



# Web-Based Continuing Dental Education in California

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## ABSTRACT

*This article asks and answers a series of questions about Web-based continuing education for dentists. A summary of these answers are: (1) all indicators point to a substantive increase in the number and types of continuing education courses in the next five years; (2) the main reasons to take an online dental C.E. course are that it is available at any time from any location that has an Internet connection and the total cost per unit will be substantially lower compared to traditional C.E. courses; (3) the best type of online C.E. course would be one that has an identified experienced expert instructor, provides a case-based or problem-based approach, and provides an interactivity opportunity between the instructor and student via chat room or e-mail; and (4) online continuing dental education is simply one of many methods that can be used by dental practitioners and will not replace other continuing education methods but rather supplement them. In summary, as more and more online dental C.E. courses become available, it is hoped they will be designed to be more than a series of slides since this method does not take advantage of the unique features and opportunities provided by the Internet.*

With the continued invasion of the Internet into many aspects of life, it is inevitable that it will begin to change the way California dentists engage in continuing education. The only questions are, "How soon is this change going to happen, and will it be an improvement?" By simply searching the World Wide Web for online dental C.E. offerings, it is possible to easily find more than 300 courses and eight providers. Based on the expansion of the e-learning field and improvements in technology, it is also highly likely that this number will grow rapidly in the next five years.<sup>1,2</sup> A partial listing of the online course providers is provided in **Table 1**. What is not known about these companies is the volume of clients that register to take C.E. courses from them or their profitability.

Many educational experts claim that most online courses are not de-



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Table 1

## A Partial List of Providers of Online Continuing Dental Education

Internet address	Physical address	Cost per C.E. unit	Courses in catalog
DenTrek.com	LearnHealthSci. Inc. 5786 La Jolla Mesa Drive La Jolla, CA 92037-7720	\$25 to \$35 per unit	64
DentalDidactics.com	Dental Didactics 200 N. La Cumbre Road, Suite L Santa Barbara, CA 93110	\$6 per unit	22
FICE.com	FICE 899 S. College Mall Road, Box 362 Bloomington, IN 47401-6301	\$30 per unit	16
eHealthcareCEU.com	eHealthcareCEU 6330 Brockway Road LeRoy, OH 44086	\$20 per unit	12
marquette.edu/dhforum	DH Forum c/o Marquette University Continuing Education 1918 W. Wisconsin Ave., #250 P.O. Box 1881 Milwaukee, WI 53201-1881	\$10 per unit	4
dentalpro.intelihealth.com	(this is a wholly owned subsidiary of:) Aetna Inc. 151 Farmington Ave. Hartford, CT 06156 (partnered with the University of Pennsylvania Dental School)	\$25 per unit	22
Dentalxchange.com	Dentalxchange 2201 Dupont Drive, Suite 650 Irvine, CA 92612-1515	\$20 per unit	164
ArcMesa.com	ArcMesa Educators 788 Shrewsbury Ave. Tinton Falls, NJ 07724	\$10 to \$15 per unit	45

signed as well as they should be. A recent article<sup>3</sup> on the use of the Internet for educating practicing physicians makes the following statement: *“While the Internet offers an educational distribution system accessible to practicing physicians, most CME online programs are text-based and infrequently interactive or guideline-based. It is unlikely that these programs have broad impact on physicians’ practice patterns. Neither the broad capacities of Web technologies nor the evidence of effective methods for influencing physicians’ practice patterns has influenced the design of most CME programs.”*

Of course, although online courses are not yet designed to take full advantage of their educational potential, they are being developed and offered to medical and dental professionals nonetheless. The cautious individual would ask two more questions. “Why take an online C.E. course when you can take a lecture-based C.E. course?” and “If I want to take a dental C.E. course online, what should I look for?” This article examines these two questions by presenting information on what is currently available in the online C.E. arena to California dentists

and dental professionals and by speculating on what will be available in the near future. It makes suggestions about the educational value of courses to potential consumers of online dental C.E. Specifically, this article considers how online courses might be best designed with regard to their instructional strategy (e.g., linear slide-audio presentations versus problem-based learning). Some of the recommendations in this article are based on personal experiences of the author as well as a thorough review of the online educational literature as it relates to



Table 2

### Problems With Lecture-Based Continuing Education Instruction

1. Lecture-based instruction is a passive experience for the attendee and while some students do well with this format, many others do not, including those with attention-deficit problems or low long-term retention.
2. Adult learners have different learning characteristics from traditional college or professional students. In general, adult learners are highly motivated; they want content to be relevant and well-organized. Adult learners are self-directed and independent; passive experiences are not preferred.
3. Traveling to and from continuing dental education courses requires substantial time beyond the time for the course itself. This is an unimportant issue if the dentist lives near the dental school or C.E. venue where the course is being provided. Often professionals do not have the extra time needed to access many C.E. courses because of family- and job-related responsibilities.
4. The costs for a C.E. course also will include time away from work, travel (airfare, train, automobile), lodging, and food. These costs may double or triple the cost of the course.

the alternative (e.g., traditional live C.E. courses). Clearly, there are numerous examples where a live C.E. course is a better choice (e.g., for hands-on training in a specific technique). As a starting point for making the comparison between traditional courses and online courses, it is logical to first identify the difficulties inherent in traditional lecture courses. The summary in **Table 2** provides no comparisons or criticisms of hands-on laboratory courses since lecture-based, linear presentations of content are the predominate way information is transferred from instructor to student in most dental C.E. courses in California.

The main problem associated with a lecture-based course is that it is a passive experience for the attendee. While this is efficient for large groups and probably less time-consuming for the instructor than numerous small-group seminars where problems and cases are discussed, it is ill-suited for most adult learners who typically desire a more active educational experience. Nevertheless, in a traditional, lecture-based, linear-presentation-style course, the lecture occupies 80 percent to 98 percent of the student-instructor time. This is true even though it is a well-established fact that most students do not learn efficiently by this method.<sup>4-6</sup> In many courses, student-to-student or student-to-faculty discussion occupies less than 2 percent of class time, on average, even in small-enrollment classes.<sup>7</sup> Disagreement with the instructor is generally unacceptable, and traditional instruction stresses memorization and recall rather than conceptual understanding.<sup>8</sup>

Another difficulty with traditional C.E. programs is a logistical one, in that travel by the student to the course venue is required. While sometimes this is desirable (when the C.E.

learning effectiveness of Web-based instruction versus traditional lecture-based instruction.

### Why Take an Online C.E. Course?

The obvious answer to the above question is that there is an ever-increasing need to keep current with procedures, preventive modalities, legislation, materials, methods, and concepts. Moreover, as increasing numbers of practicing dentists become more knowledgeable about the Internet and have computers with high-speed connections, the potential numbers of distance learners increases. The dentist with a wide curiosity, a high-bandwidth Internet connection, no need for continuing education credits, lots of time, and a willingness to take disparate information and piece it together could use the Internet to surf for information. This surfing would involve three methods: looking at the entire Web using a browser (e.g., [www.google.com](http://www.google.com), [www.profusion.com](http://www.profusion.com), [www.altavista.com](http://www.altavista.com)); searching the online National Library of Medicine public medical information service called MEDLINE (<http://www.nlm.nih.gov/>), where it is easy to find journal ab-

stracts and online scientific publications; and looking at U.S. dental and medical school Web sites, where much information is posted for current students but is also visible to others without restriction. The problem with these methods of surfing is that the information found is usually not highly organized or focused and often many Web sites with material of questionable integrity are retrieved, thus requiring a significant amount of time spent in sorting through the volume.

On the other hand, if a dentist wants to access organized and focused information using the Internet, and does not mind paying for the time of an expert who has organized the content into a logical learning program, then online courses are logical. It is easy to anticipate that the more savvy dentists become, the more they will begin to expect C.E. to be delivered at the same pace they can get information elsewhere, namely on demand.

Ideally, one should partake of an online course if it provides an educational experience that is evidence-based, well-presented, customized to the needs of the learner, and more convenient and cost-effective than

Table 3

**The Design Features of an Ideal Online Course<sup>‡</sup>**

Factor	Ideal design	Less than ideal
Pre-test	A pretest is used to assess the student's current knowledge and then modify the course content based on his or her existing level.	No pretest is provided.
Preview option	A short preview of the course is available for the potential student to view before enrolling.	Does not have a preview option.
Technology	While some technology is required, it is relatively simple with few associated presentation problems.	The required technology is complex, it requires many downloads, and it hangs up the computer or is slow or fractured in the audio or video. (Obviously, this will be very dependent on the user's computer and expertise.)
Interactivity	The course is faculty proctored; there is ample student-to-faculty discussion (e.g. list-server or faculty e-mail provided); and a student-to-student discussion forum (e.g. chat room) is available and encouraged. A proctored course will, by necessity, have some time limitations associated with it. Thus, while the course can be accessed 24 hours during the time it is offered, the course must have a clear start and stop point.	Course is not proctored and has no discussion forum or no time for Q & A.
Case-based	Case-based or problem-based content with branching presentations that allow the student to progress at his or her own pace according to his or her own expertise and ability. Current courses that earn 1 to 2 C.E. units do not lend themselves to multiple levels of content.	Course is a fact-based presentation of date provided in a linear fashion (e.g. slides with text or audio).
Quiz	Assessment method (e.g., quiz) challenges the student to think and respond and is presented frequently with immediate detailed written feedback.	Quiz is simple regurgitation of facts (e.g. multiple choice) without adequate immediate feedback options.
Credentials of course author	The author is a clear expert* in the field and also an excellent teacher and has had additional training in online education.	The author is not identified or not an expert.*

<sup>‡</sup>For California licensed dentists who need state-authorized C.E. credit, it is also important to make sure the course vendor is registered and the course is approved for C.E. credit in California. This certification is typically evident on the vendor's Web site. Moreover, some of the nonproctored online courses will be considered similar to "correspondence courses," and there are restrictions on the total number of units that can be applied to the 50 C.E. units every two years requirement in California. Other courses, where there is instructor interactivity and proctoring, will not be subject to these restrictions. It is critical for the student to establish these facts with the vendor before registering.

\*Defining what constitutes an "expert" is difficult; but in the course author's biosketch, it would be appropriate to see advanced training in the field, membership and a service record in the appropriate professional society that deals with the expert's claimed focus, multiple publications in peer-reviewed journals and invited chapters in textbooks, and a teaching post at a recognized university-level educational institution where they teach the topic of concern.

is offered in a vacation locale), it is always time-consuming; and there are expenses above and beyond the course itself. A full accounting of these costs would result in a figure that would double or triple the cost of the course above that of the course tuition.

**Pros and Cons of Online Courses**

It is also appropriate to critically look at Web-based instructional issues. First, very few of the Web-based courses offer more than a downloadable or online viewing of slides with associated text and/or audio. Very few of the den-

tal C.E. course offerings in the marketplace are proctored by an instructor and offer instructor-student interaction. While a number do offer online testing opportunities in which the student receives automatic and immediate feedback about the correct answer, oth-



ers only instruct the student to e-mail test answers to the provider's address before a certificate is issued. A critical negative point is that most of these currently available online courses do not have any options for instructor question-and-answer periods. Of course, both synchronous chat rooms and asynchronous list-serve discussion groups are readily available options for any course on the Internet; but these are not generally used in dental C.E. programs. **Table 3** presents the pros and cons one can use to judge the quality of an online course.

Spallek and colleagues recently reported on the types and nature of existing courses and discussed the merits of online dental C.E. courses.<sup>10</sup> Specifically, they surveyed 436 past online C.E. course participants who had participated in nine online courses provided by six organizations. They asked questions about the reasons for enrollment, course expectations, and resulting satisfaction. They had only a 39 percent response rate, and data from the nonresponders could have substantially altered the results. Nevertheless, they reported that online dental C.E. courses generally meet the needs and expectations of the course participants. When there were complaints, they were typically of two types: the lack of communication with peers and instructors and courses that appeared to be outdated.

### ***Are Online Courses Important to Medical C.E.?***

This question is difficult to answer since the number and variety of medical practitioners is almost as vast as the number and types of online educational opportunities. Recently, however, the use of the Internet by dermatologists in the United Kingdom, Sweden, and Norway was examined.<sup>11</sup> Data were collected using questionnaires mailed to 1,291 members of the dermatologi-

cal societies of the United Kingdom, Sweden, and Norway. Approximately 51 percent responded; and 95 percent of those claimed access to the Internet at work (77 percent) and/or at home (83 percent). Moreover, 62 percent found medical databases on the Internet; and 25 percent believed the Internet version of medical journals to be important for their continuing medical education. In contrast, 83 percent believed that medical journals on paper, medical meetings (81 percent), and various forms of contact with peers

and colleagues (62 percent to 66 percent) were important to continuing medical education. Statistical analysis showed that age and private practice were negative predictors for Internet use ( $p < 0.001$ ). This study shows that although a large proportion of dermatologists, especially younger doctors, use the Internet for medical and educational purposes, Internet use has not yet replaced traditional ways of obtaining medical C.E.

Similar data is not available for dental specialists, and certainly the number of online dental C.E. courses is considerably less than those available in medicine; but some predictions can be made from the above data. First, it is likely that dentists who enroll in on-

line C.E. will tend to be younger than those who take traditional lecture-based live C.E. courses. This prediction is based on the fact that younger practicing dentists are likely to be more familiar with Web-based instruction because they probably experienced this method of teaching during their schooling. Second, it is also easy to predict that online continuing education will, at least in the short term, only supplement other methods of education (e.g., paper-based journal articles, dental meetings, and interaction with colleagues).

### ***Are Some Methods of Teaching Better Than Others?***

A recent paper described the issues considered critical to instructional design when attempting an evidence-based online course for medical students.<sup>12</sup> The focus in the paper was on the need to break away from the traditional educational models, which are typically based on acquisition of factual knowledge. It was strongly suggested that if a Web-based course is to take optimum advantage of its technologic potential, it needs to:

- Provide many links to online textbooks, syllabi, and Web-sites with high-quality content that can be accessed as needed in a nonlinear fashion;
- Take a problem-based approach;
- Incorporate student-to-student chat rooms, make e-mail addresses available, or create course list-serve groups for faculty-to-student communication; and
- Utilize frequent online student assessment and feedback tools so that students and faculty can gauge where they are in their educational quest.

Even more important is the work by Casebeer and colleagues<sup>3</sup> which suggests that to achieve a substantive behavioral change as a result of a Web-based C.E. course, it is necessary to de-

Figure 1

### Suggested content and links for a problem-based, multilevel, Web-based continuing education course

#### Suggested Online Course Web Page

1. Link to short preview of course.
2. Link to author's biographical sketch.
3. Registration and payment for course.
4. Links to suggested reference materials (e.g., online books, online articles, online syllabi, other Web sites that contain valuable information).
5. Link to student biosketches (optional).
6. Link to pretest to assess level of existing knowledge.
7. Link to problems/cases ready for solution. Ideally, several cases/problems will be available at different levels of difficulty.
8. Link to case/problem posting site. Here, each student or group of students would post their solutions to a problem or case by certain date. After the deadline, answers will be available for viewing by all in class who have access.
9. Link to student-to-student discussion forum. Usually, the student discussion forum is used for a working group of students to formulate their answers to a case/problem or simply to post discussion.
10. Link to student-to-faculty discussion forum. Usually the student and faculty discussion forum is where the faculty answers specific questions posed by the students, and/or comments on the answers posted by the students.
11. Link to quiz(zes) needed to officially pass course. These quizzes are best done after each case/problem closes and allow the students to see what they have or have not learned.

of view on a topic are brought to bear.

At present, the best that can be said about online education compared to traditional methods of education is that they are equivalent. Russell performed a thorough review of the educational literature comparing distance educational methods with traditional lecture courses.<sup>15</sup> He concluded that there were no significant differences in the amount of content learned between distance education and traditional teaching methods. Of course, distance learning is a broad term that would incorporate many different methods of distant site education (e.g., video disk, live videoconferences, asynchronous online delivery of materials); and there may indeed be differences when these various methods are contrasted. For example, one paper examined the student ratings for two courses taught in both a traditional and distance format by the same instructor.<sup>16</sup> They found no significant differences in course grade or in the students' ratings of the course or instructor. Moreover, the students were split in their ratings of which course was more organized.

In the field of dentistry, one author compared a slide/audiotape teaching with Web-based teaching methods on 33 first-year dental hygiene students in an intraoral radiographic anatomy course.<sup>17</sup> These students were divided into two groups using a random assignment method. The groups used one method to study the mandibular arch and the other to study the maxillary arch. The order of study was different for each group. A test was taken at the completion of each instructional format. Thirty-one subjects completed the study, and there were no significant group difference in the mean test performance. However, almost 70 percent of all participants reported that they preferred using the Web-based format to the slide/audiotape.

In the field of medicine, one author

sign learning modules that:

- Possess a precourse assessment of the individual student's knowledge of the topic being taught;
- Result in a customized presentation of a series of short interactive cases/problems that are appropriate to the level of knowledge and skill of the student as established by the initial precourse assessment;
- Determine competency by providing questions about the case or problem to the student, immediate feedback, and a comparison of these answers to those given by peers; and
- Provide reference materials to the student so as to make the newly acquired behavior or knowledge easy to implement into his or her practice.

Casebeer and colleagues go on to suggest that Web-based instruction is

best when it is evidence-based, is problem-based, and allows for student-to-student and student-to-faculty interactions (Figure 1). Most current online courses do not utilize these features. If, however, these recommendations made were incorporated into an online course, the student would be much more likely to be an engaged active participant rather than a passive attendee. Student engagement in his or her own learning process is highly associated with better development of the student's full potential.<sup>13,14</sup> This landmark work by Astin<sup>13,14</sup> claims that the actions that promote student engagement are in-depth thinking tasks rather than short-term memorization tasks, writing tasks rather than multiple-choice tests, guided independent study opportunities, and courses where different points



conducted a controlled trial of the effect of computer-based nutrition education compared with standard lecture-based nutrition education on 49 first-year general-practice medical residents.<sup>18</sup> Assessment was done with a 79-item pre-post pencil-and-paper examination and three incognito standardized patients' visits to the residents. Statistical analysis showed a significant group difference for both the pencil-and-paper examination ( $P = 0.002$ ) and for the three standardized patients' visits assessment checklists test ( $P < 0.001$ ). While the amount of change was modest at best, the computer-based instruction was found to be more effective.

The e-learning optimist would say the above data are a compelling reason for switching to Web-based methods since the advantages of on-demand education without leaving the office or home are the real factors of importance in choosing to go online. However, once online courses begin to improve in design and take full advantage of the capabilities of the Internet, they have the potential to be substantially better. Most studies have not measured the cost-benefit of distance education from the consumer's point of view. One example of the optimist's view of these data comes from Nettles and colleagues who reported that, while the majority of the 49 studies they examined demonstrated no significant difference between Web-based and traditional classroom education on conventional assessment tests, nearly 30 percent of the studies report that Web-based programs had positive outcomes based on student preference, improved grades, higher cost-effectiveness, and a higher percentage of homework completion.<sup>19</sup>

The e-learning pessimist would interpret these data as evidence that we should be wary of distance education since it will create a lot of busy-work,

cost a lot of money, and will not improve the educational outcome. One author found that 50 percent of instructors currently teaching a distance education course indicated that the quality of the distance education course, when compared to a traditional course, was lower.<sup>20</sup> It is not clear from this article what caused the lower quality. Perhaps it was due to course directors who were mandated to teach an online course without appropriate technologic support or training in online educational instruction design. The one conclusion that is incontro-

*It is not the instructional method that makes the difference in student learning, but the design of the course itself.*

vertible from these data is that it is not the instructional method that makes the difference in student learning, but the design of the course itself. **Table 4** provides an analysis of online C.E. course providers.

### ***Problem-Based Learning and the Web***

In the final section of this article, it is appropriate to address the interaction between Web-based learning and problem-based learning. Problem-based learning is currently a highly popular instructional strategy that is increasingly being used to replace tra-

ditional lecture-based learning. It is characterized by self-responsibility for thinking and learning, awareness of social responsibility, and thinking and acting from a scientific perspective.<sup>21</sup> Problem-based learning has been widely implemented in medical schools, some dental schools, law schools, and other pre-professional programs in both traditional and online instruction.<sup>22-24</sup> In medical school courses, students develop strategies for examining intake information, evaluate critical physical and physiological conditions of a simulated patient from multiple perspectives, and propose diagnoses. Problem-based learning is easily adaptable to Web-based instruction. For example, one author concluded that when Web-linked computers are used to support collaborative work, this substantially facilitates discussion between the student group members and the instructor.<sup>25</sup> Another author concluded that students using problem-based learning via the Web produce better quality written and oral work, investigate and propose more solutions to presented problems, and are more engaged in learning using Web-based methods than traditionally taught students.<sup>26</sup> Not all excursions in Web-based instruction using problem-based learning are as successful. For example, one author reported that if the problem-based-learning student uses the Web as his or her only source and does not collect in-depth information, the information retrieval is often incomplete, superficial, and results in an inaccurate diagnosis.<sup>27</sup> In spite of this drawback, problem-based learning via the Web offers significant enhancements to learning.

### ***Conclusion***

In this article, five questions were asked and detailed answers were provided. These questions and their answers can be summarized as follows:

## An Analysis of Current Online Course Providers

WWW address	Instructors and instructional format Feature: (+) positive; (-) negative	Technical issues and content presentation style	Other
DenTrek.com	(+) Course faculty ARE identified. (-) No student-instructor interaction (+) Available: 24 hr-365 day/yr. Most courses 1-2 hrs long.	Linear lecture style (slides with associated audio). Flash Macromedia software and Flash Player download required.	Dentists and hygienists. 5-10 min preview is available.
DentalDidactics.com	(-) Course faculty NOT identified and appear to be all authored by one person. (-) No student-instructor interaction. (+) Available: 24 hr-365 day/yr. Most courses 1-2 hrs long.	Linear lectures style (text with some images). Format is Adobe PDF, and the file is downloaded for viewing on local computer.	Dentists and hygienists. No previews
FICE.com	(-) Courses authored by one individual. (-) No student-instructor interaction. (+) Available: 24 hr-365 day/yr. Courses from 1-12 hrs long.	Linear lectures style (text and images). Format is PDF, and the file is downloaded for viewing on local computer or mailed.	Dental hygienists only. Entire course can be viewed.
EHealthcareCEU.com	(-) Course faculty NOT identified. (-) No student-instructor interaction. (+) Available: 24 hr-365 day/yr. Most courses 1-2 hrs long.	Linear lecture style (text and images). Format is PDF, and file is downloaded for viewing on local computer. Quiz scored immediately.	Dentists and hygienists. Only short description.
marquette.edu/dhforum	(+) Course faculty ARE identified. (-) No student-instructor interaction. (++) Case-based presentations! (+) Available: 24 hr-365 day/yr. Most courses 1-2 hrs long.	Most are linear presentations (text with images). File is downloaded for viewing on local computer. Can view entire course, but certificate only after paying fee.	Only dental hygienists. Only short description.
dentalpro.intelihealth.com	(+) Course faculty ARE identified. (-) No student-instructor interaction. (+) Available: 24 hr-365 day/yr. Most courses 1-2 hrs long.	Most are linear presentations, which are viewed online. Online quiz and immediate scoring are available with printed certificates.	Courses for dentists and hygienists. Short course description is available.
Dentalxchange.com	(+) Course faculty ARE identified. (-) No student-instructor interaction. (+) Available: 24 hr-365 day/yr. Most courses 1-2 hrs long, but some are longer.	Most are linear presentations, which are viewed online. They also have streaming video-audio lectures by experts. Online quiz and immediate scoring are available with printed certificates.	Short outline of course available. Courses for dentists, hygienists, and assistants.
ArcMesa.com	(+) Course faculty NOT identified. (-) No student-instructor interaction. (+) Available: 24 hr-365 day/yr. Courses 1-6 hrs long.	Linear presentation of content (text and images). File format is either HTML or PDF (which can be downloaded locally). Online quiz with immediate scoring with printed certificate.	Courses for dentists and hygienists. Only short course description available.

**1. How soon is this change going to happen and will it be an improvement?** Of course no one knows this answer, but all of the indications are that a substantive increase in the number and types of continuing education

courses is likely to occur with a five-year period.

**2. Why take an online C.E. course when you can take a lecture-based C.E. course?** The main reasons would be that most online dental C.E. courses

can be taken at any time from any location that has an Internet connection. Secondly, while the cost per unit for these courses appears to be similar to live courses, the associated costs are far less (e.g., travel, lost time from work,



hotel, and food). Another reason is that all evidence suggests that for the experienced teacher who has some experience with online education, the course is at least as good as a traditional live lecture course.

**3. If I wanted to take a dental C.E. course online, what should I look for?** The best type of online C.E. course would be one that:

- Has an identified, experienced instructor who is an expert in the topic;

- Provides a case-based or problem-based approach to the content of the course; and

- Provides an interactivity opportunity between the instructor and student via chat room or e-mail.

**4. Are online courses important to medical C.E.? While the future may change this answer, at this time they are simply one of many methods that are used by medical practitioners to gain knowledge about a new topic. It is likely this will be the same for dentistry.**

**5. Are some methods of teaching better than others?** The short answer is that the best online course is well-designed, provides accurate information, and is taught by an expert in the field. The specific course design features suggested for online courses are those that:

- Provide many links to online textbooks, syllabi, and Web-sites with high-quality content that can be accessed as needed;

- Take a problem-based approach;

- Provide a precourse assessment of the individual student's knowledge of the topic being taught and then suggest problems that are appropriate to the students precourse knowledge level;

- Incorporate student-to-student chat rooms, make faculty e-mail addresses available, or create course list-serve groups for faculty-to-student communication;

- Utilize frequent online student assessment and feedback tools so that students and faculty can gauge where they are in their educational quest and the student can rank their own competency compared to the performance of peers; and

- Provide reference materials to the student so as to make the newly acquired behavior or knowledge easy to implement into his or her practice. As more and more dental C.E. courses come online, it is hoped that they will have many, if not all, of these features. **CDA**

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