

EDUCATIONAL STRATEGY ON HOME VISITS BASED ON MASSIVE OPEN ONLINE COURSES

ESTRATÉGIA EDUCACIONAL SOBRE VISITA DOMICILIAR BASEADA NO CURSO ABERTO MASSIVO ONLINE

ESTRATEGIA EDUCATIVA SOBRE LA VISITA DOMICILIARIA BASADA EN EL CURSO ABIERTO MASIVO ON-LINE

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ABSTRACT

Objective: to evaluate the effectiveness of an educational strategy for university students on home visits, based on the Massive Online Open Courses. **Method:** quantitative, quasi-experimental, with no control group, pre-and post-test type performed with 135 students attending the 1st and 3rd semesters of Nursing, Physiotherapy and Medicine. A course made available online consisting of three modules was used as educational strategy. A pre and post-test questionnaire was applied, one addressing participants' characterization and the other on the course evaluation. **Results:** there was a predominance of females (74.8%), with a mean age of 20 years. Participants evaluated positively the media resources used. When asked whether they would like to use educational strategies based on the Massive Online Open Courses in other disciplines, 97.8% answered affirmatively. Of the 135 participants, 96.3% said they feel more apt to perform home visits in the Family Health Strategy after the course. It was found strong statistical association between pre- and post-test scores ($p < 0.001$), in which 83% of the participants had a higher score in the post-test, which shows the effectiveness of the intervention. **Conclusion:** the educational strategy on home visits, based on the MOOC tool has proved to be effective, and may be a potential teaching and learning tool for undergraduates in the health area.

Keywords: Home Visit; Education; Educational Technology.

RESUMO

Objetivo: avaliar a eficácia de uma estratégia educacional para estudantes universitários sobre visita domiciliar, baseada no Curso Aberto Massivo Online. **Método:** pesquisa quantitativa, quase-experimental, sem grupo-controle, do tipo pré e pós-teste realizada com 135 estudantes dos 1º e 3º períodos de Enfermagem, Fisioterapia e Medicina. Utilizou-se como estratégia educacional a oferta de um curso disponibilizado no website constituído por três módulos. Foi aplicado um questionário pré e pós-teste, um de caracterização dos participantes e um de avaliação do curso. **Resultados:** houve predominância do sexo feminino (74,8%), com média de idade de 20 anos. Os participantes avaliaram positivamente os recursos midiáticos utilizados. Ao serem questionados acerca se gostariam de utilizar estratégias educacionais baseadas no Curso Aberto Massivo Online em outras disciplinas, 97,8% responderam afirmativamente. Dos 135 participantes, 96,3% afirmaram se sentirem mais aptos para realizar a visita domiciliar na Estratégia Saúde da Família após a realização do curso e foi encontrada associação fortemente significativa entre as notas do pré e pós-teste ($p < 0,001$), sendo que 83% dos participantes tiveram nota maior no pós-teste, o que mostra a eficácia da intervenção. **Conclusão:** a estratégia educacional sobre visita domiciliar baseada na ferramenta MOOC mostrou-se eficaz, podendo ser uma potencial ferramenta pedagógica de ensino e aprendizagem a graduandos da área da saúde. **Palavras-chave:** Visita Domiciliar; Educação; Tecnologia Educacional.

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RESUMEN

Objetivo: evaluar la eficacia de una estrategia educativa para estudiantes universitarios sobre la visita domiciliar basada en el curso abierto masivo on-line. **Método:** investigación cuantitativa, casi-experimental, sin grupo control, tipo pre y post-test, realizada con 135 estudiantes del 1º y 3º semestres de Enfermería, Fisioterapia y Medicina. Como estrategia educativa se utilizó la oferta de un curso disponible en internet con tres módulos. Se aplicó un cuestionario pre y post-prueba, uno de caracterización de los participantes y otro de evaluación del curso. **Resultados:** predominó el sexo femenino (74,8%), con media de edad de 20 años. Los participantes evaluaron positivamente los recursos utilizados. Cuando se les preguntó si les gustaría usar las estrategias educativas basadas en el curso abierto masivo on-line en otras asignaturas, el 97,8% respondió afirmativamente. De los 135 participantes, el 96,3% afirmó sentirse más apto para realizar la visita domiciliar en la estrategia salud de la familia después de haber realizado el curso. También se encontró asociación fuertemente significativa entre las notas pre y post-test ($P < 0,001$): el 83% de los participantes obtuvo mejor nota en el post-test, lo cual demuestra la eficacia de la estrategia educativa. **Conclusión:** la estrategia educativa sobre la visita domiciliar, basada en la herramienta MOOC se mostró eficaz y podría ser un importante instrumento pedagógico de enseñanza y aprendizaje para graduandos del área de salud.

Palabras clave: Visita Domiciliaria; Educación; Tecnología Educativa.

INTRODUCTION

Technological advance has resulted in a transformation of society in the world, and information and communication technologies (ICT) are inserted in this process. The set of technological resources allied to the transmission of information through the internet has enabled us to interact with educational content at a distance. The expansion of forms of connectivity stimulates the use of ICTs by modern society, which has resulted in changes, including in the educational process.^{1,2}

In education institutions, the use of distance learning (D-Learning) and ICTs have been progressively incorporated into different educational levels. In higher education, they have become one of the main educational tools, especially in the health area. This global initiative is a strong trend that has spread across continents, which enables students from various geographic locations to learn in a collaborative and interactive way by using the internet.³

A modality of distance learning that has been propagated through virtual platforms, unlike the traditional D-Learning courses, are the Massive Open Online Courses (MOOC). MOOCs can be accessed by anyone connected to the internet by registering on a platform. Because of this wide scope, MOOCs are titled massive and open, thus reaching a representative number of people.^{4,5}

This innovative technology, applied to education, has caused great impact and radically changed the distance learning modality. MOOCs have the potential to reshape education for students, teachers, and educational administrators. These courses have changed the way education, more specifically traditional and online education, is transmitted, conceived and used.⁶

In a systematic review of the literature, the authors stated that MOOCs have become immensely popular in the world in a short time. However, there is very little research of its use in the field of health and medicine. Of the total of 98 articles included, 94% were offered in the English language and only

three MOOCs were offered by developing countries (China, the West Indies and Saudi Arabia). On average, the courses last from six to seven weeks, with access and online activities by the participants for two to four hours/week.⁷

MOOCs generally consist of short-duration video classes, texts, assessments, and asynchronous interactions, especially among students, through forums, discussion topics, blogs and social media tools, frequent and well-established distance education strategies. However, not all courses are massive in terms of number of students, nor do they use only open educational resources (such as gratuitousness), which hampers the homogeneity of characteristics.⁸

The potential of the development and application of ICTs to increase the number and quality of teaching and learning processes of skills and abilities in the field of health knowledge for university students is acknowledged. And one of them is the teaching-learning process for qualified care to individuals, families and communities within the context of the Family Health Strategy (FHS).

Among the tools for qualified care in the context of FHS, the home visit (HV) stands out. It is composed of a set of health actions aimed at both educational and assistance care of individuals and families. HV performed by students can be an important tool in the construction of skills required for the exercise of health professions.⁹

HV is an activity that brings students closer to the local reality and to people, to a better understanding of their problems, their needs and ways of life, thus allowing the student to better understand the social, economic and cultural dimensions involving the health-disease process. Thus, it is an important educational or pedagogical strategy in the construction of skills that favor a broader view of healthcare.⁹

In view of the above, this study aimed to evaluate the effectiveness of an educational strategy on home visits, focusing on the Family Health Strategy, for university students in the health area, using the MOOC tool.

METHOD

This is a quasi-experimental quantitative research, without control group, of the pre- and post-test type.

Participants were students attending the first and third semesters of undergraduate Nursing, Physiotherapy and Medicine courses enrolled in the first half of 2016.

Simple random sampling was used, without replacement, considering 2% sample error and 95% confidence. Students' participation was defined according to the enrollment number in each course, for both sexes. The first student was randomly chosen as the starting point and then the other participants, until completing the number established to compose the sample, according to each course.

The inclusion criteria were: Nursing, Medicine and Physiotherapy students enrolled in the first and third semesters in the first half of 2016, regardless of gender and age. As exclusion criteria were: students who, even enrolled in the first and third semesters in the first half of 2016, were not available to participate in the research due to sick leave or for being attending again a discipline due to fail, making it difficult for them to participate in the scheduled time for the research; and those who did not agree to participate in the study.

The research followed the following steps:

In the first stage, a questionnaire was elaborated on the content of home visit at the FHS, which was set up in the pre- and post-test. This Likert-type questionnaire, after elaborated, was submitted to refinement by means of the evaluation of six judges, two of them being teachers of each course: Nursing, Physiotherapy and Medicine, with experience in the subject for at least five years and with qualification as masters or PhDs.

In order to prepare the pre- and post-test questionnaire, an integrative review of the literature was conducted to search for evidence in online publications about the teaching and the practice of HV, its potentialities and fragilities in the FHS. In addition, printed publications on this subject were used.

The second stage was the development of a course on the theme "Home visit in the Family Health Strategy using the MOOC tool", offered by the Dean of Extension to the students, which had three face-to-face meetings and distance tutoring.

We also elaborated matrix of competencies that guided the development of the design and development of the MOOC tool. Thus, the matrix of competences on knowledge, skills and attitudes regarding home visits was a guide for the selection and construction of media and educational resources/objects, aiming to reach the learning objectives.

Media resources/objects, such as video classes, dramatization videos, didactic support material, augmented reality game and quiz, all with contents on home visits focused on the FHS, were made available.

In the first meeting, the Questionnaire 1 was applied, which aimed to raise the sociodemographic characteristics of the participants, whether they had computer equipment, whether they had access to the internet, access point and time of daily use, whether they had already participated in distance learning courses, whether they knew the MOOC as an educational strategy in professional training and in which social networks they participated. A pre-test questionnaire was also applied before students participated in the teaching-learning process in order to verify the degree of competences on knowledge, skills and attitudes regarding the subject.

The third step was the intervention, consisting of the provision of interactive content on home visits as a resource to approach the individual and the family within the framework of the FHS, based on the MOOC tool. The course lasted eight weeks.

In the fourth step, the same questionnaire was applied as a post-test. The objective was to evaluate the degree of competences on knowledge, skills and attitudes on home visits in the FHS after the intervention. At that occasion, the student also answered the questionnaire 2 in order to evaluate the formatting, access, navigation on the internet, technological resources, time available to take the course, the didactic support material and whether the student would like to use the MOOC in other courses and disciplines at university.

After being collected, the data was stored in a database created using SPSS for Windows software version 17.0. The quantitative data for characterization of the participants and for evaluating the educational augmented reality games were presented through a percentage analysis of the answers found. In order to test the reliability of the pre- and post-test questionnaire, the internal consistency analysis (consistency in which the instrument measures the attribute or trait) was adopted by the calculation of the Alpha or Cronbach's coefficient. The normal range of alpha coefficient values is between 0.00 and +1.00 and the higher the reliability coefficient (internal consistency), the more precise the measurement. For this study, Cronbach's alpha values above 0.70 were adopted.¹⁰

For the univariate analysis between sex, age, owning a portable computer, microcomputer, i-Pad or tablet, undergraduate course, access time to the internet, having made use of the virtual learning environment (VLE) in a discipline at university and the degree of knowledge about before visit before and after MOOC use, chi-square tests were used for comparison of proportions and the Mann-Whitney test was used for continuous variables and Spearman's correlation coefficient. The Wilcoxon test was used to compare the pre- and the post-test scores. The $p < 0.005$ was adopted. This study was submitted to the Research Ethics Committee of the Federal University of Alfenas-MG and approved by Opinion no. 1,092,492 on June 3, 2015.

RESULTS

The course was divided into three modules: a) family approach; b) concept of home visit; c) phases of the home visit. The first module presents as a content the family approach, which aims to conceptualize the family, to show the history of its creation, identifying its structure, types and functions, and family approach tools, also raising its stages and family risk classification. The second module presents the concept of HV, which aims to know, in addition to the concepts, the objectives and benefits thereof in the FHS. And the last module focused on the phases of the HV, approaching and analyzing its phases together with the welcoming, the bond, the ethics and the professional attitude.

All modules contained didactic material in the PDF format or virtual book, video classes, dramatization videos and quiz. Modules 1 and 2 also had augmented reality with interactive game.

A total of 135 students participated in the study, 13.3% attending the 1st semester of Nursing, 9.6% the 1st semester of Physiotherapy, 31.1% the 1st semester of Medicine, 11.1% the 3rd semester of Nursing, 12.6% the 3rd semester Physiotherapy and 22.2% the 3rd semester of Medicine.

All of them reported accessing the internet, with average usage time of five and a half hours per day ($SD = 3.44$), a minimum of one hour and a maximum of 18 hours per day. Among the 11.9% who said they had already attended a distance learning course, the most cited courses were "English course", "Courses at the *Descomplica* website", "Courses at the *Veduca* website", "Health education", "Healthy Behavior" and "Therapeutic Communities".

Of the 63% who stated having performed HV during the undergraduate course, 27.4% had performed only one visit, 11.1% had performed two visits, and 24.5% had performed more than two visits. Among the disciplines in which home visits were conducted, they mentioned the Family and Community Medicine; Collective Health Policies; Epidemiology; Environmental Health; Fundamentals of Physiotherapy; Health Policies and Practices; and in Extension Projects.

When asked about the educational objectives proposed by the research, all considered appropriate the visual format-

ting of the page, the access to the website page, the browsing of the internet, the hypertexts and the images.

Table 1 presents the percentage distribution of the study participants in the evaluation of the educational strategies used in the course.

Regarding the time available for the course, 0.7% of participants consider it inadequate, 1.5% inadequate, 22.2% adequate and 75.6% very adequate.

When questioned about whether they would like to use educational strategies based on the Massive Open Online Course in other disciplines, 97.8% answered affirmatively.

Of the 135 participants, 96.3% stated they felt more apt to perform home visits in the FHS after the course.

The pre-test questionnaire had a mean of 19.5 points with a minimum of 1 point and a maximum of 27. The post-test questionnaire, applied after the course, averaged 23.42 points, with a minimum of 17 and maximum of 30 points.

The questions with the highest percentage of correct answers in the pre-test were question 13 (96.3%), which addressed the main focus of attention during the home visit, and question 28 (89.6%), which addressed the legal and ethical foundations of the practice of home visits. In the post-test, questions 14 and 29 had a higher percentage of correct answers, both with 99.3%, whose approach was on which professional is responsible for conducting the home visit according to the National Policy of Primary Care and on the ethical posture before the practice of home visit. Question 3, which dealt with the familiar approach tools, presented the greatest progression, obtaining 23.7% of correct answers in the pre-test and 55.6% in the post-test.

The course/semester that had the highest average in the pre- and post-test was the 3rd semester of Medicine, followed by the first semester of the same course. The course/semester that obtained the highest progression of the pre-test in relation to the post-test was the 1st semester of Nursing, followed by the 1st semester of Physiotherapy.

Wilcoxon's test for comparison of pre-test and post-test scores found a strongly significant association between pre- and post-test scores ($p < 0.001$), with 83% of participants having a higher post-test score, which shows the effectiveness of the intervention.

Table 1 - Percentage distribution of the overall evaluation of the media resources used by the course participants, Alfenas, 2016

	Inadequate	Little Adequate	Adequate	Very Adequate
Didactic material	-	-	25.9	74.1
Video class	-	2.2	31.9	65.9
Dramatization video	-	3.0	40.0	57.0
Augmented Reality	0.7	9.6	49.6	40.0
Quiz	2.2	2.2	27.4	68.1

Source: authors.

According to the Spearman test, no association between the variables was found for the evaluation by course, semester and resources used (didactic material, video class, dramatization video, augmented reality and quiz) in relation to the post-test score. Only the evaluation performed by the 3rd semester of Nursing presented a significant association to the resource quiz compared to the post-test, i.e., those who had a higher post-test score had attributed a better evaluation to the quiz resource ($p = 0.019$, $r = 0.597$). When comparing the pre-test and post-test with the age of participants, the highest scores were associated with the highest age ($p = 0.006$).

Regarding the Mann-Whitney test for the pre-test and post-test scores compared to sex, no significant association was found between these variables ($p = 0.411$), which shows that sex did not interfere with participants' pre- and post-test scores. And for the variables owning microcomputer, portable computer, tablet/i-Pad and cell phone compared to the pre-test and post-test scores, the pre-test score was higher for those owning i-Pad/tablet ($p = 0.024$, 0.040) and microcomputer ($p = 0.049$). In the post-test, there was no difference ($p = 0.150$, $p = 0.057$ and $p = 0.052$, respectively). There was no significant association between the variables owning a cell phone compared to the pre-test ($p = 0.139$) and the post-test score ($p = 0.327$). Also, we found an association between the variables having already attended disciplines in the VLE and the pre- and post-test score. And those who had used the VLE had a higher score in both the pre-test ($p = 0.004$) and the post-test ($p = 0.012$). The variable sex presented a significant association with the augmented reality resource ($p = 0.019$), in which women attributed a better evaluation of this resource than men.

DISCUSSION

Most of the participants were female, since the health professions are predominantly of that gender, a fact that is confirmed by several studies.^{9,11,12} Women make up the bulk of higher-education students and occupy the majority of the vacancies offered in university health courses, even in courses that until recently were considered historically male professions, such as physicians, dentists and veterinarians. Nowadays, the term feminization refers to the sharp growth of the female population in the labor market. And, in this scenario, Nursing emerges as one of the first female university professions in Brazil. In that same study, 14 health courses were analyzed in the period from 1991 to 2008, and only the Physical Education did not have women in their majority composition.¹³

Universities are currently considered to be part of the internet generation, which is marked by the intense use of technologies, especially the Internet, using digital information and communication technologies (DICTs). Most of the study par-

ticipants own a portable computer and internet access at home and stay on average five hours a day connected to the internet. Few do not own any mobile devices like tablets, smartphones and cell phones, which have computer-like features. The use of the internet is a worldwide reality and presents a progressive tendency to take learning to students located in distant areas. For professional training in the area, the development of skills and the knowledge for the use of informatics in the health area have been increasingly required.¹⁴

This demonstrates the potential for introducing courses in virtual platforms, since a significant number of students have the necessary equipment to implement this type of learning. It is also important to promote and support teacher training programs in the use of ICTs as a technological, methodological and transforming tool for teaching practice. Educators and teachers at all school levels should adapt to increasingly interactive and collaborative contexts.¹

In the health area, there has been a rapid increase in D-Learning, both in undergraduate and postgraduate education. Such expansion has been driven by ICTs, which make it possible to use computational tools that facilitate the teaching and learning process. In the D-Learning, the educational process made possible by the ICTs takes place in a virtual learning environment (VLE) accessed through the internet, which has the function of encompassing instructional interfaces and favoring the interaction between apprentices.¹⁵

A study aimed to evaluate the VLE in the teaching process of nursing to undergraduates of the discipline Basic Foundations of Nursing I. The evaluation made by the participants was also satisfactory, with 95.2% considering the formatting and hyper-texts as adequate; 92.9% evaluated navigation as adequate; 100% defined access as adequate; and 97.6 considered the images adequate, thus reaching the proposed objectives for the research.¹⁴

The most important steps for developing a distance learning course are goal setting; production of appropriate didactic material; and building an efficient and organized educational script. The development of virtual learning environments must be previously planned and based on educational principles in order to allow a dialogic learning and that contributes to the formation of opinions and reflections by the apprentices.^{16,17}

From the broad diffusion of the ICTs, the MOOCs present themselves as a trend that aims to provide large-scale and worldwide network learning. They are usually offered for free for anyone with access to the internet and anywhere in the world. MOOCs offer an opportunity to improve the quality of education for a large numbers of students, thus providing democratization of access to education. In addition, open education has become the refuge for those students who are away from classroom courses and who have not identified or adapted to the pace imposed by traditional institutions.⁴

The augmented reality game feature got the lowest rating by the participants. Augmented reality is defined as the enrichment of the real world, with objects and virtual information visualized through a technological device, thus providing intuitive interactions in the three-dimensional environment and expanding the educational elements from the combination of the real with the virtual world, bringing a new dimension to the education.¹⁸ This low rating can be explained by the augmented reality technology being an innovative tool, since the participants had never had contact with games used for educational purposes in the university.

Most of the participants stated that they would like to use the Massive Open Online Course as a teaching and learning strategy in other courses and disciplines. This shows that the MOOC tool was well accepted among participants. There is the possibility, within higher education institutions, of the implementation of MOOC within institutional continuous training programs. By proposing to the university community open courses in the MOOC format, it is possible to provide didactic-methodological innovation, flexibility and expansion of access to training courses. In addition, the educational process mediated by virtual environments is internalized in the higher education institution, expanding the possibilities of integrating these educational network technologies in the pedagogical practices of undergraduate, postgraduate and extension courses.^{5,19}

An editorial regarding the MOOC innovation states that there are currently few universities that grant academic credits through MOOC courses. However, there is growing evidence that more and more institutions are beginning to accept these certificates. Considering the costs and the simultaneous budget reductions in public funding for higher education, it is not difficult to see that MOOCs can become increasingly attractive as a viable option for universities to control costs. In addition, well-respected teachers in their fields can offer students the opportunity to learn from specialists to whom they would hardly have access if it were not so.²⁰

The Johns Hopkins School of Public Health in Baltimore, United States, offers MOOC-type courses since 1997. Starting in 2013, 113 fully online courses available in MOOC format begin to compute credit for students at this school. This school joined the Open Educational Resources movement in 2005, with an effort to share the extensive teaching material it holds in various public health areas. Since then, this school has developed materials for more than 110 academic courses, symposia, and training programs. The users are public health professionals who want to update their knowledge, educators who adopt or adapt teaching materials in their courses and students of the institution itself. The school had no difficulty in offering courses in the MOOC format due to the vast experience with online and open education.²¹

The course/semester with the highest average in the pre-test and post-test scores was Medicine, 3rd semester, followed

by the 1st period of the same course. Also, Medicine undergraduates were the ones that most accessed the proposed MOOC course. This result can be justified by the change in the National Curricular Guidelines of the Medicine course in Brazil.²² These changes in medical education have been guided by the needs of the population, inserting students since the first semester in the FHS, thus enabling the practice of home visits, which may be the reason for the high interest and also the highest scores.

Some Brazilian medical schools have already presented curricular changes in order to promote the training of professionals capable of fully working in health surveillance and who are more familiar with the main health problems. The Pedagogical Political Project (PPP) of the undergraduate medical course of the institution under study states that undergraduates must be able to work in the FHS, in the prevention of diseases and in the promotion of healthy habits of life. In this context, home visits have been adopted as a pedagogical strategy in the professional training of the undergraduate Medicine course.²³

When analyzing other PPPs of the courses participating in the study, it was verified that they do not present systematization regarding the conduction of home visits, but they indicate the skills expected for each semester or for extra class activities, inserted in what is called teaching and service integration, as well as in university extension activities.

The majority of the participants had already performed a HV at some stage of the undergraduate course, predominantly in the first semester. It is worth emphasizing that participants were students attending the 1st and 3rd semesters of the undergraduate course. Thus, inserting the HV at the beginning of the course has been a strategy adopted by several educational institutions.

Home visits are a beneficial strategy for the teaching and learning of health students. It promotes approximation with the social environment in which people live, becoming a facilitator for a more reliable understanding of reality, being possible to know the human being in their multiple dimensions and not only the biological one, as usually occurs at more specialized levels health care.²⁴ The home visit is an important way for students to understand their role as a supporting citizen in the process of transforming reality through the commitment to health and the quality of life of people and the community. Given this, it is expected that it will bring significant contribution to the comprehensiveness of care and humanization of care.²⁵

The incorporation of technological resources into the teaching of undergraduates in the health area has allowed the directing of the teaching-learning process, providing a dynamic and stimulating environment for both the educator and the student, transforming the student into an active subject in the search for knowledge. In addition, the use of technologies increases educational opportunities, being possible, through the computer, to simulate real situations of professional practice, providing practi-

cal skills and developing skills in the area of interest. The great facilitators of the distance modality are the ease of access to knowledge, the flexibility in time and the reduction of costs.²⁶

CONCLUSION

The use of the MOOC tool in this study was effective, enabling expressive learning on home visits. As the technological resources used were interactive, they stimulated students' participation, with highlight for the video classes and the quiz, which shows the need of technological innovation in the processes of health education and training. The other media resources, such as didactic material and dramatization videos, contributed to deepening content about home visits, showing the need to diversify teaching strategies.

MOOCs are consequences of applying technology to the education sector, which enhances learning ability for being more interactive and attractive. They have been disseminated as an open education modality, being quickly spread through virtual platforms.

A factor that helped students' learning was the possibility of taking the course at their own pace and the fact of being self-assessing. The student him/herself judged whether he/she needed to revise this resource with such a theme.

Most of the participants stated that they feel more apt to perform the home visits in the Family Health Strategy and that they would also like to use the MOOC tool in other courses and disciplines. This shows that innovative technological resources should receive more investments and be more used to stimulate students to the teaching and learning process. The advantages offered by MOOCs include easy access and low cost, and can encompass a high number of students with quality and in an agile and efficient way, being more flexible and meeting the growing demands of society. Some of the great challenges for the university where the study was carried out are the technological structure and the improvement of human resources, which are still insufficient, lacking the motivation and involvement of the academic community. A limiting factor for taking courses in virtual learning environments is the financial investment for the elaboration and development of virtual learning objects, such as the augmented reality games, which makes democratic access to new educational technologies aimed at training and qualification of students difficult.

Finally, there has been little research related to health education using innovative tools such as MOOC, so further studies that evaluate teaching and learning processes using this tool are suggested.

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