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Introducing Integrated Approach in Undergraduate Blended Learning Environments

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Abstract
In recent years the introduction of new technologies in the educational process has caused emerging of alternative teaching methods. One of them is blended learning which combines face-to-face instructions with various types of non-classroom technologically supported material delivery. Another approach that seems to be valid is integrated teaching when different subjects are interrelated or unified to provide vast amount of information in a comprehensive manner. These methods were united to develop an integrated course in Medical English and Latin for undergraduate medical students at the Ural State Medical Academy (Yekaterinburg, the Ural region, Russia). The pilot study was conducted to evaluate efficiency of the course that combined two subjects usually taught separately. 48 students were divided into two groups. Group 1 (n=24) studied the subjects in the traditional way, and Group 2 (n=24) was exposed to blended learning with an integrated approach. We used the results of diagnostic and final tests, and students' questionnaire answers to evaluate efficiency of the course. The results of the tests were compared between the two groups. Group 2 demonstrated significantly better results in the final tests. The new method of integrated teaching in blended learning environments was found to be more effective than the traditional one. Moreover, the integrated method was well accepted by students according to their questionnaire answers. Blended learning with integrated approach may become one of the ways to improve the present educational process as it gives an opportunity to structure and organize the course which will be available for students at any time. Furthermore, it will help to save time and avoid unnecessary repetition. However, the possibility of subjects integration requires thorough consideration by faculty and university administration.

1. Introduction

The undergraduate curriculum is vast and students learn many subjects at the same time. Stimulating students' abilities to integrate learning is one the most important goals of higher education. The undergraduate courses can be separated in the educational process and do not connect with each other. The burden of integration has traditionally fallen primarily on students, assuming that they would have the wit to summarize information as they moved through their studies (Huber, 2004). However, an emphasis on integrative learning can help undergraduates put the pieces together.

Currently various terms are used to describe the principles of integration in the curriculum. Joglekar, et al. define integrated teaching as 'organization of teaching matter to interrelate or

unify subjects frequently taught in separate academic courses or departments' (1994, p. 231). Kate, et al. consider the term integration in the field of education to be 'coordination in the teaching learning activities to ensure harmonious functioning of the educational processes' (2010, p. 18). In the present paper integrated approach refers to teaching of two different subjects that are interrelated and unified into a separate course to provide vast amount of information in a comprehensive manner.

Moreover, creation of blended learning environments gives an opportunity to introduce integrated methods in the curriculum. According to Vignare blended learning is using 'both environments-online and face-to-face-in a planned and pedagogically opportunistic way' (2006). In our study we use the following definition of blended learning offered by Dziuban, et al. 'courses that combine face-to-face classroom instruction with online learning and reduced classroom contact hours (reduced seat time)' (2004, p. 2).

In the following sections of the article we briefly describe integrated methods and blended learning introduced in the pre-clinical medical curriculum, our study, the results of the study and finally our conclusion.

2.   Blended learning in pre-clinical medical curriculum

Pre-clinical medical curriculum takes first two years. During these years undergraduates study various pre-clinical subjects, such as Gross Anatomy, Histology, Latin, History, Philosophy, foreign languages etc. Usually most of these subjects are taught separately without any reference to each other. Students have to learn vast amount of information that sometimes may seem to be boring. However, the early curriculum is expected to lay foundation for the other subjects who follow and should allow students to develop the skills to investigate and analyse (Kate, 2010). The challenge of the demanding pre-clinical years is to make undergraduates motivated and interested in their future profession.

Many educational researchers have discovered that online learning environments are particularly useful for communications and collaboration (DeZure, 2005; Dziuban, 2004). Nevertheless, giving up the classroom seems premature. The result is using blended learning which combines both conventional methods of teaching with current E-learning methods. It is convenient to have course documents all in one place and get to the courses any time you want. The shift in student demand and the new communication technologies has created real opportunity to innovative teaching (Vignare, 2006).

Blended learning at our academy is based on distant learning technologies that have been recently introduced in the curriculum. New information technologies available via the Internet help both to interact with students and control them more effectively. The virtual campus (http://do.teleclinica.ru) has been functioning using complex educational software "CixSoft". It offers a number of courses for pre-clinical medical students which correspond to the conventional courses taught at our academy. The courses in the virtual campus are identically designed. Each course includes the complex of hypertexts (usually electronic version of lectures) divided into modules according to the topics. Modules include not only text but also all necessary illustrated material, e.g. tables, pictures, photos and even videos. Visualization helps to study theoretical courses more effectively. Undergraduates are able to choose how much time they spend to study certain modules. Moreover, the system of links allows them to refresh their knowledge of previous topics.

All courses in the virtual campus have a developed system of controlling tasks. It includes teaching tests, controlling tests, problem solving tasks, term papers etc. depending on the requirements of the curriculum. However, students do not gain access to final tests if they

have missed some topics and teaching tests in modules of a course. Nevertheless, undergraduates can choose what topics to study first within the course.

Though E-learning has obvious advantages, it cannot substitute face-to-face communication with lecturers and comrades which is really important for undergraduates. So, such types of learning methods as discussions and research project presentations are held in classrooms. Currently, we offer our students various opportunities to study both in classrooms and in the virtual campus. However, limited technological resources do not allow us to make the use of the virtual campus obligatory for all students. Therefore, the virtual campus at our academy is only a subsidiary method of learning.

3.   Integrated teaching in undergraduate pre-clinical medical curriculum

Integrated teaching aims at connecting students' skills and knowledge from multiple sources and experiences, developing students' ability to apply theory to practice in various settings and to understand issues and positions contextually (DeZure, 2005). Significant knowledge within individual courses serves as the foundation, but integrated teaching goes beyond academic boundaries. Integration aims at giving the students a holistic instead of a fragmented outlook on his studies (Joglekar, 1994).

Integrated teaching in the medical curriculum can be done in the following ways: *horizontal integration* meaning two or more departments teaching concurrently merge their educational identities and *vertical integration* when disciplines traditionally taught in the different phases of the curriculum are integrated (Joglekar, 1994). Usually integrated courses have elements of both horizontal and vertical integration.

In the virtual campus we have introduced the following horizontally integrated course 'Medical English and Latin'. These subjects are traditionally taught during the first year of study. The integration of these disciplines appears to be obvious as both of them are based on the medical vocabulary. The structure of courses and character of medical vocabulary corresponds in both disciplines, so we think that the parallel introduction and discussion of the same topics and thus integration of the subjects will enhance comprehension of the material. Moreover, the virtual campus allows developing a vast system of hyperlinks within the course and making the subjects that are usually taught separately more interconnected.

We suppose that the subjects taught using an integrated approach have better chances of being effective. The pilot study was designed to introduce the method of horizontal integration for undergraduate medical students in our academy through the recently developed course 'Medical English and Latin'.

4.   Methods

The study was approved by the university administration. Inform consent forms were administered to first-year medical students (n=48) before the beginning of the experiment.

All students were divided into two groups. Group 1 (n=24) studied the subjects separately in the traditional way, and Group 2 (n=24) was exposed to the course based on blended learning with an integrated approach. The study was conducted from October 2010 till December 2010 at the Ural State Medical Academy. The students were taught 'Medical English and Latin'.

Traditionally the courses 'the English Language' and 'Latin and Medical Terminology' were taught separately without any reference to each other, and classroom contact hours were 4 and 2 hours per week respectively. The same number of hours was devoted to unsupervised

work. The course 'Medical English and Latin' involved 4 classroom contact hours and 8 self-instruction hours per week. The integrated course was basically designed on the similarities and differences of medical terminology and some grammar rules between English and Latin. The principles of contrastive linguistics, which are widespread in philology for comparison of different languages, were the foundation for the development of the course 'Medical English and Latin'.

The basic sources of information for the students taught in the conventional way were the textbooks approved by the Department of Education in the Russian Federation. All other sources (other textbooks, journals, the Internet, etc.) were considered to be supplementary and not obligatory. The major reference for the course 'Medical English and Latin' was the virtual campus of our academy. The course 'Medical English and Latin' consists of the complex of hypertexts divided into modules, which also include tables, pictures, and audio files. Moreover, each module has the system of links to previous topics within the curriculum and to various E-resources and includes teaching tests, controlling tests, and creative projects. Group 2 students had access to the integrated course on the 24-7 basis. Some theoretical material (approximately 30%) of the integrated course was assigned for self-instruction comparing to approximately 10% in the traditional courses. All courses were taught by the same lecturer.

Students' comprehension of medical terminology and some grammar aspects in both languages were evaluated using diagnostic and final tests. Tests were identical for both groups and consisted of two parts to assess comprehension of Latin and English medical terminology and grammar. The level of students' knowledge of vocabulary and grammar was determined using a success coefficient (Cs) (Bespalko, 1988). $Cs=a{:}n$, where a is a number of students' correct answers, and n is a number of all answers. The results of tests were compared between the two groups. Students' perception of the new approach was collected using a post-test questionnaire.

5. Results

The results of the diagnostic tests in Medical English and Latin showed insignificant difference in the level of knowledge between the two groups.

Table 1. Results of the diagnostic tests

Group number	Number of students	Cs (mean value)	
		Medical English	Latin
Group 1	24	0,42	0,38
Group 2	24	0,41	0,36

The results of the final tests in Medical English and Latin were quite different. They demonstrated significant results obtained in the final test in the group using integrated teaching.

Table 2. Results of the final tests

Group number	Number of students	Cs (mean value)	
		Medical English	Latin

Group 1	24	0,72	0,71
Group 2	24	0,88	0,85

Cs ≥ 0,7 means comprehension of a subject (Bespalko, 1988).

The results of the final tests were also evaluated using the 1-10 score scale, where 1-3 scores referred to unsatisfactory mark, 4-6 scores – satisfactory mark, 7-8 – good mark and 9-10 – excellent mark. The range of scores in Group 1 was from 3 to 9 scores with a mean value of 6,2. The range of scores in Group 2 was from 5 to 10 scores with a mean value of 7,4.

Students' feedback regarding the new approach in teaching showed the following results. 87% of students were enthusiastic about the new integrated approach in blended learning and they felt that this method helped them to retain the subjects better. 18% experienced inconveniences with blended learning as they had no permanent access to the Internet. 85% would like to continue their education using blended learning. 83% would like to have other subjects to be integrated and taught in joined manner as it might help to avoid unnecessary repetition and loss of valuable time.

## 6.	Conclusion

The new method of integrated teaching in blended learning environments was found to be more effective than the traditional one. Significant results were obtained by comparing the integrated method with the traditional one. This method was enthusiastically accepted by students. Moreover, students had a positive attitude toward introduction of this method in the educational process in general. Although various factors such as teacher's and students' motivation, interest and enthusiasm to the recently developed cause might influence the significant difference between the results of the two groups, the present study showed a positive tendency to better comprehension of the material by students which should be proved in further research.

Nevertheless, the need for integration is currently felt both by students and lecturers. The integrated teaching will allow avoiding fragmented manner of teaching when lecturers are not aware of what is taught in other courses. Therefore, the new methods of teaching may be considered as a possibility to be introduced in the medical curriculum. Blended learning with integrated approach may become one of the ways to improve the present educational process as it provides course material in an organized and structured manner available for students 24 hours a day. Moreover, this method saves time and gives students an opportunity to plan their own study day. However, careful considerations should be done to decide what courses in the medical curriculum may be integrated by using this method. Further investigation of the effectiveness of integrated courses using blended learning environments is needed.

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