Needs  
Assessment, Program Design and Formative Evaluation

By

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Submitted in partial fulfillment of the  
requirements for the degree of  
Doctor of Philosophy  
under the Executive Committee  
of the Graduate School of Arts and Sciences

COLUMBIA UNIVERSITY

2017

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## **Abstract**

### **A Professional Development Program for Dental Medical Educators in Kuwait: Needs Assessment, Program Design and Formative Evaluation**

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New innovative methods of teaching and learning adopted from mainstream research and development in educational theory and practice are being adapted to serve the unique needs of the medical professions. The success of these methods requires careful planning and establishment of faculty development programs. The purpose of this study is to perform a needs assessment for a faculty development program at the Faculty of Dentistry- Kuwait University, centering on Case-based learning (CBL) and Problem-based learning (PBL) methods of teaching and lesson planning, and to design and test the faculty development digital module that is based on findings from the needs assessment. The author conducted a “proof of concept” mixed methods case study to answer three main research questions. First, what are the perceptions of the current dental faculty about the need for a professional development program? Second, what are the perceptions of, and characteristics and responses to, the learning experiences by a sample of the faculty who experience learning from a set of online professional development modules? Third, what evidence is there that the set of online modules have addressed the needs of the faculty participants? This study was conducted at Kuwait University Faculty of Dentistry. A needs assessment survey was sent to all 44 members of the faculty, of which 34 faculty responded to the needs assessment. The results of the needs assessment showed that overall there was a generally positive response to all of the items pertaining to a need for professional development with 28 faculty expressing interest in participating in an online faculty development program module. However, only 15 of the 28 who expressed interest actually participated in the

online module. The results from the instruments embedded in the module showed that 87% of the participants were “satisfied with the module lesson on how to plan CBL lessons. The change in participants’ responses to the last three items of the post-instructional survey pertaining to case-based and problem-based learning was sufficiently large enough to be statistically significant. Future research expanding from this study would help to establish the foundational work to design a more substantial treatment of the various concepts covered in this study in a larger professional development program. The feedback and information gathered from the experimental modules such as used here can serve as a guide to improve and expand future program designs that encourage student-centered collaborative and transformative learning. Additional experimental research is also warranted where the novel designed products for professional development are evaluated by comparing the gains in student learning with the new methods compared to methods more typically used in traditional adult learning and dental education.

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## **Acknowledgments**

I would like to extend my biggest gratitude and appreciation to my advisor, Dr. O. Roger Anderson. Dr. Anderson is the personification of a mentor and an advisor. I can truly say without his support and guidance, this work would not have seen the light of day. In his wisdom and leadership, Dr. Anderson helped many dental students and dental professionals bridge the gap between the profession of dentistry and the art of teaching. Dr. Anderson has been my advisor from my first day at the masters program at Teachers College and throughout my time as a doctoral student in the Science Education department doctor of philosophy program. During that time, Dr. Anderson was an advisor, a mentor, and an excellent role model of the type of educator I aspire to be. I am extremely honored and grateful to have Dr. Anderson be my mentor and advisor.

I would also like to extend my deepest gratitude to Dr. Felecia Mensah whose constant guidance and feedback helped shape this work. Dr. Mensah's style of teaching qualitative research methods course has sparked my interest and passion for the field of qualitative research, and for that I am forever grateful. I would also like to thank Dr. Letty Moss-Salintijn whom I had the privilege to have as my teacher. Her generosity of spirit and compassion in teaching is truly remarkable and inspirational. I would also like to thank the entire Science Education department faculty and staff for their tireless efforts to create a productive learning environment.

Last but certainly not least, I would like to thank my family and close friends whose love, support, and encouragement helped me accomplish this work. My hope is that is work serve as a setting stone of further research in faculty development and dental education in Kuwait.

Haneen Alyaseen

## **Chapter I**

### **Introduction**

#### **Background of the Study**

The Faculty of Dentistry at Kuwait University was established by a proclamation in 1996. By 1998 the school enrolled its first class of 26 students. The Faculty of Dentistry is an institution that is expanding and developing rapidly with a focus on curriculum development, establishment of postgraduate specialties and research educational programs, and a goal to provide quality dental and oral healthcare to the nation.

During the period of 1998-2006, the Faculty of Dentistry offered a six and one-half year dental degree program that comprised three semesters of a pre-professional program that the students enroll in alongside their colleagues from the Faculty of Medicine. There are five semesters of Biomedical Sciences leading to a Bachelor of Medical Science degree (B.Med.Sc.), and finally five semesters of clinical studies and training leading to the award of Bachelor of Dental Medicine (B.D.M).

The faculty adopted a new system based on a case-triggered curriculum from student intake that was conducted in 2005 to commence in the academic year 2006-2007 onwards. This system has been adopted in collaboration with the Faculty of Medicine and is divided into three phases (I, II and III). Phase I consists of the first two semesters of the pre-professional program. Phase II of the program spans the period of the third to eighth semesters (or end of fourth year) of the dental curriculum. The students are awarded the Bachelor of Medical Sciences (B.Med.Sc.Dent.) degree at the end of Phase II. Phase III is where the bulk of clinical training occurs, and it spans five semesters or two and one-half years at the end of which students are awarded the Bachelor of Dental Medicine (B.D.M.) degree.

Major changes are taking place in dental medical education, as new and innovative methods of teaching and learning adopted from mainstream research and development in educational theory and practice are being adapted, and appropriately re-invented, to serve the unique needs of the medical professions. Among these developments are the use of modern technological teaching aids such as online learning, video-based instruction, and a variety of hybrid approaches including blended learning that incorporates traditional methods with newer student-centered learning. Among these is a flipped classroom method. In flipped classroom instruction, traditional means of introducing students to new information (such as text-based material and/or lecture formats) are combined with more student-centered learning methods such as case-based learning (CBL) and problem-based learning (PBL) (Varthis, 2016). Typically, in a flipped method of instruction, some background or essential new information is presented either in-person through lecture or by means of online resources such as pre-recorded video presentations. The next class session is devoted to active learning where CBL or PBL is used to motivate and engage the students in applying the previously learned background information to constructively address the CBL or PBL situation they are asked to discuss. These active learning situations often involve small groups of students who engage in the discussion activities and as a product create a report or a plan for a medical procedure to address the situation presented to them.

CBL and PBL are also used as “stand alone” learning methods in addition to their incorporation into a flipped classroom learning experience. As these newer methods become more prevalent in medical education, and especially in dental education, the teaching faculty is increasingly challenged to fully understand these new teaching approaches, and to be professionally educated in the use of CBL or PBL to most effectively realize the strengths that

these new methods afford. Thus, faculty professional education in use of these new methods is increasingly important. Given the need for newer ways of delivering faculty professional education, the use of online and digitally designed modules to provide readily accessible resources for busy faculty members is increasingly important. This thesis contains a report of a research study to design and evaluate a digital module for dental medical faculty professional development related to CBL and PBL methods of teaching and learning.

### **Purpose**

More specifically, the purpose of this study is two-fold: First, to perform a needs assessment for a faculty development program at the Faculty of Dentistry- Kuwait University, centering on CBL and PBL methods of teaching and lesson planning. Second, to design and test the faculty development digital module to determine its efficacy as part of a program of curricular change that is specifically designed to address the issues raised during the needs assessment.

### **Organization of the Thesis**

After this introductory chapter, a review of relevant literature and the conceptual framework for the thesis study is presented in Chapter II. Chapter III presents the methods, including the setting, participants, procedures used for the learning module, instruments and their interpretation, data analysis, and statistical procedures. Chapter IV presents the results for each research question. Chapter V is a discussion of the results and prospective future lines of further research. Appendices are provided containing an outline of the digital module topics, instruments and other documents used in the study, and other pertinent documents intended to clarify the methods of the study.

## **Chapter II**

### **Literature Review**

#### **Relevant Literature Base**

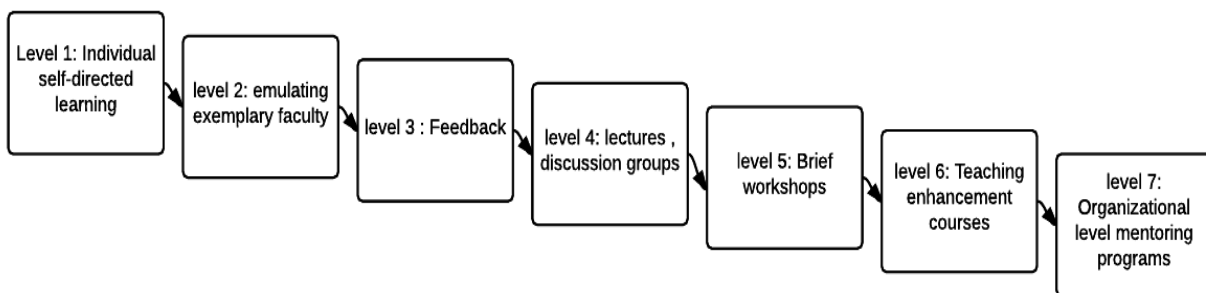
Traditionally, dental faculty are not trained as educators, and with the ever changing dental education in terms of student diversity, exposure to new diseases that students will need to address, classroom technology, and higher student expectations, faculty members have to be prepared to cope with these challenges (Sullivan, 2010). In 2001, the American Dental Association published a report indicating that the promotion of public oral health depends on achievement of several goals including integration of communication technologies into practice and responding to evolving student needs and expectations. The American Dental Association also recommends providing trained faculty to meet the challenges of curricular change. The availability and effectiveness of a faculty development program is a major predictor for success of implementation of curricular changes (Hendricson et al., 2007).

**Faculty Development.** Faculty development programs are planned programs to prepare institutions and faculty members for their academic roles including teaching, research, administration, writing/scholarship, and career management (Bland, 2000; Hendricson et al., 2007). In the past, faculty development programs were viewed as planned programs to prepare faculty for their teaching roles. In most recent years, however, faculty have been improving their skills through formal and informal professional development programs and activities.

Faculty development programs can be implemented to address several aspects of managing a dental school, including teaching and role modeling, guiding faculty through curricular changes, and patient health care and management. The scope of faculty development also involves developing research capacity, career development, and leadership development.

Faculty development programs can also emphasize or change the faculties' beliefs or attitudes regarding their roles and responsibilities. Faculty development programs can also situate faculties' intuitive performance in an appropriate conceptual framework (Steinert, 2013).

**Accomplishing Faculty Development.** Reviews of published research in the medical education field (O'Neill & Taylor, 2001; Steinert, n.d.) show that almost all faculty development strategies fit within a hierarchy (Figure 2.1) described by Ulian and Stritter (1997). Their hierarchy is composed of seven tiers of strategies that enhance teaching effectiveness of faculty, whether individually or in a group. The first level is based on the individual and is concerned with self-directed learning activities. Examples of the first level include reading, reflection, and self-evaluation. The second level includes emulating experienced or exemplary faculty. The third level is receiving feedback either through observation or videotaping. The next four levels are group strategies. The fourth level is being part of short duration lectures, discussion groups, or activities of similar nature. The fifth, sixth, and seventh levels are concerned with brief workshops, teaching enhancement courses, and organizational level mentoring programs, respectively.



*Figure 2.1.* Hierarchical levels of faculty development strategy (adapted from Ulian and Stritter, 1997).

**Importance of Faculty Development.** Methods of teaching are changing and evolving as newer evidence is gained from modern theoretical perspectives and educational research results, thus placing increasing importance on faculty development. Literature reviews conclude that faculty development as the major predictor of success of educational reform (Hendricson et al., 2007; McAndrew, 2010). Second, over the past few years dental schools have been losing a large number of faculty to private practice, and a majority of the recruited faculty are among an older generation who are ending their private practice, but do not have a good grasp of modern educational theories and teaching practices (Chmar, Weaver & Valachovic, 2006). Therefore, faculty development programs are needed to keep up with the changing faculty population through professional education of individuals who may have clinical experience but lack adequate teaching background and skills.

**Consequences of Reform Without Faculty Development.** In many instances implementation of new educational approaches or changes to a dental curriculum without faculty development has resulted in negative feedback and frustration from both faculty and students, and in some cases an abandonment of the reformed program (Licari, 2007). Another area where this has also been apparent challenges is incorporation of newer information technologies. Even with major financial investments in e-curriculum and technology learning, most faculty make minimal use and limit the use of this technology to uploading lectures and allowing students to submit their assignments online (Hendricson et al., 2004).

**Expected Outcomes from Faculty Development.** Faculty development of Dental Education is a relatively new field. The majority of the programs are based on studies conducted in the Medical Education field (Hendricson et al., 2007). In a study surveying American and Canadian dental schools, only 14% (five schools) of the schools that responded to the survey (32



schools) had offices of professional development (O'Neil & Taylor, 2001). One of the earliest published articles on dental faculty development programs was in problem based learning (PBL) in response to new initiatives at The University of Southern California School of Dentistry (USC), where they implemented a full PBL program (Dalrymple et al., 2006; Dalrymple et al., 2007). The dental school at USC was going through curricular changes to implement PBL as the primary method of instruction. In preparation for that transition, USC developed a framework to guide and help the faculty through the transition. The framework included the creation of a series of PBL core skills workshops. It is important to note that PBL is an increasingly common method of instruction in medical school education.

More generally, faculty development programs have been designed based on studies of students' perceptions of faculties' teaching effectiveness and skills, as well as studies of continuing education courses and how they affect the outcome of practice behaviors of healthcare professionals (McGrath, Yeung, Comfort, & Mcmillan, 2004). In 1984, the *Journal of American Medical Association* published an article with the title "A Critical Appraisal of the Efficacy of Continuing Medical Education" (Haynes, R.B., 1984) followed by a second review in 1992 titled "Evidence for the Effectiveness of CME: A Review of 50 Randomized Controlled Trials" (Davis, Thomson, Oxman, & Haynes, 1992). Due to its substantial exclusion criteria and review techniques, this study set the standards for subsequent outcome assessments for health profession programs (Hendricson et al., 2007). The report concluded that Continued Education (CE) programs that focused entirely on lecture-based methods had the short-term ability, as evident by pre and post-testing, to enhance the participants' wealth of knowledge. However, these CE programs were not successful in providing considerable changes in attitudes, skill levels, or confidence. Moreover, the CE programs rarely resulted in application of skills during

actual patient care.

Markedly different, but significant, outcomes were found in 14 of 50 studies reviewed by Davis et al. (1992). These 14 studies implemented a variety of active, learner-centered, and practice reinforcement techniques in addition to lectures. In many instances, they were implemented without lectures. The techniques included training seminars (e.g., Cumming et al., 1989; Linn, 1980; Mazzuca et al., 1990), educational interventions (e.g., Stross & Bole, 1980; Vinicor et al., 1987; Wilson et al., 1988) or a variety of affordances to ensure compliance with medical practices such as computerized reminders (McPhee, Bird, Fordham, Rodnick & Osborn, 1992), intensive interventions with guidelines to promote best practices (e.g., Meyer, Van Kooten, Marsh & Prochazka, 1991), and a variety of counseling sessions (e.g., Wilson et al., 1988). Some of the documentation gathered included completion of self-assessments of practice behaviors or self-review of patient records to identify practice behaviors and learning needs. They also included using algorithms to solve clinical problems, analyzing case scenarios, and using clinical practice guidelines in workshops. Giving and receiving feedback and critiques on the performance to and from other practitioners during patient care simulations were also some of the techniques used. Some of the other techniques they used included finding ways to reduce implementation barriers for practice guidelines through troubleshooting and problem solving. These studies also encouraged participants to share their opinions and concerns about new clinical techniques, and debating the merits of practice recommendations. The results of these studies showed a significant positive change in the patient care behaviors, attitudes, and confidence levels of participating physicians.

A report of Best Evidence in Medical Education Collaborative (BEME) contained a major task of reviewing available research on faculty development programs (Steinert et al.,

2006). The BEME group also provided recommendations for designing faculty development programs as well as ways to assess the outcomes of these programs based on the results of the reviewed studies (Steinert et al., 2006). To analyze and classify the findings from the reviewed studies, the BEME group used Kirkpatrick's (1997) four-level hierarchy of educational outcomes framework. The four levels of the hierarchies from lowest to highest are reaction, learning, application, and results.

The first level is the reaction. This level measures the learner's level of satisfaction of the experience, including her/his opinions and perceptions. The second level is learning that tracks the learner's changes in attitudes, knowledge, and skills. The third level of the hierarchy is behavior, which includes application of new skills and changes in practice. Fourth and highest level is the result, or the outcome, which refers to the effect of the training or faculty development program on the learner's practices, or changes of policy in an organization.

The BEME group searched approximately 3000 articles published between 1980 and 2002 in the field of faculty development. They only examined articles discussing teaching effectiveness. Studies that did not address program evaluation or those that were prescriptive in nature were excluded. This resulted in 53 reviewed studies. The review showed different programs had varying lengths, formats, and teaching methodologies or approaches (Figure 2.2). However, student-centered active learning methodologies were the most commonly used approaches. A majority of the studies used a quasi-experimental design with pre- and post-testing. Methods to assess effectiveness varied among studies with the majority using a faculty self-report approach.

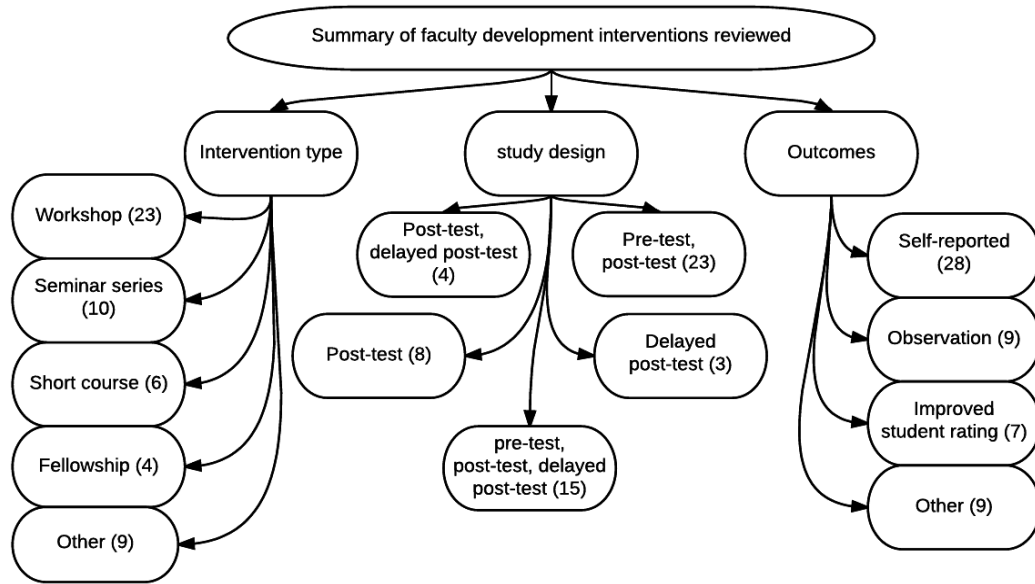


Figure 2.2. Summary of reviewed faculty development interventions.

The group used Kirkpatrick’s (1997) four-level hierarchy model to analyze the data, which showed positive outcomes for the first three levels of the hierarchy (reaction, learning, and behavior) as presented in Table 2.1. However, only nine studies reported outcome for the fourth level (results).

Table 2.1 Data Analysis Using Kirkpatrick’s Hierarchy

Outcome	Number of studies	Percentage of studies relative to 53*
Reaction	39	74%
Learning	41	77%
Behavior	38	72%
Results	9	17%

\*Percentages are reported as proportion of the total of 53 studies. Outcome levels are included in more than one study, hence the percentages are not cumulative.

Hendricson et al. (2007) summarized the expected outcomes from the 53 studies as follows:

The BEME concluded that the studies support the following outcomes that can be

expected from faculty development:

- Overall satisfaction with faculty development programs was high. The methods used, especially those with a practical and skills-based focus, were valued by the program participants.
- Participants reported a positive change in attitudes toward faculty development and towards teaching as a result of their involvement.
- Participants reported increased knowledge of educational concepts as well as specific teaching strategies and gains in skills such as assessing learners' needs, promoting reflection, and providing feedback.
- Self-perceived changes in teaching behavior were consistently reported.
- Participants reported a greater involvement in new educational activities and establishment of new networks of colleagues. (p.1,528)

**Best Practices for Online Learning Modules.** There has been considerable progress in developing theoretical and practical guidelines for developing online learning environments. The progress is reflected in the terminology used for the discipline. The recent accepted terminology has transitioned from online learning, to distributed learning, to e-learning (Dempsey & Reiser, 2012). E-learning encompasses a variety of electronic learning approaches including synchronous and asynchronous technology, distance and face-to-face learning, and learning by different modalities including online, computer-based, and blended learning. A review of the research history conducted on role of media and teaching shows the high hopes and expectations researchers had of media's effect in enhancing teaching and learning (Clark & Salomon, 1986). The literature shows that it is not the type of media that affects learning, it is the method of instruction and how it affects cognition that eventually plays a role in acquiring skills and

knowledge enhancing learning outcomes (Clark, 1994).

Keeping an emphasis on quality of instruction in mind, instructional designers use conceptual frameworks for the instructional design. These are as productive and useful in e-learning as they are in traditional learning designs (Dempsey & Reiser, 2012). Among these conceptual frameworks are Gagne’s nine events of instruction (Gagne, 1985) and the ARCS model (Keller, 1983). For example, Robert Gagne proposed a systematic approach for instructional design (Figure 2.3). His approach, which is based on a behaviorist and cognitive/information processing theories, uses sequential events or levels as an instructional design strategy (Gagne, Briggs, & Wager, 1992).

Table 2.2 Gagne’s Nine Events of Instruction

Instructional Event	Explanation
Gaining attention	External stimulus signaling start of instruction
Inform learner of the objective	Type of performance expected at the end of instruction
Stimulate recall of prior knowledge	Resurfacing relevant knowledge and skills previously learned
Present stimulus material	Present the content and “hook” of instruction
Provide learning guidance	Directing the learner’s thinking to desired outcome through different stimuli
Elicit performance	Practice learned concepts to help internalize knowledge and skills
Provide feedback	Feedback on how the learner is doing in the learning process
Assess performance	Assess learning based on previously stated learning objectives
Enhance retention and transfer	Establish generalizability of the learned concept

Keller’s ARCS is an acronym for “attention, relevance, confidence, and satisfaction.”

This series of stages is based on research on the role of motivation in learning. The theory

emphasizes that people are motivated to learn when they see value in what they are learning (Keller, 1987). Traditionally, motivation has been assumed to be a responsibility of the learner. In some cases, the motivation state has been attributed to innate tendencies, or through behavioral and psychological approaches that enhance autonomous motivation. The ARCS model was developed on the premise that the instructor and the learning environment should actively promote student motivation to learn.

The four ARCS conditions are considered essential if instruction is to be motivational and more effective. Each of the four will be considered sequentially. (1) Attention: the designed instruction must have the ability to encourage and sustain attention, a necessary step for further cognitive processing. (2) Relevance: the designed instruction has a perceived benefit to the learner, thus increasing engagement. (3) Confidence, the third condition, can be increased through the design strategies of instruction that are intended to enhance student efficacy. One strategy to increase confidence is by providing learners with goals that are achievable, but gradually increase in difficulty. (4) Satisfaction, the fourth condition, emphasizes the importance of a student sense of accomplishment. One of the strategies to fulfill the “satisfaction condition” is to encourage learners to apply a newly learned skill in real life situations with appropriate context, and with sufficient support that they realize a reasonable degree of success.

**Professional Development Models.** The foregoing review provides some general principles for improving the quality of a learning experience, but there also are specific sources of advice on how to best design and deliver instructional models for professional development. Although there are various instructional design models with different approaches, they all share certain characteristics. Most design models are systematic in process, student-centered, goal-oriented, and are sufficiently described in detail to permit valid and reliable evaluation of the

designed program (Branch & Merrill, 2012). The most commonly used model is a “linear” process ADDIE model. ADDIE is an acronym for “analysis, design, development, implementation, and evaluation.” This design may be entirely linear in its development, but often it is not. The designers typically go back and forth, cycling through the ADDIE stages as they are presented with new data or formative evaluations. Most current instructional design models are variations of the ADDIE model (Piskurich, 2006). An appropriate evidence-based and empirical approach to professional development design is particularly relevant to this thesis where one of the goals is to create and evaluate a modest, digital-based professional development module as a proof-of-concept approach for the Kuwait dental medical faculty.

Learning design models increasingly use technology or technology-supported systems. Learning can be achieved with or without technology, but not without a favorable learning environment, an essential given for all effective learning. Technology provides designers with the opportunity to create environments that are conducive to learning (Bransford, 2000), especially providing flexible, individualized, and active learning conditions. Moreover, the environments created through e-learning can readily simulate real life problems or situations to create teaching moments that may not present themselves whenever needed in real life.

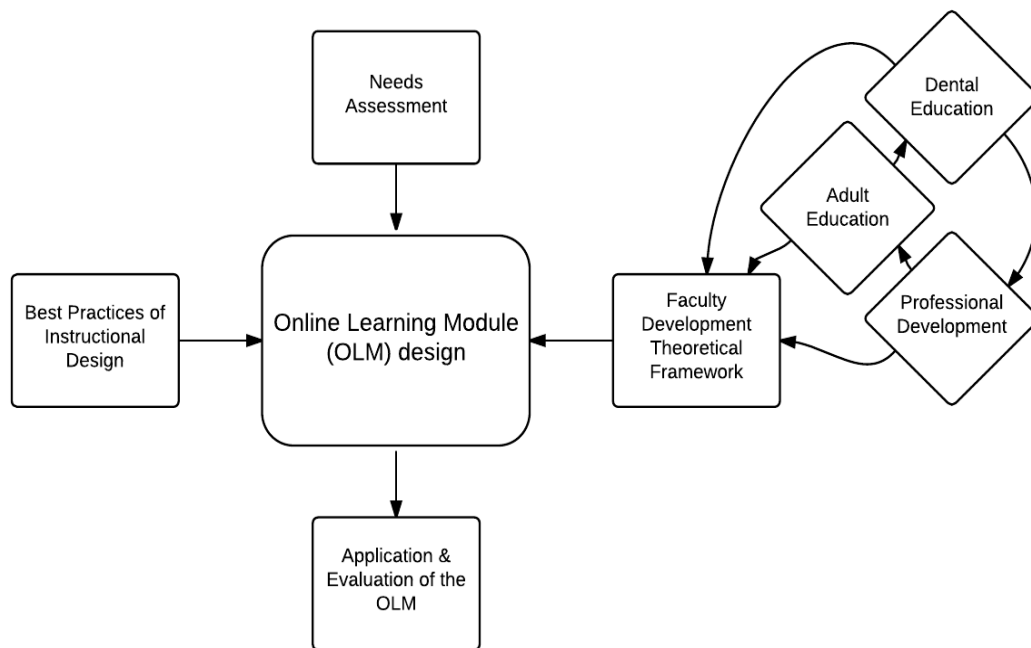
### **Conceptual Framework of the Study**

The content of a faculty development program is most beneficial when it is carefully planned to be relevant to participating faculty’s roles, responsibilities, and needs. Kuwait University Faculty of Dentistry is currently going through curricular changes and will continue to experience reform for the foreseeable future. An appropriately designed faculty development program will help the faculty through the transition and implementation of the reform agenda.

A carefully designed program will probably be more likely to be accepted, perceived



positively, and provide knowledge and skills that are applicable to the classroom settings, if it addresses real needs as perceived by the potential users. Therefore, it is of interest in this study to also understand factors that are relevant to a faculty's decision to attend or not attend a faculty development program. Thus, one of the first steps in designing a faculty development program that is appropriate and perceived as genuine for the participant is to use a needs assessment study to obtain a baseline of the faculties' knowledge, concerns, and desired outcomes. Based on the needs assessment, and insights from the literature review, a digital-based learning module can be developed to address the needs of the Kuwait medical educators. A diagram of the conceptual framework for the study is presented in Figure 2.3.



*Figure 2.3.* Conceptual framework for the thesis study, showing the pivotal role of needs assessment, and contributing sources of evidence for the digital module development, resulting in its final application.

When developing an instructional module or other curriculum resources, it is important to consider the central role of the instructor who will use the resource. An instructor's

understanding of relevant learning theories can help inform her/his teaching approaches by providing a scientific or philosophical foundation for selecting instructional methods (Torre, Daley, Sebastian, & Elnicki, 2006; Wilson & Peterson, 2006). Different theories can be applied in various learning contexts. Knowledgeable instructors can draw upon one or several learning theories to teach their audience or students based on learning objectives, desired outcomes, and environment. In the case of this research, the audience is adults who are dental educators. Therefore, this research uses insights from adult learning theory and research as a theoretical lens, particularly the concepts of andragogy, constructivism, and transformative learning.

**Andragogy.** Andragogy comes from the Greek word *andra* meaning “man,” and *agogus* meaning “leader of.” Andragogy is defined as “the science of adult learning, that is of teaching adults in an adult way, as opposed to teaching them as if they were children” (Dictionary of Human Resources and Personnel Management, 2006, p 13). Several American and European researchers have contributed to the history of andragogy as a stand-alone field of study. In its earliest years, andragogy was composed of several fragmented theories and concepts contributed from researchers such as T ten Have, Poeggeler, Kapp, and Herbart, among many others (Knowles, 2011; Zmeyoz, 1998).

The andragogical model as described by Knowles (1980) is based on six assumptions of the adult learner:

1. The need to know

Adults are more encouraged to learn something if they know why they need to learn it. Educators of those adult learners are more successful in having the adults learn something if they display the value and benefit of learning the concept to the learner.

## 2. The learner's' self-concept

The andragogical view of adulthood is a psychological one. From a psychological perspective, an individual is an adult when s/he arrives at a self-concept of being responsible for his/her own life. When learners reach psychological adulthood, they develop a need to be treated as an independent individual, capable of making their own decisions and being able to self-direct his/her learning process.

## 3. The role of the learner's experiences

Adults generally bring more experiences into their educational setting than children do. Not only do adults have more experiences, they also have more varied experiences compared to children. This has an implication that adult learners typically want their education to be more individualized rather than standardized. Adults also look at experiences as part of who they are, not simply something that happened to them. Therefore, their experiences need to be valued and taken into consideration for their learning experience. However, coming into a learning environment with previous experience may be a negative aspect, if the learner perseverates with habits that are stuck in previously established ways of responding. Therefore, creative learning experiences should encourage the learner to explore new and challenging opportunities to learn.

## 4. Readiness to learn

Adults are ready to learn the things that will help them achieve their goals more effectively in accordance with their current work environment. The readiness to learn something coincides with their current stage of development, especially their cognitive maturity and existing goals and expectations for their lives. In the case of this research, the faculty already know how to be dentists. However, their current position as dental educators with increasing expectations to learn new instructional techniques should encourage them to learn newer

methodologies for dental education.

#### 5. Orientation to learning

Adults have a life-centered orientation preference to their learning experience. Adults are interested in learning the things that they can apply and can help them in their daily life and career. They also have a better learning experience if the things that they are learning are presented in a real life context.

#### 6. Motivation

Adults respond better to internal versus external motivation. When they return to their professional positions after training, they should be able to perform the skills they learned because they understand the intrinsic value of what they have learned, and thus they see the benefit in doing so without the need to provide extrinsic sources of motivation to learn.

A closely related perspective that is consistent with an approach that is student-centered, life-related, and encourages active involvement in learning based on prior experiences is “Constructivism.”

**Constructivism.** Constructivism is a philosophical perspective that emphasizes how we learn new ideas or concepts. It assumes we construct new knowledge based on current or past knowledge and experiences. In practical terms using this perspective in teaching, best practices emphasize making connections between a learner’s previous knowledge and the current information he/she is expected to learn. As a result, new meaning is assigned to this connection and new knowledge or experience is generated. This theory is supported by recent research in the field of educational neuroscience, which yields evidence that in order for the brain to make new representations, it builds neural connections representing new experiences to already existing similar neural networks representing experiences the individual had in the past (e.g. Anderson,

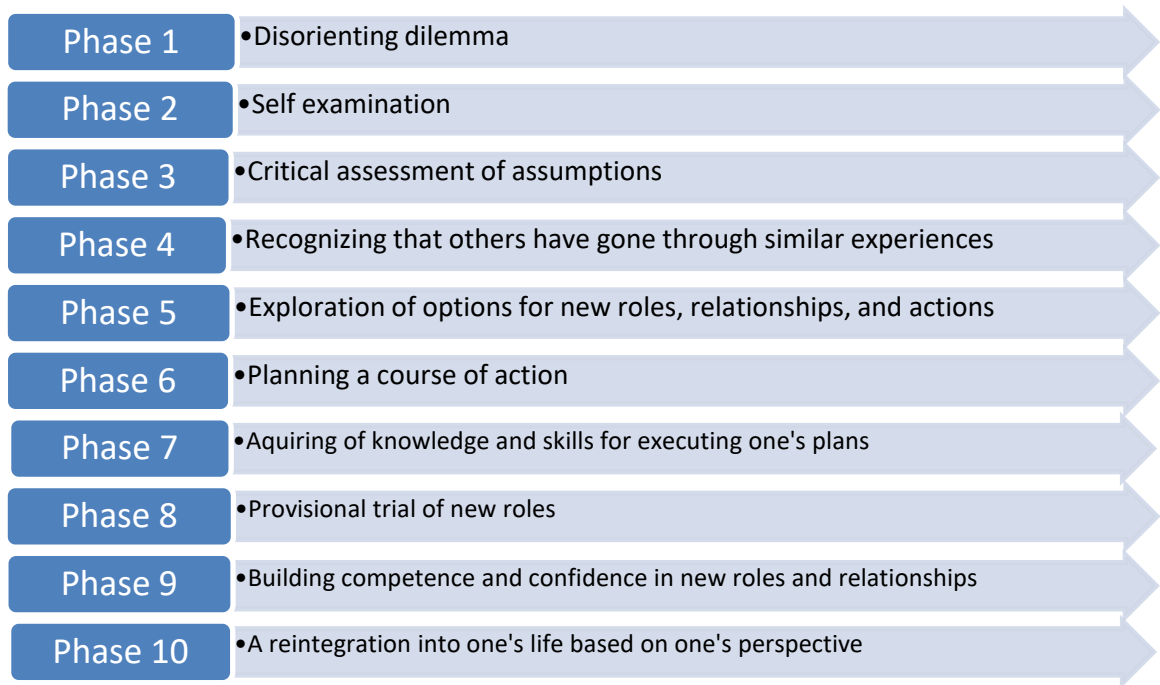
2009, 2014). The kind of experience per se is not as important to effective learning as is our interpretation and reconstruction in memory of past experiences.

As an educator, or facilitator, adopting the constructivist theory, it is important to first identify what students already know, how they represent what they know cognitively, and what experiences they already have and try to relate new knowledge and skills to those experiences. However, it is not always possible for an educator to create individualized cognitive links for each and every student. Therefore, it is important to include materials in the syllabus that encourage students to make their own representational linkages between new experiences and already existing ones in memory. A closely aligned perspective is the theory of transformative learning (Mezirow, 1996) that draws heavily from a variety of philosophical and educational theories, including constructivism.

**Transformative Learning.** Transformative learning is “the process of using prior interpretation to construe a new or revised interpretation of the meaning of one’s experience in order to guide future action” (Mezirow, 1996, p. 162). Early work on transformative learning began when Mezirow was studying factors that hindered or facilitated women’s return to education or workforce after a period of time out of that environment or experience. At the conclusion of the study, Mezirow (1978) determined these women had an exceptional enlightenment resulting from their re-entry into an active professional life and experienced a “personal transformation.” Mezirow identified ten phases the women experienced during that transformation as listed in Figure 2.4 (Kitchenham, 2008). The shared phases that led to transformation, in addition to Mezirow's intrinsic interest in adult education, eventually resulted in the development of transformative learning theory.

There are 10 levels beginning with the disorienting dilemma (Phase 1) that establishes a

context for self examination (Phase 2). This leads to additional more specific forms of reflection, including assessment of assumptions, recognizing similar experiences of others, exploration of new options, etc. culminating in planning a course of action (Phases 3 to 6). The last phases involve implementation aspects of the course of action with a final phase of reintegration into the person’s life within a life perspective (Phase 10).



*Figure 2.4.* The ten phases of transformative learning.

Transformative learning theory is not an extension of an existing intellectual theory, rather it is an integration of earlier work in various disciplines with an underpinning in constructivist assumptions (Mezirow, 1991). Transformative learning theory is also influenced by the work of Kuhn’s paradigms (1962), Freire’s conscientization (1970), and Habermas’s domains of learning (1971, 1984).

Kuhn’s (1962) paradigms were a product of his analysis of a disagreement between social scientists and natural scientists in the interpretation of scientific inquiry and especially the rather commonly accepted view that science progresses by gradual accretion of knowledge, without

adequate recognition of the revolutionary changes that occasion new prevailing views. To resolve the disagreement, Kuhn established the idea of scientific paradigms, which he defined as “the universally recognized scientific achievements that for a time provide model problems and solutions to a community of practitioners” (Kuhn, 1962 in Kitchenham, 2008, p.4). Kuhn’s paradigms translated into “frames of reference” in Mezirow’s transformative learning theory. Frames of reference are “The structures of assumptions through which we understand our experiences” (Mezirow, 1997, p.5). This theory is based on the idea that we can create frames of reference or meanings from many of the things in our lives. When we encounter a new experience, if it fits in our frame of reference, we readily accept it. However, if it contradicts our frame of reference, it causes us to reflect on it more closely and learn from it. It encourages us to consider whether we need to change the meaning we had already created for it. Basically, transformative education approaches are student-centered, where the learner is challenged to critically reflect on his/her existing world views and theories by confronting contradictory evidence, and thus reformulate existing perspectives. This also is consistent with modern methods of science teaching and learning known as conceptual change (e.g., Hewson, 1981); this is when students are challenged to re-evaluate some non-scientific ideas when confronted with contradicting evidence.

Paulo Freire’s work on conscientization or consciousness-raising influenced the politics of adult education (Dirkx, 1998) and also included an emphasis on critical reflective thought that can be transformative, thus making it a relevant contribution to Mezirow’s perspectives. Freire believed in promoting critical reflection on issues concerning an oppressed illiterate community in Brazil. Freire’s influence is reflected in Mezirow’s theory through the concept of perspective transformation or the ten phases of transformation in Figure 2.4. The consciousness-raising

theory included several levels of consciousness growth. The highest level, critical trans activity, had the most influence on Mezirow's theory leading to the establishment of the concepts of critical reflection, critical self-reflection on assumptions, and critical discourse (Kitchenham, 2008). Critical reflection is the process of removing oneself from a situation and reflecting on its meaning critically. This involves considering it from multiple perspectives, examining the meaning an individual has previously attached to a particular scenario, and assessing whether that meaning is still valid. Critical discourse is about engaging in active discussions with others to create new meaning. It is achieved through assessing the evidence and argument of a point of view or issue and being open to looking at alternative points of view. This is followed by reviewing the learning experiences and reflecting critically on the new learning and making a critical judgment based on a new assessment of that information (Mezirow, 2003).

In Mezirow's work, technical learning became instrumental learning, practical learning became dialogic, and emancipatory became self-reflective. Instrumental learning is more task or problem oriented, answering questions as the best way to learn something. Dialogic learning focuses on the meaning behind words and gestures when communicating with others and answers questions of best environment to learn something. Self-reflective learning addresses the question of "why do we need to learn something" (Mezirow, 1997).

Two concepts essential for the process of perspective transformation are "frame of reference" and "meaning schemes." Frame of reference encompasses cognitive, conative, and affective components and has two dimensions, habits of mind and points of view (Crowther & Sutherland, 2008). Habits of mind are perspectives that govern ways of thinking, feeling, and acting. Habits of mind have sociolinguistic, moral-ethical, epistemic, philosophical, psychological, and aesthetic dimensions. These perspectives and their dimensions are expressed



as points of view each comprised of cluster of meaning schemes. Meaning schemes are a collection of attitudes, beliefs, feelings, and judgments that make up an interpretation. Each of these components are dynamically related to one another with meaning perspective and related frame of reference comprising habits of mind. The latter includes a variety of perspectives we bring to bear on experiences (including sociolinguistic, philosophical, psychological, etc.) resulting eventually in “clusters of meaning schemes.”

Transformative learning also suggests there are two types of learning. The first is instrumental learning, which is more task or problem oriented. The second is communicative learning, which focuses on the meaning behind words and gestures when communicating with others. Transformative learning emphasizes that learning is more than absorbing words and content. It is about allowing adults to make sense and establish meanings in their lives and really transform how they view the world.

The foregoing review of literature and the relevant principles of adult learning were used to inform and guide the research questions and methods of this thesis study.

### **Research Questions**

1. What are the perceptions of the current dental faculty about the need for a professional development program?
  - a. What specific interests or areas of faculty development are needed at KU Faculty of Dentistry?
  - b. To what extent do the faculty perceive the prospective faculty development opportunity to be appropriate and necessary?
  - c. What are some of the opinions and percepts that the KU faculty have about adult learning and specifically CBL and PBL?

2. With respect to a faculty development online learning modules:
  - a. What are the perceptions of, and characteristics responses to, the learning experiences by a sample of the faculty who experience the modules?
  - b. To what extent is there evidence that the professional development modules address the perceived interests and needs of the faculty participants?
3. What evidence is there that the set of online modules, based on transformative learning model, effectively addressed the needs of the faculty participants?
  - a. Based on Likert-type survey evidence reported by the participants?
  - b. Based on the quality of the lesson plan submitted at the end of the professional development module and evidence of knowledge gains?

## **CHAPTER III**

### **Methods**

A mixed methods approach combining qualitative and quantitative methods was used, including questionnaires, Likert-type surveys, and open-ended responses that were content analyzed. Qualitative research in general provides an in-depth view into the human experience by allowing the research to be conducted in the natural setting, including narratives obtained from the participants that may enrich quantitative evidence. An instrumental case study approach was chosen for this study to collect and analyze the initial data. Instrumental case studies focus on the issue rather than on the case itself (Creswell, 2013). The issue in this case is the need of faculty development programs in dental education.

### **Position Statement**

The author was a participant researcher during this research, because she was a member of the faculty. Her extensive knowledge of curriculum and appointed faculty provided insight to interpret the qualitative aspect of the study, but did not incur a conflict of interest.

### **Field Settings and Participant Population**

This study was conducted at Kuwait University Faculty of Dentistry. The method of instruction at Faculty of Dentistry – Kuwait University is predominantly problem-based during the first four years when dental students study alongside their colleagues from the medical school. The teaching responsibilities during the first four years are shared between dental and medical faculty. The following three years, the teaching responsibility is solely on dental faculty and the method of instruction is primarily traditional lecture-based. The faculty at Kuwait University dental school come from all over the world and possess varied amount of teaching experience in multiple disciplines.

The needs assessment survey was distributed to all 44 faculty members. Thirty two members out of the 44 faculty responded to the needs assessment survey. Evidence gained from the needs assessment survey (see next section and details in the section on Instruments and Data Gathering Procedures) is reported to more fully characterize the participants in this study. The mean number of years  $\pm$  S.E. since obtaining dental degree of the participants who agreed to participate was 17.7 years  $\pm$  10.6. The amount of years the participants have been teaching dental medicine is 10.4 years  $\pm$  8.4, while the amount of years they have been teaching at Kuwait University is six years  $\pm$  4.25. Among the demographic and background information collected, the following summarizes major professional characteristics of the participants. The participants in the study held degrees in 12 different disciplines; the number of participants from each discipline is presented in table 3.1.

Table 3.1. Number of Respondents in Each Specialty of Dental Medicine

<u>Participant's Specialty</u>	<u>Count</u>
1. Advanced General Dentistry	8
2. Pediatric dentistry	4
3. Oral medicine, pathology, radiology	3
4. Oral-maxillofacial surgery	3
5. Orthodontics	3
6. Prosthodontics	3
7. Operative dentistry	2
8. Periodontics	2
9. Endodontics	1
10. Anesthesia	1
11. Dental material	1
12. Microbiology	1

The majority of the participants were graduates of American dental schools as evident by the DDS degree they held. Kuwait University graduates typically hold a BDM degree, and they comprised seven of the 32 participants. Table 3.2 presents the degrees that the respondents hold.

Table 3.2. Type of Degree the Respondents Hold

<u>Participant's Degree</u>	<u>Count</u>
1. DDS	14
2. BDS	6
3. BDM	7
4. DMD	3
5. Other	2

The majority of the participants (85%) also considered their teaching role as most important compared to their other roles. They also perceived their teaching responsibilities as most time commitment compared to time devoted for other responsibilities.

### **Digital Professional Development Program Design**

The results of the needs assessment were used, in conjunction with the conceptual model for the professional development digital module (see Chapter II), to guide the design process for the faculty development program. The design of the learning module, emphasizing CBL and PBL learning, utilized an interactive PowerPoint platform that provided information on adult learning theory, comparative information on CBL and PBL, and finally advice on how to design CBL lessons, leading to an assignment for the user to propose a CBL lesson using the principles and guidelines presented in the professional development module.

The professional development module was developed by following modern principles of adult learning and best practices for digital module design. This included encouraging the learner to use prior knowledge, active responding and control by the participants, video embedded segments, and embedded opportunities for participants to make assessments of the quality of the

experience, and creatively design lesson plans in relation to the kind of teaching approach presented in the module. The content of the module is outlined in Appendix I, and the entire digital module (formatted for PC platforms or PC-compatible such as MAC with Windows) is available online at <http://pocketknowledge.tc.columbia.edu/home.php/viewfile/159823>

### **Instruments and Data Gathering Procedures**

**Needs Assessment and Respondents' Percepts about Learning Theory.** A survey containing both closed-ended and open-ended response items (Appendix B) was distributed to all 44 members of the Faculty of Dentistry at Kuwait University via e-mail using Kuwait University e-mail system. The survey was designed to include items and questions the author perceived relevant to the culture of the participants, based on professional judgment arising from her several years serving as a faculty member at Kuwait University, and pertinent dimensions derived from prior research as summarized in the Literature Review section of Chapter II.

The survey also adopted recommendations available in the dental education and health care profession literature (e.g., Steinert, 2013). The main purpose of the survey was to assess participants' initial understanding of principles of teaching and learning, largely using Likert-type items that focused on the respondents' opinions and percepts about teaching methods used in dental education, adult education, and how people learn in general. It also included respondents' perspectives on CBL and PBL. The survey did not assess participants' professional dental knowledge. The goal was to acquire evidence of their perceptions and attitudes about relevant pedagogical knowledge.

In addition to the initial demographic background section, there were four sections specifically related to the main pedagogical goals of the survey as follows:

Dimension 1: Importance/role of faculty development

Dimension 2: Learning theories (Adult learners, transformative learning, constructivism)

Dimension 3: Pedagogies: Problem based learning (PBL)

Dimension 4: Pedagogies: Case based learning (CBL)

Thirty two faculty members responded to the needs assessment survey, twenty eight of which expressed interest in participating in the online faculty development module. However, only 15 out of the 28 who expressed interest actually participated in the online module on faculty development.

**Evidence Gathered During Learner Interaction with the Learning Module.** As the participants interacted with the PowerPoint module, links were provided to Word documents that were intended to encourage reflective thought about the content in a given segment of the module. These Word doc. response documents consisted of the following items:

Student Learning Outcomes based on Blooms' Taxonomy (Appendix C)

Student Initial Abilities in Group Discussion and Problem Solving (Appendix D)

Template for CBL Lesson Design and User's Percepts of the Task (Appendix E)

The evidence of the participants' responses is recorded directly in the response spaces within each of the documents in Appendices C, D, and E.

**Evidence of Ability to Design CBL Lessons.** A final assignment was required of each participant who completed the learning module. They were asked to prepare a CBL lesson plan for a topic in dental medical education that they chose, and using the best professional practices that they gained from the professional development module. A framework for the lesson plan was presented as an outline of the major components to be included, modeled after a sample CBL lesson plan presented to them in the digital learning module. The instructions and example of the lesson plan framework is presented in Appendix F. A set of Likert-type items assessing the

learner's perceptions of the professional development learning experience while responding to the online learning module was embedded in the lesson plan framework for designing a CBL lesson (Appendix E) and was used to provide evidence of the participants' reaction to the experience of using the professional development module.

Each lesson plan was evaluated using a rubric that addressed each of the main components contained in the lesson plan outline (See Appendix G for the rubric and the directions for applying the rubric). The rubric contained eight assessment categories, each with a possible range in scores from 0 to 3, for a maximum possible score of 24.

**Pre- and Post-instructional Evidence of Percepts and Gains in Professional Content Knowledge.** An identical form pre- and post-instructional Likert-type survey (Appendix H) was included in the packet of learning materials sent to the participants. It consisted of two major sections: (1) items pertaining to knowledge gained from the professional education module on CBL and PBL, and (2) an opinion survey assessing how satisfied the users were with the learning experience, and their opinions about their confidence in what they learned, and its likely merits for engaging dental medical students.

### **Data Analysis**

**Data Reduction.** Each of the sources of data was analyzed using the specified data interpretations described for each instrument as presented in the foregoing methods sections. Where appropriate data were presented as tables and graphs.

**Statistical analyses.** Descriptive statistics (percentage of responses occurring in each Likert response option: SD, D, N, A, SA) was used to present the data from Likert survey items. Some demographic data regarding years of service in teaching, etc. was analyzed using means and standard errors. In addition, a Wilcoxon signed rank test was used to assess statistically



significant differences in the responses to the Likert-type survey items in the pre- and post-instructional survey (criterion level of  $p \leq 0.05$ ). The responses on Likert scale were coded 1-5 corresponding to Strongly Disagree (SD) to Strongly Agree (SA) for each individual, the numerical value of the response for each question was entered into the Wilcoxon signed rank test columns. However given an N of 15 who participated in the online learning experience, the  $p$  value could not be calculated for some of the items due to the sample size and no estimate of significance was obtained. The Wilcoxon signed rank test, a non-parametric t-test omits data rows (participants) that exhibit zero change from pre-test to post-test, which results in reducing sample size (N) and the minimum N the test requires to calculate  $p$  value is 10. Therefore, differences must be particularly large to achieve statistical significance.

Spearman's rank-order (Rho) correlation analysis was used to examine possible patterns of relationships between some items in the demographic data contained in the first part of the Likert needs assessment survey (commitment and time devoted scales) and the Likert items in that survey that assessed the participants' perspectives on dental education professional development, because there was insufficient evidence of normality to use parametric correlations. Table 3.3 summarizes the research questions, sources of data and means of analysis.

Table 3.3. Summary of Research Questions, Sources of Data and Proposed Means of Analysis

Research Question	Data Source	Statistics/ Analysis
<p>1. What are the perceptions of the current dental faculty about the need for a professional development program?</p> <p>d. What specific interests or areas of faculty development are needed at KU Faculty of Dentistry?</p> <p>e. To what extent do the faculty perceive the prospective faculty development opportunity to be appropriate and necessary?</p> <p>f. What are some of the opinions and percepts that the KU faculty have about adult learning and specifically CBL and PBL?</p>	<p>Needs assessment and pre-instructional survey</p>	<p>Direct interpretation &amp; descriptive statistics for Likert data</p> <p>Correlation of demographic data with Likert scale results</p>
<p>2. With respect to a faculty development online learning modules:</p> <p>a. What are the perceptions of, and characteristics responses to, the learning experiences by a sample of the faculty who experience the modules?</p> <p>b. To what extent is there evidence that the professional development modules address the perceived interests and needs of the faculty participants?</p>	<p>Feedback embedded in modules,</p> <p>Post-instructional survey</p>	<p>Direct analysis</p> <p>Descriptive statistics for Likert items embedded in modules</p> <p>Paired t-test between pre- and post-opinion survey</p>
<p>3. What evidence is there that the online module, based on transformative learning model, effectively have addressed the needs of the faculty participants?</p> <p>a. Based on Likert-type survey evidence reported by the participants?</p> <p>b. Based on the quality of the lesson plan submitted at the end of the professional development module &amp; evidence of knowledge gains?</p>	<p>Lesson plans submitted by the participants embedded in modules including the Likert items related to satisfaction, and the knowledge gain items</p>	<p>Likert item analyses of satisfaction</p> <p>Direct analysis using lesson quality rubric &amp; Pre-post analysis of learning gains</p>

## CHAPTER IV

### Results

Each research question and the related results will be addressed sequentially.

#### Research Question 1

The results for the first research question on faculty needs assessment and perceptions of adult learning (CBL and PBL) including the three sub-questions are presented in tables 4.1 to 4.4. Table 4.1 presents the results of the faculty perceptions of need for faculty development.

Table 4.1. Perceptions of Need for Faculty Development

<u>Likert survey items</u>	Percent responses				
	SD	D	N	A	SA
1. FDP is important for faculty improvement.	0	0	3	25	72
2. FDP helps prepare for teaching.	0	9	6	41	44
3. FDP may be beneficial to new/junior faculty.	0	0	0	25	75
4. FDP is beneficial to experienced/senior faculty.	0	0	22	34	44
5. Gaining additional classroom teaching skills could be beneficial to my teaching practices.	0	3	16	42	42
6. Gaining additional clinical teaching skills to my teaching practices is useful.	3	9	16	44	28
7. I am interested in attending/participating in a faculty development program.	0	9	3	47	41

*Note.* N = 32. FDP is Faculty Development Program. Items are from the Needs Assessment Survey, Dimension 1 (Appendix B).

Item 3 (Table 4.1) is of particular interest, because 100 percent of the respondents agreed or strongly agreed that professional development would be beneficial to new or junior faculty. This is slightly higher than the 97 percent who were positive about the importance of faculty development programs for faculty improvement (Item 1). The responses were more mixed for

item 2, that stated “faculty development programs help prepare for teaching.” Nine percent disagreed, six percent were neutral and the remainder were positive (“Agree,” or “Strongly Agree”). Item 6, gaining additional clinical skills, was among the most diverse in percentages of responses. Twelve percent of the responses fell in the Disagree range, while 72 percent were in the Agree range.

Table 4.2 demonstrates interesting perceptions that faculty have regarding their responsibilities towards their students and their conception of how adults learn. When it comes to motivation for learning, 78% of the respondents believed it was their responsibilities to motivate their students to learn. Moreover, 41% took a neutral position on the students’ ability to learn on their own, while 47% either disagreed or strongly disagreed with that statement.

Table 4.2. Perceptions of Learning Theories

<u>Likert survey items</u>	Percent responses				
	SD	D	N	A	SA
1. I think it is the responsibility of the faculty to motivate their students to learn.	0	3	19	44	34
2. Students can learn on their own by interacting with the content material.	13	34	41	9	3
3. Student’s prior knowledge influences how they gain and understand new knowledge.	3	3	28	41	25

*Note.* N = 32. Items are from the Needs Assessment Survey, Dimension 2 (Appendix B).

Table 4.3 contains a report of the respondents’ perceptions of pedagogical principles of PBL. The percentage of respondents who either agreed or strongly agreed that PBL is an appropriate learning strategy (37%) is nearly the same percentage of respondents (41%) who took a neutral position on the matter. The participants had varied responses regarding the content expertise of a PBL facilitator. However, (60%) of the respondents either agreed or strongly

agreed that the facilitator should be an expert in the content being taught. Item 3 is of particular interest because nearly all respondents (91%) believed that providing foundational knowledge is important for students' PBL learning.

With respect to respondents' perceptions of case based learning (Table 4.4), 72% of respondents either agreed or strongly agreed that they are familiar with the concept of case-based learning. However, a less percentage (63%) of respondents understood the difference between case-based learning and problem-based learning, the latter being a method that is primarily used during the first four years of medical school at Kuwait University. When asked about their confidence in designing a case for case-based learning session, a little over half of the respondents (56%) either agreed or strongly agreed. Nearly half of the respondents (47%) were neutral on which inquiry method, open or guided, they thought was superior.

Table 4.3. Perceptions of Pedagogical Principles of Problem-based Learning (PBL)

<u>Likert survey items</u>	Percent responses				
	SD	D	N	A	SA
1. PBL is an appropriate dental learning strategy.	6	16	41	31	6
2. A PBL facilitator should be an expert in the content being learned.	3	22	16	41	19
3. Providing foundational knowledge is important for students' PBL learning.	3	0	6	50	41

*Note.* N = 32. Items are from the Needs Assessment Survey, Dimension 3 (Appendix B).

Item 4 (Table 4.4), that addressed whether open inquiry nature of PBL is superior to the guided inquiry nature of CBL for students learning, is of interest because nearly half of the respondents were neutral in their perspective, while nearly 40% responded negatively.

Approximately 18% were favorable. This is a rather complex item involving comparative analysis of PBL to CBL, including relative effectiveness of open inquiry relative to guided

inquiry for students' learning. It is not clear if the complexity of the item may have contributed to more varied responses of the respondents.

Overall, the response pattern in this table is widely distributed between the five options, but with less percentage in the Strongly Disagree category. Items 1 to 3 have a substantial percentage in the Agree or Strongly Agree category (generally over 50%), compared to the more neutral to negatively skewed responses in item 4.

Table 4.4 Perceptions of Pedagogical Principles of Case-based Learning (CBL)

<u>Likert survey items</u>	Percent responses				
	SD	D	N	A	SA
1. I am familiar with the concept of case based learning.	3	12.5	12.5	53	19
2. I understand the difference between problem based and case based learning.	3	19	16	41	22
3. I feel confident in my skill to design a case for a CBL session.	9	16	19	34	22
4. The open inquiry nature of PBL is superior to the guided inquiry nature of CBL for students' learning.	12.5	25	47	12.5	3

*Note.* N = 32. Items are from the Needs Assessment Survey, Dimension 4 (Appendix B).

To gain additional insights into the relationships among the items in the Needs Assessment Survey, pairwise correlations among items that were sufficiently robust ( $r \sim 0.60$  or higher) are presented in Table 4.5. As shown in Table 4.5, there were eleven items from the Needs Assessment Survey that were most highly intercorrelated with each other; and among these, the first seven are from Dimension 1, and particularly emphasized FDP and the benefits to junior and senior faculty in joining FDP. The most highly correlated were items 9 vs. 10, and 10

vs. 11 ( $r = 0.84$  and  $0.81$ , respectively), all pertaining to relationships among CBL and PBL items.

Table 4.5. Intercorrelations Between Pairs of Items from the Needs Assessment Survey<sup>a</sup>

Items	Pairwise correlations <sup>b</sup>
1. FDP important to improve faculty.	1 vs. 2 = 0.64
2. FDP helps improve teaching.	1 vs. 4 = 0.62
3. FDP beneficial to junior faculty.	1 vs. 7 = 0.59
4. FDP beneficial to senior faculty.	2 vs. 3 = 0.57
5. To gain additional teaching skills.	2 vs. 4 = 0.66
6. To gain additional clinical skills.	2 vs. 5 = 0.66
7. Interested in participating in FDP.	3 vs. 7 = 0.56
8. Students can learn on their own.	4 vs. 7 = 0.72
9. Familiar with the concept of CBL.	6 vs. 8 = 0.68
10. Know difference between CBL & PBL.	9 vs. 10 = 0.84
11. Confident in designing case for CBL.	10 vs. 11 = 0.81

<sup>a</sup> Appendix B. <sup>b</sup> Spearman's rank order correlation coefficients.

Of interest is the relatively high correlation of Item 6 (related to improved clinical skills) in relation to item 8 (students can learn on their own),  $r = 0.68$ . It is not immediately clear why they are so strongly correlated, but there may be some perception that clinical skills require more autonomy and self-motivation than other learning situations. Given the strong positive intercorrelations among responses to the four items on Dimension 4 of the Professional Development Needs Survey (Table 4.5), indicating strong interactive relationships among the items, further analyses were made.

Table 4.6 presents a more detailed analysis of the responses to the four items. Based on the responses to item 3 (Dimension 4) related to confidence in designing CBL cases, two groups of respondents were identified: (1) those who chose either Neutral, Disagree, or Strongly

Disagree for their response (*Not Agree group*), and (2) those who chose either Agree or Strongly Agree (*Agree group*). There were 13 and 18 respondents, respectively in the two groups. Then, within each group (1 or 2), the percentage of individuals who chose to “Agree” with the three remaining items in Dimension 4 were tabulated (Table 4.6). This table indicates that respondents who overall Agreed or Strongly agreed that they knew how to design a case for CBL consistently responded more favorably (A and SA) to each of the three items, compared to the respondents who did not agree that they were confident in designing a case for CBL. The largest differences were for items 1 and 2 (Table 4.6) compared to item 3.

Table 4.6. Perceptions of Respondents Who Reported Being Competent to Design a CBL Compared to Those Who Did Not (Item 1-3 in Dimension 4, Appendix B)

<u>Likert survey items</u>	<u>Percent responses</u>			
	<u>(1) Not Agree group</u>		<u>(2) Agree group</u>	
	<u>A</u>	<u>SA</u>	<u>A</u>	<u>SA</u>
1. Familiar with the concept of CBL.	31	0	67	33
2. Understand difference between CBL and PBL.	15	0	56	39
3. PBL is superior to CBL for student learning.	1	0	11	6

Note: N = 13 for the “Not Agree” group, and N = 18 for the “Agree” group.

## Research Question 2

This question addressed the participants’ perceptions of the learning experience using the professional development learning modules. The results are presented in Table 4.7.



Table 4.7. Summary of the Respondents' Perceptions of the Professional Development Learning Experience While Responding to the Online Learning Module

<u>Likert Survey Items</u>	<u>Percent responses</u>				
	<u>SD</u>	<u>D</u>	<u>N</u>	<u>A</u>	<u>SA</u>
1. Satisfied with lesson on how to plan CBL lessons	0	0	13	73	13
2. Confident in teaching CBL in daily practice	0	13	27	47	13
3. Students likely would welcome this kind of lesson	0	7	33	40	20
4. CBL lesson time commitments are reasonable	0	40	27	33	0
5. CBL promotes critical thought more than lectures	0	0	13	53	33
6. CBL promotes becoming a better dental practitioner	0	0	20	53	27

*Note.* N = 15. Items are from the Likert scale feedback following lesson plan (Appendix E).

The first item shows that 86% of the respondents were satisfied with the lesson on how to plan CBL lessons. Moreover, 60% felt confident in teaching CBL in their daily practice. Over half of the respondents (60%) felt their students would welcome this kind of lesson, while 33% were neutral. Item 4 shows 27% of the respondents were neutral regarding how reasonable the time commitment required for CBL lessons, while 40% disagreed and 33% agreed. Results show 86% of respondents agreeing that CBL promotes critical thought more than lectures. Moreover, 80% of the respondents agreed that CBL promotes becoming a better dental practitioner.

### **Research Question 3**

This research question focused on to what extent the online learning experience addressed the needs of the dental medicine faculty. There are two sources of evidence: (1) the pre- and post-survey related to the online learning module, and (2) quality of the CBL lesson plans presented by the respondents as the final task in the online learning module. The results of the Pre- and Post-instructional survey are presented in Tables 4.8 and 4.9 covering items related to adult learning theory, CBL and PBL and lesson planning.

Table 4.8 Pre-instructional Survey

<u>Likert survey items</u>	<u>Percent responses</u>					
	SD	D	N	A	SA	A+SA
1. Adults as opposed to younger learners are less likely to require a justification for what they are learning or explanation why it is relevant	40	13	27	20	0	20
2. In many cases, given the complexity of medical education, the student's past experiences are not particularly relevant to new learning in dental education	27	60	13	0	0	0
3. Self-concept is largely addressed in studies of adolescents and is less important in understanding how adults learn.	27	7	67	0	0	0
4. In identifying learning objectives using taxonomy of objectives, the lowest level is "Knowledge."	13	7	27	33	20	53
5. Both Case-based learning and problem-based learning are considered to be student-centered.	0	0	27	47	27	74
6. In general, PBL differs from CBL because PBL reflects real practice, common conditions in the community, and important pathological and psychological phenomena	7	0	47	33	13	46
7. In assessing adult learning such as CBL and PBL approaches in dental medical education "Communication skills" in general are categorized as equally important as logical ones such as "Reasoning,"	0	0	47	40	13	53
8. Assessment skills related to learning are largely the responsibility of the instructor in a course	7	13	0	53	27	80
9. Comparatively, CBL and PBL both require analytical skills, but PBL focuses more on solving a problem or for example creating a plan for medical treatment.	0	13	27	47	13	60
10. At this point, I consider that my knowledge of CBL and PBL is sufficient to be highly successful using the methods	27	33	20	20	0	20
11. I know how to prepare lesson plans for either CBL or PBL teaching methods	27	40	7	27	0	27
12. At this time, I believe that I have sufficient sound information to provide some guidance to other faculty who would like to try using either CBL or PBL methods	33	33	20	13	0	13

Note. N = 15. Items in Tables 4.8 and 4.9 are from the pre-instructional survey (Appendix H).

Table 4.9 Post-instructional Survey

<u>Likert survey items</u>	SD	<u>Percent responses</u>				
		D	N	A	SA	A+SA
1. Adults as opposed to younger learners are less likely to require a justification for what they are learning or explanation why it is relevant	67	20	0	7	7	14
2. In many cases, given the complexity of medical education, the student's past experiences are not particularly relevant to new learning in dental education	60	27	13	0	0	0
3. Self-concept is largely addressed in studies of adolescents and is less important in understanding how adults learn.	33	40	20	7	0	7
4. In identifying learning objectives using taxonomy of objectives, the lowest level is "Knowledge."	7	7	7	47	33	80
5. Both Case-based learning and problem-based learning are considered to be student-centered.	0	0	0	47	53	100
6. In general, PBL differs from CBL because PBL reflects real practice, common conditions in the community, and important pathological and psychological phenomena	13	33	0	40	13	53
7. In assessing adult learning such as CBL and PBL approaches in dental medical education "Communication skills" in general are categorized as equally important as logical ones such as "Reasoning,"	0	7	20	47	27	74
8. Assessment skills related to learning are largely the responsibility of the instructor in a course	7	47	0	27	20	47
9. Comparatively, CBL and PBL both require analytical skills, but PBL focuses more on solving a problem or for example creating a plan for medical treatment.	0	0	7	60	33	93
10. At this point, I consider that my knowledge of CBL and PBL is sufficient to be highly successful using the methods *	0	13	40	47	0	47
11. I know how to prepare lesson plans for either CBL or PBL teaching methods *	0	7	27	67	0	67
12. At this time, I believe that I have sufficient sound information to provide some guidance to other faculty who would like to try using either CBL or PBL methods *	0	13	40	47	0	47

*Note.* N = 15. Asterisks indicate significant differences relative to pre-survey results ( $p \leq .05$ ).

Tables 4.8 and 4.9 above show the responses to the items from the pre-instructional and post-instructional surveys respectively. Items 10, 11, and 12 were statistically significant at  $p < 0.05$ . Items 10, 11, and 12 pertaining to possessing sufficient knowledge to be successful using CBL and PBL, knowing how to design CBL and PBL lessons, and having sound knowledge to guide others to use these methods respectively, had a sufficiently large enough change in response to be statistically significant. Some items, while not statistically significant, showed large shift in response categories. For example, only 27% of the responses in the pre-instructional survey for item 11 were positive (“Agree”); however, in the post-instructional survey, 67% of the participants responded positively. It is important to note that some items required a “Disagree” response to be consistent with the online lesson content, for example items 1 and 2. Item 1 showed a strong negative response in the post-survey consistent with information presented in the online module. Likewise, item 2 had a fairly strong negative response in the pre-survey and a decidedly increased negative response in the post-survey. Both indicate that the participants gained new perspectives through participation in online learning.

Other results are of interest with respect to CBL lesson planning. Responses to item 5 on the comparison of CBL and PBL, with respect to student-centered learning, were already largely positive in the pre-survey results, with 72% in the “Agree” range initially, but became 100% in the “Agree” range in the post-survey results. Similarly, responses to item 1 on characteristics of adult learners, were distributed among four categories- strongly disagree to agree- in the pre-instructional survey, however, in the post-instructional survey 100% of the responses to that item were disagree or strongly disagree.

The change in response to item regarding Bloom’s taxonomy of objectives was not sufficiently large enough to be statistically significant. However, while the responses to the pre-

instructional survey were distributed among all 5 categories for item 4, 80% the responses to the post-instructional survey were in the “Agree” and “Strongly Agree” category.

The results of the CBL lesson plan evaluation using the scoring rubric (Appendix G) are presented in Table 4.10.

**Table 4.10 Lesson Plan Score for Each Participant and the Mean Value**

Participant	Lesson plan score
1.	6
2.	20
3.	17
4.	7
5.	6
6.	20
7.	12
8.	17
9.	15
10.	17
11.	17
12.	4
13.	22
14.	16
15.	16
<u>Mean score</u>	<u>14</u>

*Note.* The maximum possible score is 24.

The data in Table 4.10 show that there was a substantial range in rubric scores from a low value of 4 to the highest of 22. The mean value (14) is approximately 60% of the maximum possible score of 24. Five participants scored below the mean, four of which scored very low on rubric items 4, 6, and 7 (i.e., Situation appropriateness, Activities appropriateness, and Evaluation

procedures, respectively). The four individuals all left several sections of the lesson plan template empty, which led to the very low scores. Overall, nine of the 15 participants (60%) had scores of 16 or higher, representing an “Excellent” rating. Interestingly, eight of the nine participants who scored 16 or higher on the rubric have been teaching for five years or less (Table 4.11).

Table 4.11 The Number of Teaching Years and Corresponding Lesson Plan Scores

Participant	Years teaching	Rubric
1	21	6
2	1	20
3	1	17
4	12	7
5	20	6
6	4	20
7	4	12
8	5	17
9	4	15
10	3	17
11	20	17
12	16	4
13	4	22
14	5	16
15	2	16

While examining possible relationships between background data (Appendix B) and participants’ performance on outcome measures for the leaning module, a significant negative Spearman’s Rho correlation was found between the number of years teaching and the CBL lesson rubric score ( $r = -0.60$ ,  $p = 0.019$ ,  $N = 15$ ). By normal standards, the association between the two variables would be considered statistically significant, and indicates that the longer the participant had been teaching the less likely they were to achieve a higher score on the rubric. This is consistent with data in Table 4.11, where the majority of participants who scored 16 or higher had been teaching for five years or less.

## **Chapter V**

### **Discussion**

The findings for each of the research questions are discussed, followed by a cross-cutting discussion of findings across all of the research questions, and concluding with some recommendations for future research.

#### **Research Question 1**

Results of the faculty needs assessment and the participants' perceptions of adult learning (CBL and PBL).

Overall, there was a generally positive response to all of the items pertaining to a need for professional development among the professors who responded, with over 80% agreeing that faculty professional development would be useful (items 1-3, Table 4.1). However, the respondents were less certain that faculty professional development would be useful to more senior faculty (22% scored this as "Neutral," and 78% responded in the "Agree" range). The percentage of responses that were neutral (22%) was the highest for any question pertaining to the need for a faculty development program. Moreover, the item asking if faculty professional development would be useful to junior faculty was the only item to receive a 100% "Agree or Strongly Agree" response in that same category. The overall positive response to the item addressing the importance of faculty development is consistent with literature findings that faculty development programs are major predictors of success of educational reform (Hendricson et al., 2007; McAndrew, 2010).

The second dimension in the needs assessment was regarding learning theories in general and how adults learn in particular. The participants' responses to these items were particularly interesting; 78% of the faculty believed it was largely their role and responsibility to motivate

their adult students to learn. This perception is not consistent with what we know about the characteristics of adult learners, where motivation can be much more intrinsically based. Unlike children who are more likely to be externally motivated by praise, grades and so on to learn and do well in school, adults are mainly internally motivated, especially when they recognize why they need to learn something and see the value of this knowledge or education for their daily and professional lives (Knowles, 1980). Thus, the role of the instructor in adult learning is to provide the proper context for the learning experience to mobilize these sources of internal or intrinsic motivations to learn.

The second item of the second dimension aimed to measure perception and position of faculties regarding self-directed learning by asking if students can learn on their own by interacting with the content material. Almost half of the faculty (41%) took a neutral position. This is particularly interesting especially since the same percentage of respondents took a neutral position on PBL being an appropriate dental learning strategy (in the third dimension in the needs assessment). This connection is particularly relevant because Problem-Based Learning is the primary method of instruction during the first four years of the curriculum at Kuwait University.

The majority of the faculty also believed that the facilitator should be an expert in the field (60%) and that providing foundational knowledge is essential for PBL learning (71%). Both of these beliefs are not consistent with current literature (Saunders & Dejbakhsh, 2007). The facilitator's role is just that, to facilitate, and promote student-to-student interaction. Moreover, while prior knowledge and experience is important, providing foundational knowledge is not required. In fact, the PBL experience focuses on student driven and centered learning through



open inquiry. Students are expected to identify learning issues, objectives, and generate hypothesis. The instructor can serve as a guide and facilitator in guided inquiry learning.

The fourth dimension of the needs assessment survey measured the faculties' opinion regarding CBL. While the first and second items of the dimension regarding familiarity with the CBL concept and knowing the difference between CBL and PBL, received mainly positive responses, this was not the case for the third and fourth items. The responses to the fourth dimension warranted further investigations that revealed interesting correlations among CBL and PBL items. There were two pairs of three items related to CBL with correlation coefficient of 0.8 or higher. The first pair comprised of item nine "Familiar with the concept of CBL" and item ten "Know difference between CBL & PBL" with correlation coefficient of 0.84. Taken in total, these results indicate that respondents who claimed they were familiar with CBL also knew the difference between CBL and PBL. Moreover, a strong correlation coefficient of 0.81 also existed between "Know difference between CBL & PBL" and "Confident in designing case for CBL." The Kuwait faculty use PBL methods with the students during their time at the medical school. Therefore, these relatively strong correlations may result from this practical experience and lead to a more keen sensitivity to seeing similarities between the two methods. It is less likely due to prior training in CBL learning methods; because, even after this relatively modest introduction in the professional development module, some of the participants had low rubric scores on fundamental aspects of CBL lesson planning. The connections among items were analyzed further as reported in Table 4.6. This evidence indicates that respondents who overall Agreed or Strongly agreed that they knew how to design a case for CBL consistently responded more favorably (A and SA) to items 2 and 3, compared to the respondents who did not agree that they were confident in designing a case for CBL. The largest differences were for items 1 and 2

(Table 4.6) compared to item 3. This provides some encouraging evidence that there was consistency and alignment in the faculties' responses within each group for the items in dimension four. However, as shown in Table 4.10, generalized alignment or concurrence among items does not always translate into high levels of competence; a few of the participants scored very low on the evaluation of the lesson plans, whereas most had moderate to high scores. Moreover, there was a negative correlation between the number of years of teaching experience and lesson plan rubric scores. This suggests that while teaching experience is valuable for growth in expertise, some established ways of teaching may become inveterate; and thus, newer approaches are less easily appreciated. But, practical experience without some refreshment and new perspectives on pedagogical knowledge may not yield best instructional practices. Furthermore, as the recipients themselves recognized, professional development is useful, but not always effective if there is resistance.

For example, Brody and Hadar (2015) found at least two different tracks, or professional trajectories, of novices and experienced teachers in a professional development study. They reported that novices exhibited openness toward learning, while some of the experienced educators who claimed expertise were less willing to consider changing instructional practice. This initial differentiation at the first trajectory stage led to distinctions in development at later stages including variations in acceptance of reforms. Overall, these results emphasize the importance of teacher educators' years of experience, attitude towards inquiry, and self-perception of expertise as critical determinants of successful educational reform (Berg & Mensah, 2014).

## **Research Question 2**

This question addressed the participants' perceptions of the learning experience using the professional development learning module, see Table 4.7.

The responses to the first two questions summarized in the table, are of particular interest. Eighty-seven percent of the participants were "satisfied with the module lesson on how to plan CBL lessons," but fewer (60%) felt that they could effectively use it in teaching. While it is not clear why there is this difference among this sample of respondents, there are some possible explanations. Lesson planning was particularly emphasized in the module, but clearly some of the challenges and details of actually teaching CBL lessons were not so fully developed in the lesson module.

Other research in science education has shown that even when teacher professional education is successful in improving lesson planning, not all of the planned experiences are equally well developed when implemented in the classroom. For example, Qablan (2016) found that science teachers could be taught to be more effective in planning inquiry type lessons, but not all aspects of inquiry were equally well implemented in the classroom. The results showed that all teachers scored well in dimensions of inquiry regarding teacher as a guide, assessment, cooperative learning, and communication. In contrast, all teachers scored low in two other dimensions of inquiry regarding asking scientifically oriented questions and designing and conducting scientific investigations. The authors attributed the low scores to reduced focus on these dimensions during the workshops.

In this thesis study, the learning module initially was intended to have more breadth and depth of information, including three separate modules; i.e. Adult learners, CBL, and PBL, respectively. However, it became evident that this required too much time commitment for an

introductory “proof of concept” module that the participants had agreed to use. Therefore, the module was modified to be more focused, especially emphasizing CBL. However, this might have limited the amount of information the participants received on lesson implementation, a situation somewhat parallel to the circumstances encountered by Qablan (2016). This is addressed more fully in the section on Recommendations for Future Research.

### **Research Question 3**

The third question focused on to what extent the online learning experience addressed the needs of the dental medicine faculty. This was addressed using two sources of evidence: (1) the pre- and post-survey related to the online learning module, and (2) quality of the CBL lesson plans presented by the respondents as the final task in the online learning module.

The pre-instructional survey showed that for several of the items, the participants’ positions or perceptions were consistent with the literature. For example, a majority of the participants recognized the important role of past experience for learning. Furthermore, positive responses were given to other adult characteristics, such as the need for justification of why something is to be learned, and the importance of the role of self-concept. However, other characteristics or responsibilities of adult learners, such as motivation and assessment were misconceived. In the pre-instruction survey, 80% of the participants believed assessment skills related to learning are largely the responsibility of the instructor in a course. This percentage dropped to 47% in the post-instructional survey. Given the relatively small N, the change in response (a 37% decrease) was not large enough to be statistically significant and this warrants further investigation in the future, perhaps with a larger sample size.

The change in participants’ responses to the last three items of the post-instructional survey pertaining to CBL/PBL knowledge, lesson planning, and providing guidance to their

peers on how to use these methods was sufficiently large enough to be statistically significant. However, looking at the distributions of the responses to these items, we notice that the faculty were more confident in their ability to design a lesson plan than their ability to teach CBL or to guide their peers in using CBL methods.

### **Cross-cutting Perspectives**

While there was general agreement among the participants that faculty professional development would be worthwhile, it is interesting that the respondents were less certain about its value for senior faculty (item 3, Dimension 4, Table 4.1). By comparison, it is notable that the results of Question 3 (Table 4.11) showing that there is a negative correlation ( $r = -0.60$ ) between the years of teaching and scores on the CBL lesson plan rubric are consistent with this perception. That is, younger faculty seemed to benefit most, at least as evidenced by their ability to apply the information from the module to CBL lesson planning, while more senior faculty tended to be less proficient. Some of the issues that characterized less proficient lesson planners were low scores on the rubric items for “Situation appropriateness,” “Activities appropriateness,” and “Evaluation procedures,” suggesting that among other possible deficiencies, there was insufficient understanding of these specific items and/or less proficient understanding of the importance of alignment between the activities planned in a course and the aspects that were to be evaluated, at the end.

The concept of “alignment,” (i.e., all components of the lesson should be logically related to one another and lead to a valid and reliable evaluation that assesses the learning activities) is often one of the more difficult to achieve. For example Contino (2013) reported that lack of alignment in science lesson planning was one of the major shortcomings that she discovered in an analysis of how teachers interpret and transform curriculum guidelines into daily lesson

planning. Moreover in this thesis study, while 86% of the participants reported they felt prepared to do lesson planning, only approximately 60% of the participants felt confident that they could use CBL in their daily teaching practice. This was fairly consistent with the rubric score evaluations of the CBL lesson plans where 11 of the 15 participants had moderate to high scores, and only 4 had very low scores. This suggests that the participants as a group had a fairly accurate understanding of their capacity to plan CBL lessons after experiencing the professional development module.

The design of the online module was based on the needs assessment, the latter was based on common themes in the literature and author's knowledge of the culture of the participants; particularly, based on professional judgment arising from her several years serving as a faculty member at Kuwait University. As mentioned previously, based on the needs assessment survey responses, there were some deficiencies in aspects pertaining to adult learning that needed to be addressed. This merited the inclusion of characteristics of adult learners in the module as foundational knowledge for the participants to reflect on and build upon in their daily teaching practices. The main body of the module covered comparative aspects of CBL and PBL methods. This was a topic that the participants recommended during the needs assessment survey. Moreover, the assessment methods were originally planned, and were later emphasized, based on the request of some of the participants.

The inclusion of all of the above mentioned categories in the module may have overloaded the faculty with new information, to some degree. Nonetheless, the evidence presented in the Results indicates, overall, that this introductory module was appropriate in meeting some of the intended goals. Overall, the module was effective in increasing participants' knowledge and skills for designing student-centered lesson plans as evident by the post-

instructional survey. The participants also reported that this teaching method will probably be welcomed by their students and would make them better dentists.

While there were successful aspects of the use of the module in faculty professional development and it is likely that some of the concepts were not new to the faculty, the density of information in the module, though under individual control of time-on-task, may have hindered the participants from truly reflecting on the material presented to them. This includes opportunity to fully examine their frame of reference and thus engage in transformative learning. If this assumption is accurate, it may explain why the participants reported in general that they were more confident planning a CBL/PBL lesson than they were using it in their daily teaching practices or guiding others to use the methods.

Another aspect that is important in transformative learning, but is insufficiently emphasized in this module, is reflective discourse (e.g., Hubball, Collins & Pratt, 2005). In many learning experiences, reflective discourse is presented through collaborative learning. In the module used here, the participant's engagement was mainly with the online presentation, and occasionally with the author through e-mails, text messages, and phone calls for clarifications. Consequently, the participants were not in communication with each other, thus limiting the opportunity for collaborative learning. Moreover, the online nature of the module design was not preferred by some of the participants. One participant, a senior faculty, voiced his concern and provided feedback regarding this matter by saying that he thought the concepts taught in the module would have been easier to apply had it been in a workshop setting where faculty can apply what they have learned and share ideas on best practices for problem-based and case-based teaching. The merits and limitations of collaborative learning have been increasingly addressed as a variety of approaches have been adopted such as "Professional learning communities" (e.g.,

DuFour, Eaker, & DuFour, 2005; McLaughlin & Talbert, 2006; Mitchell & Sackney, 2000; Zmuda, Kuklis, & Klein, 2004), and it is clear that the desired outcomes are not always realized unless genuine issues of professionalism are considered (e.g., Servage, 2009). This is another aspect that can be woven into online learning modules to more fully contextualize professional faculty development and promote reflection on what it means to be a “Professional educator.”

### **Summary of Strengths and Limitations**

This study was the first to be conducted in Kuwait in the field of faculty development. The participants responses to the module was overall positive as the needs assessment revealed gaps in knowledge on adult learner characteristics and student-centered methods of instructions which the online module addressed. The condensed design of the module however may have limited the participants from experiencing the full learning that was intended. Moreover, while the online set up was convenient for the participants, it prevented them from experiencing collaborative learning.

### **Implications for Future Research**

The module designed for this research was a proof of concept effort to introduce faculty development programs into Kuwait University Faculty of Dentistry. The concept or the need of faculty development programs have already been proven and reported in the literature (Hendricson et al., 2007; O’Neill & Taylor, 2001; Bland et al., 2000). Moreover, in the 2001 report, the American Dental Association recommended providing trained faculty to meet the challenges of curricular change, promote public oral health through integration of communication technologies into practice, and responding to evolving student needs and expectations. Since then, the majority of American dental school started faculty development



departments, programs, and when programs already existed, schools modified and enhanced the programs further to correspond with standards and expectations in the literature.

The Faculty of Dentistry at Kuwait University is planning for curricular changes, including incorporation of problem-based learning and other student-centered learning strategies. The success of such transition requires careful planning and training of faculty for the new methods of instruction. First steps could include the establishment of a faculty development department, where faculty with educational degrees can collaborate with experts in the field to develop pedagogical knowledge and pedagogical content knowledge of the faculty. Moreover, such support should include technology developed and supported faculty development in addition to traditional platforms of teaching and learning.

The data generated from this study would help to establish the foundational work to design a more substantial treatment of the various concepts covered in this study in a larger professional development program. The plan for future design of faculty development programs is mainly using direct interaction between all stakeholders through settings that include seminar series and workshops. Each of the three sections covered in the module of this study can be addressed as a standalone topic in faculty development workshops and/or series. Flipped classrooms, or blended learning, where online learning precedes group based discussion and expansion of the learned material is becoming more common in dental and medical education (Rooney, 2003). The feedback and information gathered from the experimental modules such as used here, can serve as a guide to improve and expand future program designs that encourage collaborative and transformative learning.

The products used in this study (i.e. modules, templates, instruments, and evaluations) could serve as a guide or a starting point to scaffold future more extensive online learning

modules. Design-based research is becoming particularly productive in improving the quality and effectiveness of curricula (Fishman, Penuel, Allen, Cheng, & Sabelli, 2013). In this approach, the curriculum framework is designed using published evidence-based practices, and successive versions of the curriculum are subjected to classroom evaluation to iteratively improve the product based on cumulative evidence of increased performance of the learners. This modern method of curriculum design can be productively applied to adult learning, especially professional development curricula where relevance to the learner is paramount.

The participants reported that adapting student-centered instruction and designing material to support it is time consuming beyond what is reasonable or feasible. Therefore, a team of faculty collaborators of multiple disciplines is needed to design, test, and apply products and materials intended for student-centered instruction. Additional experimental research is also warranted where the novel designed products for professional development are evaluated by comparing the gains in student learning with the new methods compared to methods more typically used in traditional adult learning.

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Appendix A  
Institutional Review Board Approval, Teachers College

**TEACHERS COLLEGE**  
COLUMBIA UNIVERSITY

*Teachers College IRB*

*Exempt Study Approval*

To: Haneen Alyaseen  
From: Curt Naser, TC IRB Coordinator  
Subject: IRB Approval: 16-263 Protocol  
Date: 03/22/2016

Thank you for submitting your study entitled, "*A Professional Development Program for Dental Educators in Kuwait*," the IRB has determined that your study is **Exempt** from committee review (Category 1) on 03/22/2016.

Please keep in mind that the IRB Committee must be contacted if there are any changes to your research protocol. The number assigned to your protocol is **16-263**. Feel free to contact the IRB Office by using the "Messages" option in the electronic Mentor IRB system if you have any questions about this protocol.

Please note that your Consent form bears an official IRB authorization stamp and is attached to this email. Copies of this form with the IRB stamp must be used for your research work. Further, all research recruitment materials must include the study's IRB-approved protocol number. You can retrieve a PDF copy of this approval letter from the Mentor site.

Best wishes for your research work.

Sincerely,  
Curt Naser, Ph.D.  
TC IRB Coordinator  
curtn@axiomeducation.com

**Attachments:**

- Informed Consent\_modules.pdf
- InformedConsent\_pre.pdf

## Appendix B

### Needs Assessment

Thank you for agreeing to take part in this survey on faculty needs at the Faculty of Dentistry – Kuwait University. Your answers reflecting your opinions will help us serve you better in the future. This survey should only take 10 minutes to complete. Below are clarifications of the terms used in this survey to help you answer it.

**Faculty development programs** are planned programs to prepare institutions and faculty members for their academic roles including teaching, research, administration, writing/scholarship, and career management. The scope of faculty development also involves developing research capacity, career development, and leadership development.

**Problem based learning** is a student-centered teaching/learning method that is centered on using open inquiry to address ill-structured real-world problems, typically through student participation in discussion groups and problem-solving activities.

**Case based learning** is a student-centered teaching/learning method that is centered on using guided inquiry to address well-structured simulation of real world problems

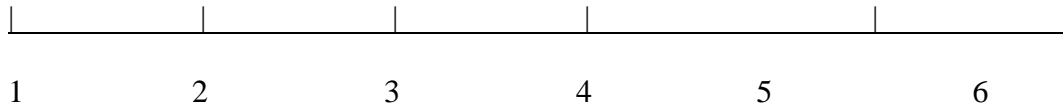
### **Background information**

1. What is your specialization? \_\_\_\_\_
2. What year did you receive your DDS or other degree? \_\_\_\_\_
3. What medical degree do you hold (DDS, BDM, DMD)? \_\_\_\_\_
4. How many years have you been teaching dental medicine? \_\_\_\_\_
5. How many years have you been on faculty at KU? \_\_\_\_\_
6. Among your professional obligations, including professional practice of dentistry, how would you rate your role as a dental faculty member (teacher) (please mark the point on

the scale that is most relevant.) That is, how important relatively do you rate your role as a (teacher) faculty member compared to other roles (practitioner, researcher)?

Least important  
important

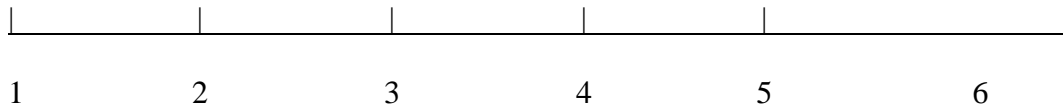
Most



7. Among your obligations as a dental faculty member, how would you rate the amount of time devoted to teaching versus other responsibilities that you have? Mark the point on the scale that is most representative.

Least time commitment

Most time commitment



8. Please list all the courses that you are currently teaching.

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**Dimension 1: Need for faculty development (Circle the best choice)**

Question	Strongly Disagree	Disagree	Neither agree not disagree	Agree	Strongly Agree
Faculty development programs are an important opportunity for faculty improvement.	1	2	3	4	5
Faculty development programs would help me prepare for teaching dentistry.	1	2	3	4	5
Faculty development programs may be beneficial to new/junior faculty	1	2	3	4	5
Faculty development programs may also be beneficial to experienced/senior faculty.	1	2	3	4	5
I can envision gaining additional classroom teaching skills.	1	2	3	4	5
I can envision gaining additional clinical teaching skills.	1	2	3	4	5
I am interested in attending/participating in a faculty development program.	1	2	3	4	5

**Dimension 2: Learning theories (Adult learners, transformative learning, constructivism)**

**(Circle the best choice)**

Question	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
I think it is the responsibility of the faculty to motivate their students to learn.	1	2	3	4	5
Students can learn on their own by interacting with the content material, i.e. learning can be a completely individual process.	1	2	3	4	5
Student's prior knowledge influences how they gain and understand new knowledge.	1	2	3	4	5

**Dimension 3: Pedagogies: Problem based learning (PBL) (Circle the best choice)**

Question	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
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		disagree			
PBL is an appropriate dental learning strategy.	1	2	3	4	5
A PBL facilitator should be an expert in the content being learned.	1	2	3	4	5
Providing foundational knowledge is important for students' PBL learning .	1	2	3	4	5

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**Dimension 4: Pedagogies: Case based learning (CBL) (Circle the best choice)**

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Question	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
I am familiar with the concept of case based learning	1	2	3	4	5
I understand the difference between problem based and case based learning	1	2	3	4	5
I feel confident in my skill to	1	2	3	4	5

---

---

design a case for a CBL session

The open inquiry nature of PBL is

superior to the guided inquiry

1

2

3

4

5

nature of CBL for students

learning

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Add any additional information on topics that you would particularly like to see included in a professional development program.-

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## Appendix C

### Student Learning Outcomes based on Blooms' Taxonomy

Identify a course that you believe is representative of your courses that you teach.  
What major topics are taught in this course, please list some below.

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With respect to this course, on a scale of 1 to 4 how important are each of the following student learning outcomes where 1 = definitely not, 2 = not important, 3 = important, and 4 = definitely important. Enter the number in the space provided after each learning outcome statement.

#### Learning outcomes

##### Conceptual Knowledge

Acquire and recall concepts and generalizations. [     ]

##### Comprehension

Ability to communicate and use conceptual knowledge. [     ]

##### Application

Use new information and apply it to solve problems, etc. [     ]

##### Analysis

Identify components and critically analyze them. [     ]

##### Evaluation

Apply relevant criteria to make critical judgments. [     ]

##### Creating

Apply knowledge to create a product or generate hypothesis [     ]

## Appendix D

### Student Initial Abilities in Group Discussion and Problem Solving

The initial abilities that students bring to a learning situation are important, especially for active learning such as CBL and PBL. Think about your “typical” class of students and rate them on how able they are for each ability when they first arrive at your class using a scale of 1 to 4, where 1 = definitely not ready, 2 = not ready 3 = ready, and 4 = definitely ready. Enter the number in the space provided after each learning outcome statement.

#### **Communication**

Exhibiting listening and collaboration behaviors.	[	]
Seeks clarification and verification of ideas	[	]
Exhibits peer teaching to facilitate shared understanding	[	]

#### **Knowledge Base**

Asks clarifying questions and seeks information	[	]
Integrates concepts and information across disciplines	[	]
Recognizes limitation in knowledge develops learning goals to address the limitation	[	]
Explores concepts through several levels of organization	[	]

#### **Reasoning Process**

Uses evidence to support generated hypothesis and modifies hypothesis based on patient information and newly acquired knowledge	[	]
---	---	---

Discuss and challenge concepts with others in a constructive manner	[	]
---	---	---

Stimulate self and others to critically think about learning issues	[	]
---	---	---

#### **Professionalism**

Maintains honesty, integrity, and ethical responsibilities	[	]
Respects others and provides and maintains a safe and healthy group environment	[	]
Accepts responsibility for obligations and responsibilities to the group	[	]

#### **Assessment Skills**

Accepts constructive feedback	[	]
Modifies behavior based on self assessment and feedback received	[	]
Accurately self-assesses own strengths and weaknesses	[	]

## Appendix E

### Template for CBL Lesson Design and User's Percepts of the Task

Please write your name:

State the topic of the lesson

**Topic:**

**Objectives:**

Conceptual knowledge:

Cognitive skills:

**Situation (Trigger, complaint or general context for the group to consider):**

**Resources provided:**

**Learning Activities:**

**Assignment(s): (what is the product or report the students are to submit?)**

**Evaluation of the lesson processes and outcomes:**

Group processes: [See assessment rubrics in the PowerPoint module]

Group report: [outcomes such as Bloom’s taxonomy knowledge and skills]

**Procedures for follow-up and student feedback:**

**Appendices [additional material you may want to attach to illustrate any aspect of the lesson.]**

**WHEN FINISHED, RESPOND TO THE ATTACHED LIKERT-SCALE ITEMS ON YOUR PERCEPTIONS OF THE LESSON PLAN YOU HAVE DEVELOPED**

Mark the option that best represents your response to each item.

I was satisfied with the information I was given in the module on how to plan such a lesson.

Definitely disagree	Disagree	No opinion	Agree	Definitely agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5

I felt confident that I could do this task in my everyday teaching, if I chose to do so.

Definitely disagree	Disagree	No opinion	Agree	Definitely agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5

This kind of learning experience is likely to be welcomed and interesting for my students.

Definitely disagree	Disagree	No opinion	Agree	Definitely agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5

Such a lesson is sufficiently reasonable in terms of time commitment that I could do it.

Definitely disagree	Disagree	No opinion	Agree	Definitely agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5

Such a lesson is likely to yield better critical judgment skills for the students compared to lectures.

Definitely disagree	Disagree	No opinion	Agree	Definitely agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5

This lesson is likely to provide a comprehensive opportunity to learn how to be a better dental practitioner.

Definitely disagree	Disagree	No opinion	Agree	Definitely agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5

PLEASE SAVE THIS ENTIRE WORD DOCUMENT BEFORE CLOSING IT OUT AND RETURNING TO THE LEARNING MODULE.

Appendix F  
Example of the Lesson Plan Framework

**Topic:** Case study of patient with gingivitis and possible periodontitis

**Objectives:**

Conceptual knowledge: To gain greater expertise in the histological and pathological characteristics of gingivitis and potential periodontitis.

Cognitive skills: To critically analyze and evaluate clinical practices and professional plans for patient care based on case history.

**Situation:**

The case involves a patient who presents evidence of serious gingivitis on repeated visits to the clinic. The clinical records, diagnoses, procedures applied, and plan for patient care will be presented, including evidence of appropriate oral hygiene education presented to the patient. The task will be for the class to carefully examine the case evidence, critically discuss the evidence presented, reflect on the appropriateness of professional decisions, and render a consensus judgment of the adequacy, quality and likelihood of success of the professional practices. Additionally, any suggestions that the class may recommend for improved professional practice in such cases where severe gingivitis may lead to more serious conditions such as periodontitis will be encouraged.

**Resources provided:**

In addition to the information described above in the case history documentation, the following online resources will be offered to help the class begin seeking external sources of information that they may choose to obtain.

Online sources

*Gingivitis: Background, Pathophysiology, and Epidemiology*

<http://emedicine.medscape.com/article/763801-overview>

*Periodontitis: Background Information*

<http://www.mayoclinic.org/diseases-conditions/periodontitis/basics/definition/con-20021679>

*Periodontitis: Treatments and Drugs*

<http://www.mayoclinic.org/diseases-conditions/periodontitis/basics/treatment/con-20021679>

*Printed Material to distribute*

POLICIES AND PROCEDURES MANUAL of the DENTAL CARE CENTER  
School of Dental Medicine.

**Learning Activities:**

The class of 24 students will be divided into three groups of eight each. They will be introduced to the topic and basic procedures of case study analyses (summarized from the information presented to them online before class). The students will be presented with the case materials, the objectives of the class will be explained and questions invited to clarify the purpose and procedures of the class. They will be informed that a final consensus report is to be submitted summarizing their deliberations and recommendations, including any suggestions for improvement of the case study procedures assigned in the class.

The instructor will serve as a resource person and move among the class participants, listen to their dialogue and provide indirect guidance as may be needed and/or answer questions on background information without providing direct guidance on their critical reflection, discussion and final conclusions.

**Assignment(s):**

The group consensus report will include a summary of the evidence used and/or gathered, the major issues relevant to the case that were discussed, the major questions and clarifications that had to be addressed, the nature of their critical judgments with respect to the circumstances and decisions rendered, and a final statement of their evaluation of the case and the professional practices, etc.

**Evaluation:**

Group processes

Rubrics designed to evaluate the quality of group discussion and critical thought will be used, including evidence of their analytical thinking skills and ability to make evaluations and sound judgments based on well conceived criteria and relevant medical evidence.

Group report

The group report will be evaluated based on the quality of the following indicators:

Quality of the report of the evidence discussed and summarized.

Professional relevance and depth of the questions that were addressed.

Evidence that the recommendations made were based on careful reflection and consistent with best practices as contained in the online resources and the Manual of Dental Care.

Overall quality of the organization, clarity and accuracy of the information in the summary statement.

**Procedures for follow-up and student feedback:**

At the next meeting of the class there will be a brief discussion of the learning experience and suggestions for future improvement. Each group will briefly summarize their group report. The instructor will engage in a discussion of the strengths and potential areas of improvement of their group work and report.

**Appendices:**

Samples of the rubrics to be used in evaluating group discussion.

[Here I would presume would be examples of the group process rating scales you taught them, and you could insert a few here to help your students get the final idea.]

Appendix G

**SCORING RUBRIC  
Lesson Plans**

Name \_\_\_\_\_

Lesson Topic \_\_\_\_\_

Dimensions to be Scored

- 1. Topic appropriateness for CBL or PBL \_\_\_\_\_
- 2. Quality of Knowledge Objectives \_\_\_\_\_
- 3. Quality of Skill Objectives \_\_\_\_\_
- 4. Situation appropriateness \_\_\_\_\_
- 5. Appropriateness of resources \_\_\_\_\_
- 6. Activities appropriateness \_\_\_\_\_
- 7. Evaluation procedures \_\_\_\_\_
- 8. Lesson plan alignment \_\_\_\_\_

(To what extent are the objectives, resources, activities, and evaluation procedures consistent and logically linked?)

Total Score \_\_\_\_\_

Code

Unsatisfactory = 0 [fails to meet minimum expectations]

Satisfactory = 1 [meets all expectations adequately]

Excellent = 2 [particularly good creativity and quality]

Superior = 3 [ Remarkably aligned design, with unusual creativity in design and development of student professional skills]

Comments:

\_\_\_\_\_  
\_\_\_\_\_



Appendix H  
Post-instructional Survey

POST-SURVEY INSTRUCTIONS

Post-Survey Items to be Completed Regarding CBL and PBL learning after using the PowerPoint module

To: participants in the module course on case-based learning (CBL) and Problem-based learning (PBL) methods

This survey is an identical form survey to the Pre-Survey you completed before using the PowerPoint learning module. This survey is intended to assess your understandings and opinions after you have used the PowerPoint learning module.

As in the Pre-Survey, if you believe that you have no clear or firm opinion, then the best option is to choose “Neutral.” Otherwise, if you now have a better understanding, choose an option that you believe best represents your present knowledge or opinion.

Please respond to each item

1) Adults as opposed to younger learners are less likely to require a justification for what they are learning or explanation why it is relevant.

Definitely disagree	Disagree	Neutral	Agree	Definitely agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5

2) In many cases, given the complexity of medical education, the student’s past experiences are not particularly relevant to new learning in dental education.

Definitely disagree	Disagree	Neutral	Agree	Definitely agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3) Self-concept is largely addressed in studies of adolescents and is less important in understanding how adults learn.

Definitely disagree	Disagree	Neutral	Agree	Definitely agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4) In identifying learning objectives using taxonomy of objectives, the lowest level is “Knowledge.”

Definitely disagree	Disagree	Neutral	Agree	Definitely agree
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5) Both Case-based learning and problem-based learning are considered to be student-centered.

Definitely disagree Disagree Neutral Agree Definitely agree

6) In general, PBL differs from CBL because PBL reflects real practice, common conditions in the community, and important pathological and psychological phenomena

Definitely disagree Disagree Neutral Agree Definitely agree

7) In assessing adult learning such as CBL and PBL approaches in dental medical education “Communication skills” in general are categorized as equally important as logical ones such as “Reasoning,” etc.

Definitely disagree Disagree Neutral Agree Definitely agree

8) Assessment skills related to learning are largely the responsibility of the instructor in a course.

Definitely disagree Disagree Neutral Agree Definitely agree

9) Comparatively, CBL and PBL both require analytical skills, but PBL focuses more on solving a problem or for example creating a plan for medical treatment.

Definitely disagree Disagree Neutral Agree Definitely agree

10) At this point, I consider that my knowledge of CBL and PBL is sufficient to be highly successful using the methods.

Definitely disagree Disagree Neutral Agree Definitely agree

11) I know how to prepare lesson plans for either CBL or PBL teaching methods

Definitely disagree Disagree Neutral Agree Definitely agree

12) At this time, I believe that I have sufficient sound information to provide some guidance to other faculty who would like to try using either CBL or PBL methods.

Definitely disagree    Disagree                      Neutral                      Agree                      Definitely agree

## Appendix I

### **A Topical Summary of the Major Themes Addressed in the Online Professional Development Module**

A summary of each major section of the professional development module is presented.

#### **Title of module**

CASE-BASED (CBL) & PROBLEM-BASED (PBL) LEARNING IN DENTAL EDUCATION:

Theory, Lesson Planning, and Assessment Strategies

#### **Introduction**

Overview of the organization of the module with information on some aspects of how to navigate interactions using hyperlinks, etc.

The three major sections of the module are listed:

First part, adult education principles.

Second part, comparison of Case-based (CBL) and Problem-based Learning (PBL) methods.

Third part, designing CBL lessons as a final focus.

Instructions for navigating the sequence of slides and accessing linked information.

#### **Theories of Adult Learning & Bloom's Taxonomy**

This section explores:

Some of the main characteristics of adult learners that are typically presented in several adult learning theories, especially those useful for CBL and PBL methods

A taxonomy of learning outcomes, called bloom's taxonomy based on the main author: Benjamin Bloom

Examples of Bloom's Taxonomy objectives document hyperlinked (Appendix C)

Students' learning outcomes including categories such as "Communication skills," "Knowledge Base," "Reasoning Process," "Professionalism," and "Assessment Skills."

#### **CBL/PBL Assessment**

This section explores:

Areas of assessment and their criteria including communication, knowledge base, reasoning process, professionalism, and assessment skills.

Guidelines and tips on how to design a rubric, sample of a rubric.

Students' initial abilities document hyperlinked (Appendix D)

## **CBL/PBL Overview**

What is CBL, what is PBL?

Similarities and differences between CBL and PBL

Uses of CBL and PBL in dental education

Guided inquiry

## **CBL Lesson Plan Design**

This section explores:

Design of learning material

Components of CBL case including context, trigger, complaint, event, and tutor guide

Sample lesson for case study (Appendix F)

Case study videos hyperlinked

Outline for CBL lesson plan

Lesson Plan template hyperlinked (Appendix E)