

Anatomy and e-learning. A virtual experience

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SUMMARY

The reform of structures and organization within Spanish universities inside the European area of Higher Education is changing the teaching-learning process in health sciences schools and faculties, including Dentistry. In particular, there is emphasis on 1) developing the skills and competencies necessary for responding to the normal range of circumstances in dental general practice, 2) on achieving some competences relating to continuing professional development, 3) on working together with other health care professionals and 4) about using contemporary information technology. We have designed a virtual subject "Applied Odontologic Anatomy" (AOA) in order to develop these general competencies as well as developing specific anatomical objectives. Accordingly, students must be prepared to apply their anatomical knowledge of maxillary and mandibular alveolar apophyses and to relate this with oral diseases and implant restorations.

In the virtual campus of Murcia University, students have the contents of the virtual material and students must resolve different tasks following some initial guidance.

We present in this paper the results of AOA evaluation using a quantitative 5 point Lickert

response questionnaire in order to assess whether students consider they had acquired the competencies mentioned above. Our response rate was 67%. The mean scores for all the competencies were between 3.56 and 4. The results show that students think that they have acquired to a high degree the competencies defined in our e-learning package, although, they also identified some problems, including difficulty in team-working and in obtaining information from the internet. Consequently, we believe that it is important to develop relevant learning resources with appropriate guidelines when using information and communication technologies and for the management of information and documentation.

Key words: E-learning – Anatomy – Competences

INTRODUCTION

One of the objectives of the Bologna Declaration (1999), formally known as "The European Higher Education Area (EHEA)", is to reform university curricula within the EU in terms of their structures, programs and actual teaching and to make the programs more comparable and to facilitate mobility and

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enhance quality. The reform of structures and organization of Spanish universities inside the European Area of Higher Education is changing the educational emphasis in health sciences schools and faculties away from teaching and towards learning and is now focussed more on the achievement of skills and competences. The Association for Dental Education in Europe (ADEE) have defined a set of competencies in the domains of knowledge, skills and behaviour that they consider essential for a newly-qualified dentist to attain prior to beginning independent (unsupervised) dental practice (Plasschaert et al., 2005).

In dental schools, by the time the dentist obtains their professional qualification, he or she must have acquired not only a broad academic and dental education necessary for responding to the normal range of circumstances in dental general practice, but must also have acquired a commitment to continuing professional development (CPD), and to working as part of the dental team alongside other health care professionals and using contemporary information technology. These principles were articulated in a meeting of the General Assembly of the Association for Dental Education in Europe (Cardiff 2004).

The UNESCO World Conference on higher education (1998) reported that information and communication technologies (ICTs) are appropriate tools for the qualitative evaluation of higher institutions and of the learning process. Furthermore, it was envisaged that the introduction of internet and e-learning in higher education would be one way to facilitate the acquisition of knowledge once qualified and to promote life-long learning, (Gil Flores et al., 2004; Varis, 2005; Bang, 2006). Consequently, there is now a perceived need for common European virtual education and common European degree system and the new information technologies will be an important tool in this process, owing to their impact on the acquisition of knowledge and skills.

It was against this background that we were led to develop a virtual tutorial package for qualified dentists called "Applied Odontologic Anatomy" (AOA). This has been developed as an elective unit in odontology and medicine in the virtual campus of University of Murcia (SUMA) to enable students to develop the competencies listed below:

Anatomy-specific competences

1. Students must be able to apply their anatomical knowledge of maxillary and mandibular alveolar apophyses and to relate this with oral diseases and implant restorations.
- #### Dental curriculum general competencies
2. Students must be competent to work with other students in a team;
 3. Students must be competent to use ICTs within the virtual campus;
 4. Students must demonstrate their ability to undertake self-directed and life-long learning.

MATERIAL AND METHODS

The virtual tutorial package was constructed as follows:

- It consisted of elective study material comprising a total of 45 hours and was intended for students in their second year of study at our Dental and Medical Schools.
- It was limited to 25 to 30 students (in the event, 27 students enrolled, 21 in odontology and 6 in medicine).
- The package was divided into 6 separate units. The topics covered were maxillary and mandibular topographic anatomy, regional blood and nerve supply, radiology, computerised axial tomography and magnetic nuclear resonance of the orofacial region (together with presentation of relevant clinical cases). It was designed in the form of slide presentations delivered through the virtual campus of Murcia University. It was intended that students would be able to work through the package in a single session.
- Within each unit of the package, students were required to answer a series of questions or perform assigned tasks as outlined. The intention was that these tasks should be completed within a defined time as specified within the package.
- It was specified that students must complete the tasks working in teams, (5 teams were organized, each one with 5 or 6 students). Students at the virtual campus were expected to use the tools of discussion boards and forums (along with e-mail) to provide communication between each other and with the teacher. Students were also required to use the internet as a resource to obtain information.
- Student learning was continuously assessed. Students were assessed both on the knowledge outcomes and on their collaborative

contribution to the work of the group using the virtual campus tools (Barberá, 2006).

- Prior to completing the package, students were required to complete an anonymous quantitative questionnaire using a 5 point Lickert response scale, together with open-format questions, in order to assess whether students considered that they had acquired the competencies defined as outcomes within the package.

RESULTS

The results are shown in Figure 1. The overall response rate was 67%. The mean value for each competency was:

1. Anatomy specific competence: 3.56/5
2. Working with other students in a team: 3.56/5
3. Being competent to use ICTs /Virtual Campus: 3.94/5
4. Being prepared for self-learning and life-long learning: 4 /5

DISCUSSION

Our results show that students considered they had acquired to a high degree all the competencies as set out in the package, although not all the students answered the questionnaire (18/27). Within the open-format questions, however, some students identified a number of specific difficulties they experienced in working through the package.

These included: problems in conducting tutorials via e-mail, difficulties experienced in working in a team and unfamiliarity when using the new technologies. The responses correlate with the quantitative responses obtained.

When talking about ICTs and the virtual campus and working in a team, typical comments were:

- “There is a lot of information on the internet and we don’t know which is best”
- “We don’t know enough English!”
- “It’s difficult to work in a team in the virtual campus because we don’t know each other”.

About self learning and life-long learning, comments included:

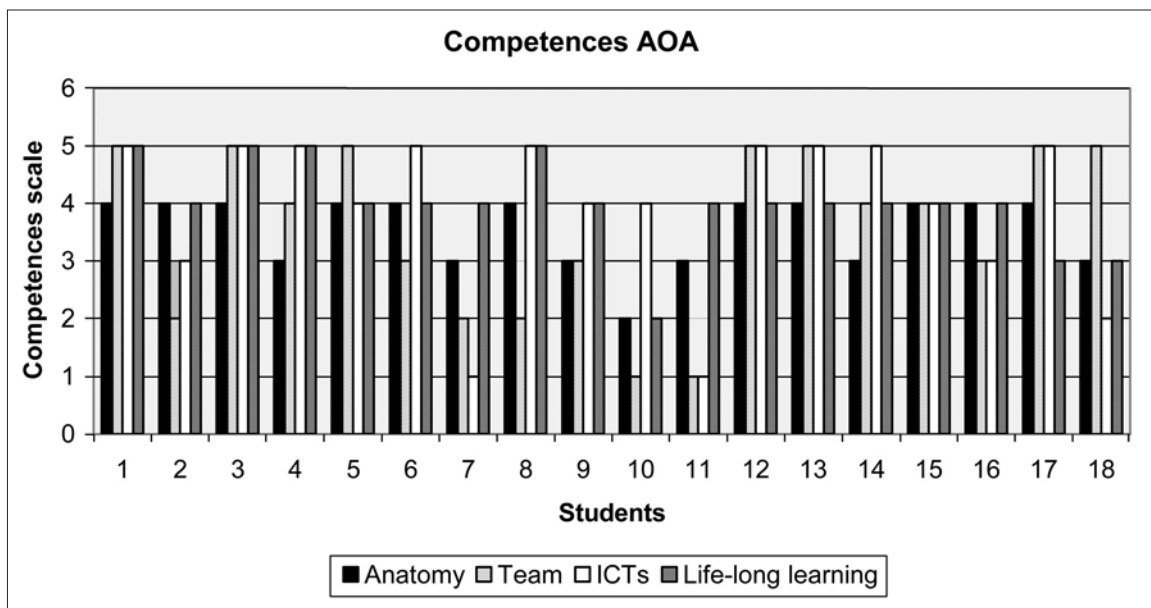
- “I don’t know how to solve tasks properly, because I can’t see the teacher.”
- “I’m not sure of doing my work correctly.”

In contrast some students were appreciative of this approach to their learning

- “What I learn, I learn better than any other way”.

In relation to the specific competency of anatomy, we observed some students appeared not to read properly (neither the general guidelines within the package nor the general messages sent to their group). This was evident from the fact that many of the answers to the questions they asked were to be found within the units themselves or had already been sent out to students in messages from the tutor. Our other observation was that students

Figure 1. Students opinion about competences.



preferred tutorial messages as a way to make contact with the teacher and provide a route to solve all problems and doubts about anatomy. Students liked to receive quick answers to all their questions within 24 hours.

We consider that, as Bang (2005) describes, students may experience difficulty in sustaining adequate attentiveness when engaged in e-learning because the packages can sometimes be perceived as boring or too difficult. The problem may be due to the fact that the student is alone with their computer, gathering and reading a significant volume of specific information, looking for new references, and using new technologies that perhaps they had yet to learn how to use properly.

We consider that these problems can be minimized if proper attention is paid to the design of these learning packages. One cause may be the emphasis that we, as teachers, place on teaching rather than focussing more properly on student learning. Consequently, we fail to select the relevant learning resources. In the field of anatomy, there can be too much information and students may not be able to separate that which is relevant from that which is more peripheral. Thus, as teachers, we need to make clear what students are expected to know and so help them identify that which is the relevant knowledge from that which is too detailed. This failure to give students appropriate guidelines to direct their learning embraces not only learning in anatomy but also more widely in the other competencies we have previously mentioned (Koper, 2005).

Based on our experiences in implementing this package, our final conclusions in relation to the design of future similar packages can be stated as follows:

- It is necessary to define specific, and relevant, competencies and explain how

these can be achieved by means of appropriate guidelines.

- Students must be educated in the use of ICTs for management of information, documentation, working in a team, continuing education, and self-learning.
- Packages must be designed to be fully interactive as this enhances student learning through providing positive feedback.

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