Online learning satisfaction and participation in flipped classroom and case-based learning for medical students

Nível de satisfação e engajamento com aulas virtuais baseadas em metodologias ativas para estudantes de medicina

Irma Uliano Effting Zoch de Moura[1] (ID) | irmauliano@gmail.com
Valentina Coutinho Baldoto Gava Chakr[1,2] (ID) | vchakr@hcpa.edu.br

ABSTRACT

Introduction: Traditional teaching, a lecturer-centered approach, has been the default methodology in medical schools. In the last decades, there has been a shift in health education towards methods that encourage the student's active participation. It has been proved that active methodologies increase engagement, and this was particularly necessary during the COVID-19 pandemic, when active methodologies were crucial to raise student participation in online classes.

Objective: This study aimed to measure student satisfaction and participation in online classes utilizing active learning methods during the COVID-19 pandemic.

Methods: We gathered data from anonymous surveys completed by fourth-year medical students during 18 months of online classes of pediatrics at a public medical school in Brazil. Classes were taught using flipped classroom and case-based learning methodology.

Results: One hundred and twenty-one students took part in this survey. Satisfaction level with case-based learning classes in the discipline was high (53% very satisfied; 39% satisfied; 6% neutral; 2% unsatisfied). Most of the students (70%) answered that, in general, they prefer CBL to expositive classes (16% prefer expositive classes; 14% are neutral). Reading compliance was good: 81% read 75-100% of the texts, and 19% read 50-74% of them.

Conclusion: The implementation of the active learning curriculum for the discipline of pediatrics demonstrated to be successful considering the participation of the students and their satisfaction level.

Keywords: Models, Educational; Education, Distance; Problem-Based Learning; Students, medical; COVID-19

RESUMO

Introdução: Metodologias de ensino tradicionais, baseadas em aulas expositivas, têm sido usadas como padrão nas escolas médicas. Nas últimas décadas, têm ocorrido mudanças na educação médica no sentido de adotar métodos que encorajem a participação ativa dos alunos. Foi provado que as metodologias ativas aumentam o engajamento e isso foi particularmente necessário durante a pandemia da COVID-19, quando as metodologias ativas foram cruciais para aumentar a participação dos estudantes nas aulas virtuais.

Objetivo: Este estudo objetivou medir a satisfação e o nível de participação dos alunos com aulas virtuais baseadas em metodologias ativas durante a pandemia da COVID-19.

Método: Foram compilados dados de pesquisa anônima respondida por estudantes brasileiros do quarto ano de Medicina de uma universidade pública federal que cursaram a disciplina de pediatria durante um período de 18 meses. As metodologias usadas foram sala de aula invertida e aprendizado baseado em casos clínicos.

Resultado: Participaram desta pesquisa 121 estudantes. O nível de satisfação com a metodologia foi alto (53% = muito satisfeito; 39% = satisfeito; 6% = indiferente; 2% = insatisfeito). A maioria dos alunos (70%) respondeu preferir ter aulas com as metodologias ativas empregadas, em comparação com aulas expositivas (16% preferem aulas expositivas; 14% são indiferentes). A adesão à leitura dos textos (sala de aula invertida) foi boa: 81% dos alunos leram entre 75% e 100% dos textos, e 19% leram entre 50% e 74% dos textos disponibilizados.

Conclusão: A implementação de metodologias ativas na disciplina demonstrou ter sido bem-sucedida, considerando a participação e o nível de satisfação dos alunos.

Palavras-chave: Modelos Educacionais; Aprendizagem Baseada em Problemas; Educação a Distância; Estudantes de Medicina; Covid-19.

INTRODUCTION

Traditional teaching, a lecturer-centered approach, has been the default methodology in medical schools since the creation of modern universities. In the last decades, there has been a shift in health education towards methods that encourage the student's active participation, based on the evidence that active teaching methods are superior to conventional styles[1].

One of the active-learning methods in healthcare education is case-based learning (CBL). Students align concepts of physiopathology with an authentic clinical case to improve critical thinking and medical practice, and establish clinical management assisted by the professor[2]. Another established method is flipped classroom (FC), which encourages students to learn fundamental concepts as required homework, and use this gained knowledge during class to solidify their grasp on the subject[3].

It has been proved that active methodologies increase engagement, and this was particularly necessary during the COVID-19 pandemic, when active methodologies were crucial to raise student participation in online classes[4].

In the discipline of pediatrics for medical students at a public federal university in Brazil, there was a modification from traditional lectures to active teaching methodology aiming to raise student participation in remote theoretical activities during the COVID-19 pandemic. The objectives of this study were to measure student satisfaction with active learning methods, and to measure the students' participation level.

METHODS

A total of 126 fourth-year medical students from 6 different classes attended the discipline of pediatrics at a federal Brazilian university between January, 2021 and June, 2022. This is a compulsory discipline of the school of medicine.

The discipline of pediatrics for fourth-year medical students comprises nineteen topics to be discussed in the theoretical module. Fifteen professors are involved in this part of the course. All faculty members produced a text with fundamental information necessary for each topic. The texts were available to the undergraduate students in the Google Classroom® platform beforehand, according to the concept of FC.[3] This platform was used as the formal means of communication with the students, and all of them had unrestricted access to it. They were instructed to read the text before each class-time activity. All students had their own laptop computer.

Class-time activities were streamed in Google Meet® at predetermined times. The first class-time activity was an assessment of the student's basic concepts about the text they had read before class. It consisted of 8-10 objective questions on the topic of the class. The students had 10 minutes to answer those questions. The mean of all nineteen assessments was used to calculate the student's grade at the end of the discipline. The second class-time activity was the discussion of a clinical case, with the synchronous presence of the professor. The concept of case-based learning (presentation of medical cases linking the theory to practice with integration of basic science, pathophysiology and clinical management[2]) was used to construct and conduct the lesson. This activity usually took 60-90 minutes to be completed. The Socrative® software could be used at the professor's discretion to interact with the students during the case discussion. Thirty-seven percent of the professors used the software to present the clinical cases to the students.

The clinical cases prepared by the faculty were designed based on clear learning and outcome objectives. The discipline coordinator defined that the clinical cases should raise the discussion of common presentations of the disease, its differential diagnosis, adequate interventions (diagnostic tests and treatments), possible complications, and prevention. The cases were presented to the students as four to five objective questions. Moreover, the cases were created to make the students integrate a range of knowledge to properly solve them (for example: anatomy, physiology, microbiology, radiology, semiology etc.).

After the conclusion of the nineteen class activities, an online anonymous survey was provided to students for them to assess satisfaction and participation related to the methodology of the lessons. At the time the students completed the survey, they did not have access to their final grades, which were calculated and released by the coordinator about 5 days after the end of the discipline completion. Google Forms® was used to collect the data. A five-point Likert scale was used to answer most of the questions (1-strongly disagree, 2-disagree, 3- neutral, 4-agree, 5-strongly agree; or 1-very dissatisfied, 2-dissatisfied, 3- neutral, 4-satisfied, 5-very satisfied). The main questions of the survey were the following: "I prefer case-based learning (CBL) lectures over traditional lectures"; "What is your overall satisfaction with lectures presented using the CBL model?"; "What is your satisfaction level with the preparatory texts made available by the professors of the discipline?" and lastly, "Fill in the blank space: I managed to read __ of the introductory texts of the discipline" with the options of "A- 75-100%, B- 50-74%, C- 25-49%, D- 0-24%". The students also had the possibility of sharing their opinions by writing comments about the discipline methodology.

Pooled answers for each question were reported as percentages. Microsoft Excel® was used as the database to calculate basic statistics. The ethics committee of the teaching institution approved the study.

RESULTS

One hundred and twenty-six students from 6 different classes fully participated in the discipline from January, 2021 to June, 2022. Ninety-six percent of the students (n=121) completed the survey.

The satisfaction level with CBL classes in the discipline was high (53% very satisfied; 39% satisfied; 6% neutral; 2% unsatisfied). Most of the students (70%) answered that, in general, they prefer CBL to expositive classes (16% prefer expositive classes; 14% are neutral). Reading compliance was good: 81% read 75-100% of the texts, and 19% read 50-74% of them. The satisfaction level with the provided texts was high (55% very satisfied; 41% satisfied; 2% neutral; 2% unsatisfied).

Some of the comments students made about their experience with the new methodology applied to the discipline are shown in Table 1. There were no negative comments specifically related to the applied methodology.

DISCUSSION

Our study shows that the implementation of an active learning curriculum for the discipline of pediatrics demonstrated to be successful considering the participation, and the satisfaction level of the students.

We think the effective implementation of a new teaching approach could be explained by several reasons. First, the characteristics of the texts. They were succinct, practice-focused and evidence-based. These qualities made them more attractive to the students. Secondly, because the assessments taken at the beginning of class-time activity were used to calculate the student's final grade, text-reading compliance was high. Consequently, the students came to class prepared to take part in clinical cases discussions, creating an engaging learning experience. Even trusting that text-reading was truly high, we consider that compliance level could have been overestimated. The fact that the survey was anonymous, and that students were not threatened by any kind of retaliation based on their answers minimizes the chance of overestimation, but we should consider that memory bias could have affected the results.

An article published on best practices for increasing reading compliance in undergraduate medical education points out that too much required reading and text complexity comprise some of the reasons why students don't read. The authors recommend that faculties can increase the likelihood students will read the assigned material by applying a short quiz on the reading[5]. Considering there is a significant positive relationship between student engagement and online learning satisfaction[6], one can conclude that good reading compliance creates a basic condition to promote interaction during online classes, which contributes to student satisfaction[7].

Recent systematic reviews on medical students' satisfaction level with e-learning during the COVID-19 pandemic showed that their overall satisfaction levels were 51.8% and 58.1%. However, these studies had a high level of methodological and instrumental variations, which makes it difficult to compare their rates with ours[7,8]. Considering there is limited literature on online CBL for medical education, we think our data contributes to fill in the gaps regarding research on this subject[9].

Although traditional teaching methods are ingrained into our organization's culture, we faced little reluctance to adopt new technologies and pedagogical methodologies by professors. We attribute this performance to their high level of motivation, and to the constant technical and pedagogical support offered by the coordinator of the discipline[10].

Our study had some limitations. We could not evaluate long-term information retention, as knowledge assessments were not repeated over the time. We could not compare student satisfaction/learning efficiency between the active learning methodology and lectures, as we did not have a control group. Also, we did not gather information on basic characteristics of the population, such as gender, age, experience with e-learning before the COVID-19 pandemic.

The results of the present study found that online learning had a good performance using FC associated with

Table 1. Students' comments on the experience with the discipline.

"The classes are excellent. The texts are very objective. I have been learning better with this methodology."
"The discipline has been very useful."
"CBL makes the classes less exhausting and more interesting."
"The texts were great."
"The methodology of the discipline improved a lot the experience of online distance learning."
"I feel that I learned more with CBL methodology compared to expositive classes."
"The discipline was so good that I am considering choosing pediatrics as a specialty for residency training."
"Reading the texts before meeting the professor motivated me to pay more attention to class-time activities."

Note: data collected by the authors.

CBL during COVID-19, but the obtained data is insufficient to say whether it is beneficial when compared to other types of teaching approaches.

CONCLUSIONS

Flipped classroom associated with CBL was successfully implemented at the discipline of pediatrics for fourth-year medical students. This methodology demonstrates a high level of participation and satisfaction by the students when it was delivered online during the COVID-19 pandemic.

AUTHORS' CONTRIBUTION

Irma Uliano Effting Zoch de Moura: data curation, formal analysis, visualization, writing – original draft preparation. Valentina Coutinho Baldoto Gava Chakr: conceptualization, methodology, project administration, resources, supervision, validation, writing – review and editing

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

SOURCES OF FUNDING

The authors declare no sources of funding

REFERENCES

1. Wolff M, Wagner MJ, Poznanski S, Schiller J, Santen S. Not Another Boring Lecture: Engaging Learners with Active Learning Techniques. J Emerg Med. 2015;48(1):85–93. DOI: 10.1016/j.jemermed.2014.09.010

2. Thistlethwaite JE, Davies D, Ekeocha S, Kidd JM, MacDougall C, Matthews P, et al. The effectiveness of case-based learning in health professional education. A BEME systematic review: BEME Guide No. 23. Med Teach. 2012;34(6):e421–44. DOI: 10.3109/0142159X.2012.680939

3. Chen F, Lui AM, Martinelli SM. A systematic review of the effectiveness of flipped classrooms in medical education. Med Educ. 2017;51(6):585–97. DOI: 10.1111/medu.13272

4. Hew KF, Lo CK. Flipped classroom improves student learning in health professions education: a meta-analysis. BMC Med Educ. 2018;18(1):38. DOI: 10.1186/s12909-018-1144-z

5. Shaffer, Kerry, Colbert-Getz, Jorie. Best Practices for Increasing Reading Compliance in Undergraduate Medical Education. Acad Med. 2017;92(7):1059. DOI: 10.1097/ACM.0000000000001729

6. She L, Ma L, Jan A, Sharif Nia H, Rahmatpour P. Online Learning Satisfaction During COVID-19 Pandemic Among Chinese University Students: The Serial Mediation Model. Front Psychol. 2021;12:743936. DOI: 10.3389/fpsyg.2021.743936

7. Tabatabaeichehr M, Babaei S, Dartomi M, Alesheikh P, Tabatabaee A, Mortazavi H, et al. Medical students' satisfaction level with e-learning during the COVID-19 pandemic and its related factors: a systematic review. J Educ Eval Health Prof. 2022;19:37. DOI: 10.3352/jeehp.2022.19.37

8. Nakhoda K, Ahmady S, Gholami Fesharaki M, Gheshlaghi Azar N. COVID-19 Pandemic and E-Learning Satisfaction in Medical and Non-Medical Student: A Systematic Review and Meta-Analysis. Iran J Public Health. 2021;50(12):2509-2516. DOI: 10.18502/ijph.v50i12.7933

9. Donkin R, Yule H, Fyfe T. Online case-based learning in medical education: a scoping review. BMC Med Educ. 2023;23(1):564. DOI: 10.1186/s12909-023-04520-w

10. Luke K. Twelve tips for managing change in medical education. MedEdPublish [Internet]. 2021 [cited in 12 October 2023];10(1). Available at: https://mededpublish.org/articles/10-53