Using discussion forums on topics of general interest as a strategy to improve the students’ interest in Physiology

O uso de fóruns de discussão sobre tópicos de interesse geral como estratégia para melhorar o interesse dos estudantes em Fisiologia

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Abstract

Physiology is a key component of health undergraduate courses’ curriculum. Several authors cite the poor performance of students in courses that involve the life sciences, as physiology. Thus, innovations that facilitate the process of teaching and learning are increasingly necessary. In this sense, the use of technologies that facilitate the students’ knowledge construction and encourage them to be an active part of this construction is very important. Our proposal sought to encourage students to participate in discussion forums on topics of general interest, related to physiology, created in Moodle virtual environment in order to encourage them to correlate the knowledge worked in the physiology classroom with their daily lives, and make them an active part of their knowledge building. We verify from the perceptions of students that the proposal was effective, providing ways to students establish a relationship between the content and their daily lives and encouraging their critical thinking.

Keywords: Physiology teaching; Moodle; Life sciences.

Resumo

A fisiologia é um componente chave para currículo dos cursos de graduação da área da saúde. Vários autores citam o mau desempenho dos alunos em disciplinas que envolvem as ciências biológicas, como a fisiologia. Assim, as inovações que facilitam o processo de ensino e aprendizagem são cada vez mais necessárias. Neste sentido, o uso de tecnologias que facilitam a construção do conhecimento pelos alunos e incentivam o aluno a ser uma parte ativa nesta construção é importante. Nossa proposta procurou incentivar os alunos a participar de fóruns de discussão em torno de tópicos de interesse geral, relacionados à fisiologia, criados no ambiente virtual Moodle, a fim de encorajá-los a correlacionar o conhecimento de fisiologia trabalhado em sala de aula com suas vidas diárias, e torná-los uma parte ativa na construção de seus conhecimentos. Verificamos a partir das percepções dos alunos que a proposta foi eficaz, provendo oportunidades aos estudantes para que eles estabelecessem uma relação entre o conteúdo e a sua vida diária, e incentivando o pensamento crítico.

Palavras-chave: Fisiologia; Moodle; Ciências da vida.
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1 Introduction

The human physiology is a common curricular component of life sciences, included in the curriculum of health and biological undergraduate courses, since its knowledge is essential to these professionals in their careers. Even considering this fact, previous authors showed that students have high failure rates in this and other courses of STEM (Science, Technology, Engineer, and Math) area, when compared with courses from other areas. An important information to cited, for example, is that only 20% of US students entering STEM courses are able to complete their undergraduate degree. This failure may be related to some characteristics found in these courses, as the large amount of topics to study, the teaching methods used, composed basically by lecture-based teaching, which can be useful to an overview of topics, but sometimes constitute a monotony and passive way of teaching which does not motivate the student to look for new information, in addition to the lack of adequate prior high school training.

The reality exposed above has made professors to search for new strategies that would increase the interest of the students in physiology, and, in consequence, allow them to better understand some complex concepts of this course. Among these strategies is the use of social networks, team-based learning, case-based lectures, seminars discussing the applications of physiological knowledge in the health professional practice, and others. Most of these experiences were successful and have shown a way to make the students more involved with physiology and with their own learning process, being a strategy to avoid the formation of professionals with poor preparation in basic life sciences, so, less prepared to make clinical decisions by critical thinking. In this sense, alternatives that seek to develop critical thinking and stimulate a relationship between a specific knowledge and their applicability should be stimulated, since it is well documented that when students can develop this critical thinking they get better in their academic performance and professional conduct, in the future.

The web-based learning has already been proven to be efficient with life science students, in basic sciences and also in clinical phases, helping students to develop skills and disposition needed to learn by themselves. Still, the use of curious facts related to daily life is a manner to introduce to the students the relation of science and their day to day life; they could perceive the importance of science and become more engaged in some active form of learning.

Physiology is a science present in our daily life, so, it is important that the students perceive its presence in their life. Although, considering that there are different types of
Using discussion forums on topics of general interest as a strategy to improve the students’ interest in Physiology students, it is important account that each student is able to learn better with some specific strategies. In this sense, investigate and propose new strategies to improve physiology teaching and promote students interest in physiology is important. Here we propose the development of a strategy named "Physiology curiosity discussion forums", which aimed to work as a tool to increase the interest of students in physiology and approximate them to the topic by sharing once a week a curiosity fact related to day to day life, and its scientific explanation, through a virtual teaching-learning environment.

With this in mind, the aim of this report is to present the experience of enhancing the physiology teaching-learning- method through this new strategy adopt with students of human physiology in the Federal University of Pampa, Uruguaiana/RS, Brazil.

2 Methods

2.1 Subjects and institutional approval

Forty-eight students of the third semester of the Physiotherapy (n = 22) and Nursing (n = 26) undergraduate courses of Federal University of Pampa (UNIPAMPA), campus Uruguaiana/RS/Brazil, that were attending Human Physiology courses, participated in this study. The participants were 19.05 ± 0.63 (mean ± SD) years old, 75% female and 25% male, and agreed to participate and evaluate the present propose. This proposal was referred to the Institutional Education Committee for evaluation and was approved (Institutional Review Board no. 10.015.14).

2.2 The Moodle and the Forums

The virtual teaching-learning environment Moodle was regularly used in Human Physiology courses of UNIPAMPA as a complement to theoretical and practical classes, to provide additional information, material and support. Moodle offers specific tools to improve and complement the teaching process, enabling the share of materials, the implementation of chats and forums, the submission and realization of online lessons, and others. Among the main features we realize that the forums are a tool for discussion by nature, and could collaborate to improve of students’ interest in physiology.

In the first academic semester of 2014, with the propose to increase the interest of students in physiology, we propose share weekly in Moodle a curiosity fact related to day to day life and to physiology, to encourage the discussion of its scientific explanation – the
Using discussion forums on topics of general interest as a strategy to improve the students’ interest in Physiology “Physiology Curiosity Forums”. The curiosities forums were created in Moodle virtual space of physiology course, and the curiosities discussed were always related to day to day life and to some content taught in the courses. The table 01 summarizes the topics proposed in the semester.

Table 01 – Some examples of topics proposed in “Physiology Curiosity Forums”

<table>
<thead>
<tr>
<th>Physiology content</th>
<th>Theme of Physiology Curiosity Forum</th>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiology of blood</td>
<td>Erythropoietin as doping in sport</td>
<td>Discuss about the role of erythropoietin in the blood homeostasis and why its use is considering doping in sports</td>
</tr>
<tr>
<td>Circulatory and immunological system</td>
<td>The spleen and exercise</td>
<td>Discuss the occurrence of side abdominal pain during intense exercise and the possible relationship to the function of the spleen</td>
</tr>
<tr>
<td>Electrophysiology of heart</td>
<td>Cardiac pacemaker</td>
<td>Exemplify the different types of pacemaker indications and contraindications and relate to the normal cardiac electrophysiology</td>
</tr>
<tr>
<td>Electrocardiogram (EKG)</td>
<td>Angina and electrocardiogram</td>
<td>Discuss about angina’s causes and its relationship with the amendments occurring in the EKG</td>
</tr>
<tr>
<td>Control of blood pressure</td>
<td>Salt and blood pressure</td>
<td>Understanding the relationship between salt intake and blood pressure regulation, especially in the diet of hypertensive patients</td>
</tr>
<tr>
<td>Ventilatory mechanics</td>
<td>Hyperbarism and differences of atmospheric pressure</td>
<td>Discuss the changes that occur during diving in deep waters</td>
</tr>
<tr>
<td>Gas exchange</td>
<td>Soccer and altitude</td>
<td>Understand the physiological changes resulting from the difference of atmospheric pressure and what are necessary to athletes’ adaptations to practice physical activities in different conditions</td>
</tr>
<tr>
<td>Osmosis and membrane transporters</td>
<td>Distended belly in malnutrition</td>
<td>Discuss the phenomenon of osmosis in the context of malnutrition</td>
</tr>
<tr>
<td>Bioelectric potentials of membrane</td>
<td>Ouabain and sodium-potassium pump</td>
<td>Discuss the cellular and systemic effects of ouabain (sodium-potassium pump inhibitor)</td>
</tr>
<tr>
<td>Research in Physiology</td>
<td>Animal research</td>
<td>Discuss the use of animals in research and new models to replace animal use</td>
</tr>
<tr>
<td>Physiology of the muscular tissue</td>
<td>Muscle cramps</td>
<td>Understanding how muscle cramps occur and the possible causes</td>
</tr>
<tr>
<td>Motor system and the autonomic nervous system</td>
<td>Induced coma</td>
<td>Discuss how the coma can be induced and its effects on nervous system.</td>
</tr>
</tbody>
</table>
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These forums were proposed weekly, according to the content worked in the classroom and from doubts raised by the students during class. Physiology professor and students tutors encouraged the students enrolled in the course to participate, always looking to make students understand the relationship of the curiosity fact and the theoretical physiology content. For this, every time that a new forum was available in Moodle e-mails were sent to students informing and encouraging them to participate. When there were no responses from the students, the teacher and the tutors immediately posted a comment, trying to facilitate their understanding about the curiosity and stimulate their participation. Whenever the students had questions or posted responses in the forums, they were promptly answered or commented, respectively, by the professor or tutors. We did not controlled if the students that participated in the forums made research from a wider array of material or were confined to material presented in the classroom, but research in trusted sources/databases was stimulated.

2.3 Assessment of the participation

To evaluate the use of curiosity forums and the effects of this methodology in the students’ interest in physiology, in the end of the semester an anonymous questionnaire was applied to students. The questionnaire contained four simple multiple choice questions (figure 01) and we also asked to students to attribute a grade to the proposal (from 0 to 10). The results were analyzed using Excel for Windows, and are presented as percentage of the total responses (objective questions) and mean ± standard deviation (in the case of grades).

3 Results and Discussion

We perceive that, in general, the students joined to the proposed forums in Moodle. Some of forums were more discussed than others, as the one about cardiac pacemaker and the role of the spleen in the exercise, maybe because these themes can be more present in the students’ daily life and arose from student questions verified in the classroom. Another theme that had attracted much attention of the students was the influence of altitude on soccer players’ performance, probably because the soccer is very popular in Brazil and 2014 was the Brazil World Cup edition. Others themes, though less popular also obtained access by students.

Some of students who are attending physiology courses (17%; n = 8) did not
Using discussion forums on topics of general interest as a strategy to improve the students’ interest in Physiology
access the forums. It can be attributed to the limited time and the large workload of undergraduate courses in Brazil, which leads the students to divide their time between many courses and difficult their opening to new experiences, like this one, that is an optional one. What students need to be able is to visualize that tools like this facilitate their learning process, promoting the self and active learning. Active learning is essential, bringing to students the opportunity to be aware of the latest findings. In this sense, a meta-analysis by Freeman, confirmed that tools like this make the student an active part of the teaching-learning process, favoring student’s learning of STEM topics.

We observed that the vast majority of students that participated in the forums activity affirmed that the content available in the forums are related to the content taught in the classroom (Figure 1A) and that these forums facilitated their understanding about how physiology is present in their daily life (Figure 1B). This last result is very important, since the ability to understand theoretical and scientific information and relate it to its applications have proved to be very difficult for people in general, including Brazilians. Thus, the availability of these topics related to news and/or daily life brings to the students the opportunity to introduce the world of physiology, and from there realize the importance of it to their formation.
Using discussion forums on topics of general interest as a strategy to improve the students’ interest in Physiology

![Graph A](source)

**Figure 1.** Students’ perception about “Physiology Curiosity Forum”. The responses of each one of the four objective questions used are represented in one graph (A to D) as percentage of total number of students.

Corroborating to the previous results, most of the students agree that the proposed forums contributed to increase their interest in physiology (Figure 1C) and to increase their physiology learning (Figure 1D). Our assessment of student learning was subjective, related to students own opinion. We did not compare the grades or performance between the students that are involved with the forums and the students that are not, what could be interesting to do in future studies. Here we are looking mainly to the students’ interest in physiology, that increased, according themselves. Using tools like the proposed here, encouraging the students to understand the physiology contents in the everyday context, we help the students to become competent, critical and a gifted professional, with a reflective and critical view about the knowledge, aware about the dynamism of the same.

Finally, when the students were asked to give a grade to the proposal, the final
Using discussion forums on topics of general interest as a strategy to improve the students’ interest in Physiology grade obtained was 8.00 ± 1.96 points. Thus, the success of the propose was evident, demonstrating that is possible carry out improvements in the physiology teaching, attracting more the students’ attention to the importance of the critical and contextualized view of physiology. In future studies we aimed to evaluate directly the impact of this strategy on students’ performance, considering the physiology content understanding, especially in conditions related to daily professional life. Regarding the forums contents, the higher interest of students in specific forums lead us to think in use more topics which have been discussed recently in the media.

It is important highlight that this propose was realized using the virtual teaching-learning platform Moodle as a complement to classroom activities. Previously, Scherl, Dethleffsen and Meyer prove the effectiveness of the use of Moodle as a great mean to facilitate the teaching-learning process. The use of technologies to facilitate access to the information create the possibility that the students have access to content that can strengthen their capacity to logical reasoning. This, when contextualized to the daily life phenomena, was a great way to improve the students interest in physiology.

4 FINAL CONSIDERATIONS

The creation and use of “Physiology Curiosity Forums” in Moodle was well accepted by students and improved their interest in physiology, enabling them to recognize the relationship between physiology and their daily life, stimulating the critical think.

References


Using discussion forums on topics of general interest as a strategy to improve the students’ interest in Physiology


Acknowledgments

The authors thank all the undergraduate students that contribute to the development of the described actions, and the Federal University of Pampa for the support and cooperation with the proposed work.