
QUALITY ASSURANCE OF EDUCATIONAL SOFTWARE COURSES OFFERED OVER THE INTERNETT (WORLD WIDE WEB) TO DENTISTS

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Objective
Introduction
Method
Criteria for evaluation
 I. Provider information
 II. Scientific content
 III. Educational content
 IV. Course characteristics
FDI database on Internet courses
References

GOAL: _____

The goal of FDI is to instigate that educational software courses offered over the World Wide Web for dentists satisfy minimum quality regarding scientific content and pedagogical requirements. Only continuing education courses of new materials and methods with proven efficacy and a sound scientific basis can adequately ensure the public's safety over time.

INTRODUCTION: _____

A new mode of continuing dental education is rapidly emerging on the Internet. After reviewing several of these online courses it becomes apparent that the quality varies greatly, and some can even be labelled as substandard, albeit such standards do not exist.

The providers of these web-based educational courses are several traditional academic institutions and professional dental organisations. In addition, a rapidly expanding number of commercial enterprises can be identified on the Internet. It is relatively easy for anyone familiar with web designing and with even only fragmented knowledge of dentistry to construct what appears to look like a professional dental educational course site. It is therefore probable that we can expect a flurry in the near future of web-based educational courses aimed for dental health care workers. Furthermore, providers of software courses on the Internet can ignore national

boundaries and can therefore realistically not be constrained by national jurisdictions.

This situation concerns the FDI, since dentists should be guided away from poor and useless web-based educational courses and be directed to high quality educational courseware that present up to date science based knowledge taking full advantage of the unique capabilities of the Internet and the computer.

At the moment there are no professional organisations in dentistry that monitor the quality of these web-based educational courses. It is therefore the intention of the FDI to keep a centrally maintained database of web-based continuing dental education courses. Moreover, the FDI will accredit the courses according to set criteria described in the following sections. The index will provide quick and accurate access to any course for dental professionals and the accreditation will hopefully incite course providers to produce high quality web-based courses.

METHOD: _____

A working group representing the FDI CEC, the FDI commission and national and international dental CAL- and educational organisations carries out the task of appraising educational software on the Internet. Additional experts will be consulted in case of divergence of opinions about satisfaction of minimum requirements.

The appraisal will centre on features of the educational software independent of technology. The hardware and software environments will not be appraised due to the constantly changing and the fact that technological standards rapidly become outdated.

Dental educational software courses encompass the three category tutorials, drills and simulations to be used on generally available web-browsers or for downloading with accompanying software to run the course.

- Tutorials are courses that provide basic instruction in a new topic and do not necessarily require mastery.
- Drills are courses that are intended to establish mastery in a topic.
- Simulations are courses that may imitate procedures for patient examination, clinical treatment, material handling, assessment of aetiology, prognosis evaluation, etc.

Educational software courses that satisfy the minimum requirements of quality will be permitted to display on the web-page the FDI-logo with an additional score level ranging from 3 to 6. The accreditation by FDI and the appraisal score will be displayed as:



CRITERIA FOR EVALUATION: _____

The criteria for evaluation that will be employed to appraise the educational courses will be an amalgamation of the paper "Judging the Usefulness of Courseware" (Edwards, 1995); relevant parts from the "Guidelines for the Design of Educational Software" (Accredited Standards Committee Medical Devices 156, 1999), and excerpts of the "Continuing Education Recognition Program- CERP" of the ADA (1999).

The accreditation levels will be from 1 to 6. Six represents a course of high and consistent quality, while 3 indicate a minimum level of professional content and appearance of the educational software. All other educational software courses identified on the Internet will be added to the database of courses available on the web pages of the FDI, but without any accreditation and appraisal score.

The educational software must satisfy minimum criteria regarding provider information and scientific content as well as pedagogical content and requirements.

The criteria for appraisal will be identical for english and non-english course.

Additional appraisal merit is given for scientific content and pedagogical requirements and learner interaction issues such as questioning, etc.

I. PROVIDER INFORMATION

Minimum requirements:

- The Internet homepage (web) address must be easily identified on the introduction page
- The course provider and address must be easily identified on the introduction page
- The cost of the course must be easily identified on the introduction page

Additional merit

- Learners should be allowed to make comments both to the courseware author(s) as well as to the responsible for the Internet homepage.
- The date of the creation or date of last update of the software should be displayed.
- Multilanguage versions of web-based courses should be encouraged

II. SCIENTIFIC CONTENT

Minimum requirements

Scientific basis

- All factual information must reflect up-to-date evidence based clinical practice.

References

- All courses must include references to the sources of the factual information

Additional merit

Scientific basis

- The content should be relevant, accurate, verified and complete.

- Participants should be cautioned about the potential risks of using limited knowledge when incorporating techniques and procedures into their practices, especially when the course has not provided them with supervised clinical experience in the technique or procedure to ensure that participants have attained competence.

References

- Resources that are referenced should be included whenever possible. Exceptions include copyrighted materials and commonly available products.
- Links that are included in the courseware should be at all times being operational.

III. EDUCATIONAL CONTENT

Minimum requirements

Educational objectives

- The introduction page must explicitly and clearly state:
 - the anticipated learner outcomes stated in behavioral or action-oriented terms for the participant. Potential course participants can then be able to determine whether the course meets their needs.
 - the information presented, content emphasis and organisation and sequence.

Accurateness

- The use of terminology must be correct

Organisation and sequence

- The prior level of skill, knowledge, or experience required (or suggested) of participants must be clearly specified

Crediting

- The course provider must issue accurate records of the individual participant's completion of the course.

Additional merit

Educational objectives

- The learner should be easily able to understand the course's goals and objectives.
- The educational objectives should preferably include description of one or more of the five items:
 - 1 changes in the attitude and approach of the learner to the solution of dental problems;
 - 2 corrections of outdated knowledge;
 - 3 provision of new knowledge in specific areas;
 - 4 introduction to and/or mastery of specific skills and techniques;
 - 5 alteration in the habits of the learner.

Content accurateness

- The completeness of the content should match the goals, objectives and audience.
- The level of detail should match the goals, objectives and audience for the product.
- The level of realism should be appropriate against the goals, objectives and audiences.

Learner-provider interaction

- Practice in applying information feedback from the learner, including course tests, should preferably occur not once immediately after instruction, but should be spread out over a number of occurrences.

- The learner should have the opportunity to react to the educational content. They should be frequent and varied, and should have an instructional purpose. The frequency of the interaction should depend on the educational objective.
- Instructors chosen to teach courses should be qualified by education and experience to provide instruction in the relevant subject matter.
- The type of interaction can be by asking questions or by direct communication with the instructor. Other interactions include making decisions, evaluating, constructing, drawing, charting, and so on. Whenever possible, a variety of interactions should be used.

Course progress control

- The learner should determine forward progress. Information should not be automatically erased until directed so by the learner.
- The learner should be allowed to repeat/review a movie, animation, audio sequences, etc.
- Learners should be allowed to exit and return to the points they left off and completed parts of the course should be marked.
- Learner data should be stored immediately so that they are not lost in case of an accidental termination or program malfunction.
- Instructions, which give an overview to the entire product, should be available on start-up.
- Help in using the product should be available and easily accessed at all times. The help should be context-sensitive, i.e. display material relevant to the current place in the course.

Course test /questions

- An evaluation mechanism must be used that will allow participants to assess their achievement of personal objectives. Such mechanisms must be content-oriented and must provide feedback to participants so that they can assess their mastery of the material.
- Activity evaluation mechanisms must be used that:
 - a. are appropriate to the objectives and educational methods;
 - b. measure the extent to which course objectives have been accomplished;
 - c. assess course content, instructor effectiveness, and overall administration.
- When the objectives of the course specifically address information acquisition, the questions should be knowledge-level questions. At all other times the questions should address the higher cognitive skills specified in the objectives.
- The learner should always have the opportunity to change any answer.
- The learner should be able to request the answer after several attempts.
- Learners should never have to correctly answer a question before proceeding.

Feedback

- If an inappropriate entry has been made, corrective and informative feedback should be provided so the learner can enter the correct response format.
- The learner should not have to search for feedback. It should be extremely obvious.
- The feedback should be erased only when the learner has indicated that they finished with it by indicating their subsequent action.
- Feedback should use the most informative format possible, e.g. include a labelled image or graphic.

- The feedback should be professional in tone. Slang and ambiguous feedback should be avoided.
- Correct answers should state why the learner is correct; incorrect answers should tell the learner they are wrong. Concurrently, the incorrect learner should be given the reason(s) why they are wrong, i.e.; the feedback should be informative.
- Feedback should be linked to the response. Subtle distinctions should be clarified

Crediting

- Verification of a course completion must clearly indicate at least:
 - the name of the course provider;
 - the date(s), location and duration of the activity;
 - the title of the activity and/or specific subjects;
 - the title of each individual course the participant has attended or successfully completed
 - educational methods used (e.g., lecture, videotape, clinical participation);
- The documentation should not resemble a diploma or certificate that attests, or appears to attest, to specific skill, or specialty or advanced educational status. Providers must design such documentation to avoid misinterpretation by the public or professional colleagues.
- The learner should be informed of the credit or score they receive for the lesson before exiting. In continuing education settings, they should also receive instructions on when and how they will receive their CE credits.

IV. COURSE CHARACTERISTICS

Minimum requirements

General

- The introduction page must describe:
 - A clear course title
 - a description of teaching methods to be used;
- Courseware that is downloaded for use with appropriate course software must not require the need for buying additional software e.g. developed by a third party company.

Additional merit

General

- Whenever possible, the lesson should be customisable. Different versions can be made for different languages and/or different audiences, which may be adapted subsequent to a pre-course test or questionnaire that tests the learners' knowledge.
- Whenever possible, the course pages should be customisable to the connection speed of the learner.
- The instructional methodologies selected should match the content and audience requirements.
- Lesson length should be based on the content and the audience. Instructional content should preferably consist of a series of short lessons spread over several sessions.
- The mastery level of the course needs to match the targeted audience and the methodology.

Software features

- Learners should be prevented from making irreversible errors such as ending and grading a test before completion.
- The courseware should prevent the learner from making an inappropriate or unavailable selection.
- The directions to making a choice and the feedback provided for an inappropriate selection should be clear.
- Keyboard controlled menus should allow the learner to change their selection before pressing Enter to activate the selection.
- Mouse controlled menus should allow the learner to backup without penalty in order to change their menu selection.
- Self-instructional activities that are primarily audio or audiovisual in nature must be augmented by additional written materials that serve the purpose of summarizing, further explaining, or clarifying the audio or audiovisual material.
- Voice, touch screen, and other forms of input should have keyboard equivalents whenever possible.
- The end of the lesson should be clearly indicated and the learner should be taken to the home page for that site or another appropriate location. The learner should not be left on the last page of the lesson.

Organisation and sequence

- The course information should be presented in a logical organisation and sequence.
- A table of contents or a diagram to illustrate the organisational structure of the subject matter should be provided.
- The lesson's organisation should preferably reflect the subject matter's organisational structure.

Readability

- Screen displays should be simplistic, easily understood, and aesthetically pleasing.
- The reading level of the text must be consistent throughout, and appropriate for the content and reading level of the targeted learners.
- Technical terms should only be used if they are relevant to the content.
- Computer terminology should be avoided.
- All technical terms should be defined in a glossary or hyperlinked to term definitions elsewhere.
- Abbreviations or acronyms should always contain an explanation at their initial use.
- The text layout should be appropriate for computer screens and easy to read/follow with consistent sentence and paragraph styles and appropriate hyphenations as well as appropriate and consistent margins.

Software improvement

- An evaluation mechanism must be used that will help the provider assess the effectiveness of the continuing education activity and the level at which stated objectives were fulfilled, with the goal being continual improvement of the provider's activities.

Safety

- Data files should indicate which learners that have completed the course and their performance score.
- The data being gathered from the learners should continuously be monitored to modify the course goals and objectives.

- Only personnel who are responsible for improving the course content should be able to access the data collected during dentist completion of a course.
- The course should accommodate accidental terminations.
- Data should be stored permanently, as it is generated, not upon completion of the course.
- Lessons over 15 minutes in length should contain bookmarks so that the learner can restart at a later time where they left off.

FDI DATABASE OF INTERNET COURSES: _____

DATABASE

- FDI will administrate a centrally maintained database of web-based continuing dental education courses that have been accredited by the organisation.
- FDI will encourage all national dental organisations worldwide to have a direct link to this database on their respective home webpages.
- Only accredited courses will be included in the database.

ACCREDITATION

- Providers of web-based educational courses interested in accreditation by FDI must submit an application form to the FDI for consideration.
- FDI will accredit the courses submitted for appraisal according to the criteria as described in the preceding sections.
- The course must meet the minimum criteria as listed under section I, provider information, section 2 scientific content, section 3 pedagogical content and section 4 course characteristics to obtain a minimum accreditation score of 3.
- If an accreditation is granted, the provider of the course will be informed with the following information:
 - the effective date of the accreditation
 - a statement and the appropriate FDI-logo that can be used to announce or publicize FDI accreditation
 - procedures regarding expiration of accreditation and reapplication
- There is no limitation to the length of the period of accreditation as long as the course is not substantially modified.
- A courses that has been modified regarding objectives, participant interaction, page length, questions or use of illustrations is considered to have been substantially modified.
- All providers of FDI-accredited web-based courses are required to pay an an application fee as well as an annual fee. The fees are based on the operating expenses of the database administration.
- The non-refundable application fee must be paid when the application for accreditation of the course is submitted. The course provider is billed for the annual fee when the appraisal process has been completed and accreditation has been awarded. The annual fee will subsequently be due at 12-month intervals. The following fees have been established:
 - Application fee \$200
 - Annual fee \$100

USE OF THE FDI LOGO

- Use of the FDI logo (or name) in connection with advertisements and written course materials associated with continuing education courses must conform to the following criteria:
 - It shall not be used to imply that any CE activities or CE credit hours have been approved or endorsed by FDI
 - it shall not be used on letterheads or in any fashion that would imply that the organization is affiliated with FDI other than as a recognized course provider;
 - it may not be displayed in a type size larger than the provider organization's name, or given greater prominence than the provider organization's name;
 - it shall not be published in conjunction with any statement or material that, in the FDI's judgment, may be harmful to the FDI's good will or may tend to undermine the FDI's credibility;

ACCREDITATION WITHDRAWAL

- Accreditation will be withdrawn if there is non-compliance with the FDI criteria for accreditation or misuse of the FDI logo.
- If accreditation is denied or withdrawn, the applicant provider will be provided with the identification of the specific criteria with which FDI found noncompliance;
- Non-payment of the annual required fee will be viewed as a decision by the course provider to voluntarily withdraw the course from the database list. The name of the course will be removed from the current list of FDI accredited courses. Any provider wishing to reinstate a course accreditation following discontinuation for non-payment of fees will be required to submit a new application to the FDI and follow the established procedures for accreditation.

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