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Development and evaluation of an educational video on atopic dermatitis as a teaching tool in medical school

Desenvolvimento e avaliação de vídeo educativo em dermatite atópica como ferramenta no ensino médico

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ABSTRACT: *Introduction.* Technology has reorganized the way to live in recent years, as well as how to communicate and learn. Information and communication technologies (ICTs), such as films and videos, are a dynamic teaching tool to expose and debate different topics. Consequently, its use in medical education has risen in the past years. *Objective.* This study aimed to assess the impact of an educational video on the learning of undergraduate students of medical school. *Material and Methods.* A transversal descriptive study was conducted with medical students from 1st to 4th year of a private university in Curitiba-PR. An educational video was developed with further exhibition to participants. A structured questionnaire with objective questions about the content of the video (Atopic Dermatitis Questionnaire) was applied before and after its exhibition as well as a second questionnaire (Educational Video Evaluation Questionnaire) about the use of the video as a didactic resource. *Results.* A total of 215 students participated in this study. Atopic Dermatitis Questionnaire before and after video exhibition showed an increase of right answers in five of the seven questions – three of them with significance ($p < 0.05$). As for the Educational Video Evaluation Questionnaire, 93.55% of students considered the video satisfactory or totally

satisfactory as regards scientific quality, 79.36% had their learning expectations attained and 89.45% believed that the use of this tool facilitates the learning process. 73.85% of the participants indicate the use of the video in medical education. *Conclusion.* The evaluation of the use of educational video in medical teaching demonstrated significant rates of satisfaction with the resource and contribution to learning, being recommended as a teaching tool by most students. Therefore, ICTs can act as facilitators in the theoretical and practical correlation, and they have potential to aid in the retention of content and learning.

Keywords: Education, medical; Teaching materials; Instructional films and videos.

RESUMO: *Introdução.* A tecnologia reorganizou a forma como se vive nos últimos anos, bem como a forma de se comunicar e aprender. As Tecnologias da Informação e Comunicação (TICs), como filmes e vídeos, apresentam uma proposta dinâmica de exposição e debate de conteúdo e são cada vez mais empregadas como recursos didáticos na educação médica. *Objetivo.* Objetivou-se desenvolver e avaliar o impacto de um vídeo

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educativo no aprendizado de alunos de graduação do curso de medicina. *Materiais e Métodos.* Pesquisa descritiva transversal com estudantes de medicina do 1º ao 4º ano de uma universidade privada em Curitiba-PR. Foi desenvolvido um vídeo educativo sobre dermatite atópica com posterior exibição. Houve aplicação de questionário estruturado com questões objetivas sobre o conteúdo do vídeo (Questionário Dermatite Atópica) antes e após o vídeo e um segundo questionário sobre a satisfação com o uso do vídeo como recurso didático (Questionário Avaliação do Vídeo Educativo) após a exibição do vídeo. *Resultados.* 215 alunos participaram do estudo. A análise do Questionário Dermatite Atópica pré e pós exibição do vídeo mostrou aumento de acerto em cinco das sete questões de maneira global, sendo três delas com significância ($p < 0,05$). Quanto ao Questionário Avaliação

do Vídeo Educativo, 93,55% considerou o vídeo satisfatório ou totalmente satisfatório quanto a qualidade científica, 79,36% teve suas expectativas de ensino atendidas e 89,45% acreditou que o uso dessa ferramenta facilita a aprendizagem. Sobre a utilização de vídeos educativos na graduação, 73,85% recomenda o uso como recurso pedagógico. *Conclusão.* A avaliação do uso de vídeo educativo no ensino médico demonstrou taxas significativas de satisfação com o recurso e de contribuição para a aprendizagem, sendo recomendado como ferramenta de ensino pela maioria dos alunos. As TICs podem, portanto, atuar como facilitadoras na correlação teórico-prática, além de terem potencial de auxílio na retenção do conteúdo e no aprendizado.

Descritores: Educação médica; Materiais de ensino; Filmes e vídeos educativos.

INTRODUCTION

Information and Communication Technologies (ICTs) are increasingly produced and employed as a didactic resource in education¹ for developing critical thinking, expression, communication, intelligence integration, interdisciplinarity and teamwork². Digital technology advances and popularization together with the cost reduction of electronic equipment have been boosting this strategy³.

The use of films and videos are examples of ICTs. Their images and narratives directed to teaching in the health area illustrate the broadness of experiences and human relations and offer students the opportunity to get involved, debate and reflect on the conception and care in health in a dynamic and attractive way⁴. At the same time, ICTs stimulate independence, focus and reproducibility in a safe and monitored environment, where students can understand patients and all their context².

In psychiatry and family medicine, among other specialties, ICTs are applied to knowledge training, communication skills, medical ethics and humanism⁵. When used as a starting point for a discussion, participants feel free to express their points of view, since films are impersonal. In addition, students of different ages learn to analyze situations from diverse perspectives, ranging from the view of patients and their families to experiences at the bedside⁵.

The use of short videos related to a previously discussed topic incorporated into a slide show is a positive way to relate theory and practice, enrich the lecture, engage and motivate students⁴. Film exposure, followed by the open debate among undergraduates with the teacher as moderator focusing on emerging themes, has proved to be a useful and enjoyable tool for improving learning, relationships, attitudes, personal and professional values⁶.

In the last decades, medical graduation has brought curricular changes to guarantee a broad formation in line with the current demands of the Brazilian health system. Teaching certain components of clinical knowledge is still a challenging task in the current teaching scenario. Some

specialties, such as dermatology, still have scarce vertical and horizontal integration throughout the course⁷.

A strategy to meet educational demands adequately is the training on the topic through didactic videos and interesting teaching-learning tools.

The objective of this study was to develop and assess the impact of an educational video on the learning of students attending between the 1st to 4th year of the medical course. The learning acquired after presentation of the video entitled 'Diagnosis and treatment of atopic dermatitis' was evaluated, as well as the degree of academic satisfaction with this technology, and its recommendation by students in undergraduate education.

MATERIALS AND METHODS

A descriptive cross-sectional prospective study of medical students from a private university in Curitiba-PR was conducted in the second half of 2017, in two stages: (1) development of the educational video; (2) application of a structured questionnaire before and after the video presentation for students who agreed to participate voluntarily. The project was approved by the Research Ethics Committee (n. 1.991.975 as of 30/3/2017) and followed Resolution 466/2012 of the National Health Council (Portuguese acronym: CNS).

The video duration is seven minutes, and it was developed by the researchers with integration of media, drawings, texts, sound, animation and transition of static images for an easier understanding of the subject presented, with emphasis on ethics, educational purpose and quality. The work team defined the stages of testing, recording and editing by taking advantage of their mobile devices, personal computers and resources to add sound, images, lighting and figures. Illustrative drawings were produced by researchers themselves. Adobe Premiere® and Adobe Photoshop® were used for the final editing.

As for the data collection instruments, the Atopic Dermatitis Questionnaire contained seven objective questions regarding atopic dermatitis (AD), which was the topic addressed in the video. The questionnaire was applied

before and after the video presentation. The questions were the following: (1) What is atopic dermatitis (AD)?; (2) AD has as risk factor; (3) About AD...; (4) The following are the diagnostic criteria for AD; (5) It is not a symptom of AD; (6) About AD, mark the true alternative; (7) These are recommendations to the individual with AD, except ...

The Educational Video Evaluation Questionnaire was applied only after the video presentation. It included a Likert Scale based on four categories adapted from Cabero (1998), as follows: 1) content, 2) technical and aesthetic aspects, 3) pedagogical proposal and 4) degree of satisfaction with the didactic resource employed⁸.

The sample is probabilistic with a 94% confidence interval (CI), a sampling error of 5%, and participation of 215 academics (N = 215) out of the 507 enrolled students from the 1st to 4th year of medicine in the institution during the study period. Inclusion criteria were students attending between the 1st and 4th year of medical school, aged over 18 years, and who signed the informed consent form. Those who did not wish to participate were excluded. The approach occurred intentionally and through accessibility, during the class interval. Video sessions were scheduled on different days and times in the classroom available on the campus for a greater possibility of joining the study.

The Atopic Dermatitis Questionnaire was applied before and after the video presentation and analyzed through the Marginal Homogeneity Test ($p < 0.05$). Cross-tables of responses before and after the video were constructed to help in interpretation, as well as calculations of change percentages, right answers and response errors.

Data from the Educational Video Evaluation Questionnaire were initially described through mean and standard deviation. The comparison between answers of this questionnaire and the established variables (sex, year of medical course, having had a class on atopic dermatitis) were evaluated through the Fisher's Non-Parametric Test or the Chi-Square Test. The level of significance adopted for these comparisons was 5%.

The analysis of the questions of the Atopic Dermatitis Questionnaire had a low n value (n=205) compared with the total n value, because questions were left blank or answered with more than one alternative. In all analyzes, the aforementioned CI and sample error were preserved.

RESULTS AND DISCUSSION

For the development of this study, were followed the four steps of instructional design as proposed by Filatro and Piconez (2004) for use of ICTs: (1) analysis, (2) design and development, (3) implementation, (4) evaluation⁹.

By understanding instructional design as the planning of teaching-learning, analysis is the first step. It involves identifying learning needs, defining instructional

objectives and raising the restrictions involved, which, in this study, is the bibliographic review and problematization. The next step is the design and development that comprise the planning of instruction and development of instructional materials and products, which in this study is the development of the educational video. Implementation is the third step, and includes the training of teachers and students regarding the proposal of instructional design and exposure to the teaching-learning situation, i.e., presentation of the educational video. Finally, evaluation is the monitoring, review and maintenance of the proposed system that corresponds to the application of questionnaires and their subsequent analysis⁹.

Two questionnaires were applied to the study sample, namely: Atopic Dermatitis Questionnaire before and after the video exhibition; and Educational Video Evaluation Questionnaire only after the exhibition. A total of 215 valid questionnaires were counted, and all participants were volunteers and students between the 1st and 4th year of the medical course of a private university in Curitiba-PR.

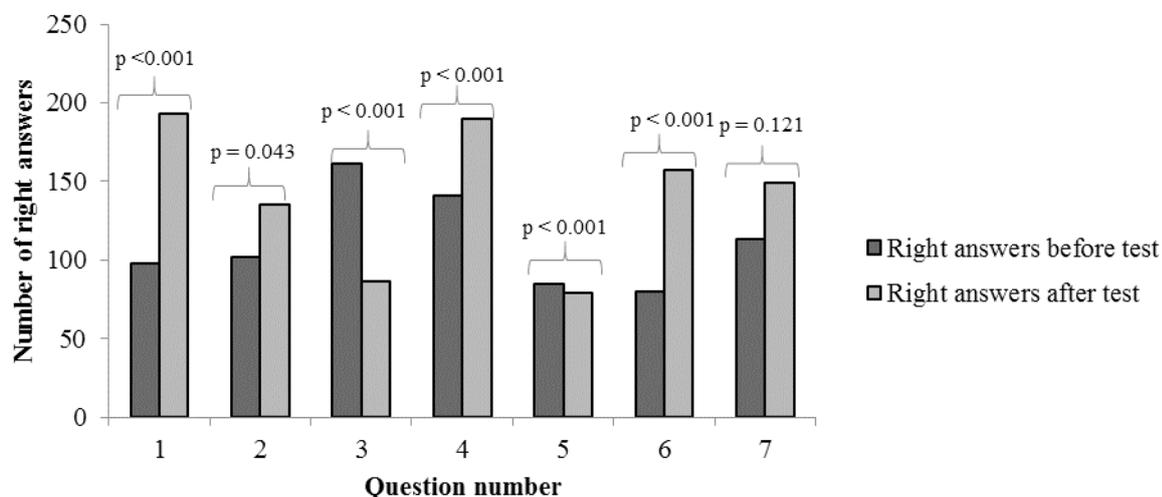
The highest rate of adherence was among 3rd year students with 68 subjects, followed by 4th year students (51), 2nd (50) and 1st (46) years. Students' mean age was 22 ± 4.06 years, ranging from 18 to 51 years, and there was a slight predominance of females (57.21%). Of the 215 participants, 192 (89.3%) had not had previous classes on the theme.

The general analysis of responses of the Atopic Dermatitis Questionnaire before and after the video presentation showed a significant increase of right answers ($p < 0.05$) in three of the seven questions (questions 1, 4 and 6). In questions 3 and 5, there was a lower rate of correctness ($p < 0.001$ in both). In questions 2 and 7, where $p > 0.05$, the correctness rate before and after the video exposure ranged from 49.75% (n=102) to 65.85% (n=135) and from 55.12% (n=113) to 72.68% (n=149), respectively (Graph 1).

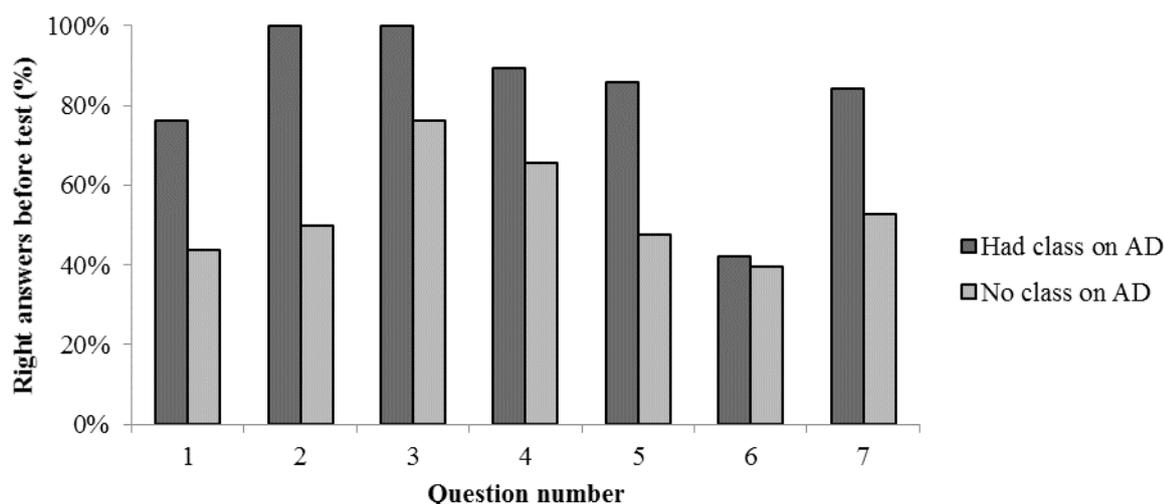
When considering the group of students who had already had a class on atopic dermatitis (n=23) and those who had not (n=192), the percentage of right answers in the Atopic Dermatitis Questionnaire applied before the video (pre-test) was comparatively higher in students of the first group. It is noteworthy that the percentage of right answers before the video presentation (pre-test) in those who had classes on AD was higher in all questions (Graph 2).

The greatest increase in the percentage of right answers was from 47.48% to 94.14% in the 1st question that addressed the concept of atopic dermatitis. More specific questions about the disease concept (questions 1 and 6), its risk factors (question 2), diagnostic criteria (question 4), and recommendations for patients (question 7) presented higher percentages of right answers when compared with questions that required more epidemiological and detailed knowledge on atopic dermatitis (questions 3 and 5).

Graph 1 – Right answers of questions from Questionnaire 1: Atopic Dermatitis (before and after the test)



Graph 2 – Right answers of the Atopic Dermatitis Questionnaire (before test) of those who had class on atopic dermatitis versus those who did not



Regarding the Educational Video Evaluation Questionnaire, in all blocks, the ‘satisfactory’ or ‘totally satisfactory’ answers predominated, ranging from 71.43% to 95.41% (Table 1).

Male subjects had a lower index of satisfaction with the video, and a significant difference compared with the female sex, in 21 out of the 26 items evaluated by the Educational Video Evaluation Questionnaire (p<0.05). Only in the following items there were no significant difference between sexes (p>0.05): scientific quality; sufficient amount of information; references; clear objectives: inform, motivate, sensitize, exemplify, etc.; appropriate design and duration.

In most questions, there was no significant

difference (p>0.05) between the video evaluation by those who had and had not attended previous classes on atopic dermatitis, except for the following (p<0.05): language suitability; references; type of letters used in written text; if learning expectation was met.

When compared by year of medicine course, participants also did not present significant differences between the answers, except for the ‘sufficient amount of information’ item with which 4.44% of 1st year students were dissatisfied. Of respondents who answered ‘totally satisfactory’ or ‘satisfactory’ for this item, 21.8% were in the 1st year, 22.33% in the 2nd year, 30.96% in the 3rd year, and 24.36% in the 4th year.

Table 1 – Items from the Educational Video Evaluation Questionnaire evaluated as ‘satisfactory’ or ‘totally satisfactory’ in percentage of responses (n=205)

| Block | Item | Satisfactory/ Totally satisfactory |
|--|---|---------------------------------------|
| Video content | Scientific quality | 93.55% |
| | Clarity in subject presentation | 93.12% |
| | Contextualization | 88.94% |
| | Sufficient amount of information | 91.71% |
| | Language suitability | 95.41% |
| | Content suitability | 94.50% |
| | Provides references | 91.20% |
| Technical and aesthetic aspects of the video | Composition, movements, lighting, colors | 91.74% |
| | Size of the graphic elements: photos, captions, figures | 95.41% |
| | Technical and aesthetic quality of visual elements | 91.24% |
| | Use of involving language | 77.31% |
| | Type of letters used in written text | 93.49% |
| | Music and sound effects | 81.19% |
| | Script, arguments, environment, and appropriate characters | 84.86% |
| Pedagogic proposal | Originality, rhythm and variety of presentation | 83.49% |
| | Practical applications of the content | 89.81% |
| | Clear objectives: inform, motivate, sensitize, exemplify, etc. | 91.24% |
| | Interdisciplinarity | 72.81% |
| | Recapitulations and synthesis | 71.43% |
| | Appropriate pedagogical proposal | 91.71% |
| | Suitable language | 90.74% |
| Degree of satisfaction with video as a teaching medium | Suitable format and duration | 79.17% |
| | Creates and facilitates learning situations | 89.45% |
| | Motivates reading and studying the subject | 73.39% |
| | Met your learning expectation | 79.36% |
| | Would recommend this type of teaching resource in undergraduate courses | 73.85% |

Regarding the recommendation of videos as a teaching resource in undergraduate courses (Table 2), most participants recommended the use of this teaching tool. Only 8.4% considered it ‘totally unsatisfactory’ or

‘unsatisfactory’. Among the dissatisfied group, most were men (n=11), attending the 1st year of medicine course (n=7) and had not attended a class on atopic dermatitis (n=17).

Table 2 – Recommendation of use of educational videos in undergraduate courses

| Would recommend this type of teaching resource in undergraduate courses | 1  | 2  | 3  | 4  | 5  |
|---|---|---|---|---|---|
| General | 10 (4.7%) | 8 (3.7%) | 39 (18.1%) | 55 (25.6%) | 103 (47.9%) |
| Sex | | | | | |
| Female (n= 123) | 3 (2.4%) | 4 (3.3%) | 16 (13%) | 35 (28.5%) | 65 (52.8%) |
| Male (n= 92) | 7 (7.6%) | 4 (4.3%) | 23 (25%) | 20 (21.7%) | 38 (41.3%) |
| Year of medical school | | | | | |
| 1 st (n=46) | 5 (10.9%) | 2 (4.3%) | 11 (23.9%) | 15 (32.6%) | 13 (28.3%) |
| 2 nd (n=50) | 0 (0%) | 3 (6%) | 8 (16%) | 12 (24%) | 27 (54%) |
| 3 rd (n=68) | 4 (5.9%) | 2 (2.9%) | 13 (19.1%) | 19 (27.9%) | 30 (44.1%) |
| 4 th (n=51) | 1 (2%) | 1 (2%) | 7 (13.7%) | 9 (17.6%) | 33 (64.7%) |
| Class on AD | | | | | |
| No (n= 192) | 9 (4.7%) | 8 (4.2%) | 36 (18.8%) | 51 (26.6%) | 88 (45.8%) |
| Yes (n= 23) | 1 (4.3%) | 0 (0%) | 3 (13%) | 4 (17.4%) | 15 (65.2%) |

Likert scale legend: 1= Totally unsatisfactory; 2 = Unsatisfactory; 3 = Reasonable; 4 = Satisfactory; 5 = Totally satisfactory

In the current literature, data on new teaching models, such as the use of videos, involve issues such as the limit between right and wrong, and there is a certain intellectual restlessness regarding these models. The present moment of change is a result from thoughts of decades, and the most opportune time for materializing these ideas, because of political-pedagogical aspects and the growing globalization that facilitate the easier and faster exchange of experiences¹⁰. Thus, emerges a new field of study that aims to evaluate students' application and acceptance of these new teaching models.

The National Curricular Guidelines established for undergraduate medical courses also address ICTs. Their domain is considered a general competence of doctors, and the most appropriate decision-making ability is based on scientific evidence and continuing education¹¹. The latter is closely linked to the doctor's ability to use ICTs¹². The use of short videos or movies excerpts in this scenario has been studied as a tool of this new qualification condition of doctors.

A classic study conducted by Self et al.¹³ between 1989 and 1992, evaluated if a film presentation with subsequent thematic discussion would assist in the development of moral reasoning in 114 1st year medical students. A questionnaire was applied before and after the film exhibition, and groups were divided between those participating in the activity for two trimesters, another group that participated for only one trimester, and a third group that was not exposed to the film and the proposed discussion (control group). There was a significant

difference between questionnaires before and after the movie in groups involved in the project, which led to the conclusion that the video used for educational purposes can influence medical students' moral reasoning positively¹³. The present study also makes use of the application of questionnaires before and after the video presentation. Although the general methodology was different from that adopted by Self et al.¹³, the general rate of right answers was higher compared with tests before and after the video on atopic dermatitis.

In the present study, was found a higher number of correctness with statistical significance in three questions. All questions of the Atopic Dermatitis Questionnaire were multiple choice with a single answer, but three questions (number 1, 4 and 6) were direct interrogatives with the question and answer directly present in the video and the text, so, they were simpler^{14,15}.

In question 5, the number of right answers decreased between the Atopic Dermatitis Questionnaire applied before and after the test (p<0.001). Although it is also a direct interrogative¹⁶, its alternatives are medical technical terms with which basic cycle students have not had much contact yet, thus increasing its level of difficulty.

In question number 3, there was the greatest reduction of right answers, going from 78.53% to 41.95%. This is a more complex and extensive question that requires the association and interpretation of knowledge acquired during the video presentation, and the need to stick to details. In most responses changed in the second moment of the questionnaire, was marked the alternative constructed

to demand more attention from students, and it had an epidemiological error only at the end of the sentence. This may justify this difference in the percentages before and after the video.

The video duration should also be considered depending on viewers' attention time. At Monash University in Australia, 1-2 minute videos were incorporated into PowerPoint® presentations to enrich pharmacology classes, and they resulted in a better ability to relate theoretical content to practical simulation and students' motivation to attend classes⁴. According to Ikeda et al.¹⁷, the longer the duration of the educational video, the harder it can be to achieve the desired learning, since the first ten minutes are usually those of most attention. Duration of the video produced in this work is seven minutes. The answer to question 1 was in the first minute of the video, and this was the question with the highest number of right answers after the video and the highest increase in the rate of right answers between pre-and post-video. These facts reinforce the importance of better matching the planning of the educational video with the attention time.

Several studies corroborate the role of ICTs for learning pediatrics^{18,19}, anatomy²⁰, pathology²¹ and oncology²². The application of pre and post-test questionnaires has shown that students who used these technologies learned faster and more efficiently, and had better retention of knowledge¹². A meta-analysis of comparative studies between ICT-based teaching and traditional teaching methods showed significant improvement with use of these tools²³.

In addition to the application of ICTs in teaching, it is extremely important to evaluate the acceptance of this practice. In a cohort study conducted in New Zealand with 4th year medical students, the 78 participants answered a questionnaire about their attitudes and behaviors regarding books and films applied to public health teaching. When questioned about the use of films in medical education as an aid to public health education, 88% stated they 'agree' or 'strongly agree' with the didactic application of this resource, and only 1% strongly disagreed²⁴. In the present study, the Educational Video Evaluation Questionnaire indicated that most consider the use of technology as a 'satisfactory' or 'totally satisfactory' teaching tool (73.8%), regardless of the undergraduate year and of having attended or not a previous lesson on atopic dermatitis.

In studies on the use of television and audiovisual media for teaching various subjects to medical students, was demonstrated that the use of these two tools may be related to the significant emotional context of medical education. Studies have shown that medical students are more likely

to learn and remember the subject addressed when the teaching methodology raises emotional response²⁵.

In his classic work 'Aesthetics: the idea and the ideal', Hegel²⁶ states that "sight and hearing are precisely the senses suited to pure and abstract manifestations" (p.171). The audiovisual would be able to reach levels of human perception that other media could not achieve²⁶. Therefore, it can be an element of strong creativity and knowledge modification, that culminates in the creation of mechanisms for the personal expansion of ideas by both teachers and students²⁷.

The duration of the video, its evaluation in a single institution, and the cross-sectional design are limitations of this study. Continuing to develop these technologies in the academic environment and studying their impact is extremely important. Other types and methodologies of videos in medical education should also be evaluated, in addition to the degree of retention of content presented by videos in the long term.

CONCLUSION

In conclusion, information technologies are facilitators in the theoretical-practical correlation and have the potential to aid in the retention of content and learning.

The analysis of the Atopic Dermatitis Questionnaire showed an increase in the number of right answers in the test on the video content applied after its exhibition when compared with right answers before the video in three out of the seven questions with statistical significance. The higher number of right answers was found even among students who had already had a class on the topic of the video.

A significant degree of satisfaction with the tool was also observed. Among the strongest features of the video are the scientific quality, language suitability, pedagogical content and proposal, its potential to create and facilitate learning, and the fulfillment of students' learning expectations. These are all important features in the presentation of academic content and learning.

Regarding the use of educational videos in undergraduate courses, only 8.78% (n=18) would not recommend it ('totally unsatisfactory' or 'unsatisfactory') as a pedagogical resource. Most of that percentage was of men attending the 1st year of medicine, who had not had a class on atopic dermatitis yet, thus, the majority recommends using this teaching tool.

The educational video presented significant and important rates in students' learning of medicine and in their general satisfaction with the educational proposal, hence, it impacted positively on the evaluated academic environment.

The present study was approved by the Research Ethics Committee of the Universidade Positivo under number 1.991.975 on 30/03/2017.

The authors have no conflict of interest.

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and final writing of the text. Spagnol C - Participated in the development of the educational video, data collection and analysis and final writing of the text. Ribas CR - Participated in the development of the educational video, data collection and analysis and final writing of the text. Kutzke ALRMP - Participated in the development of the educational video, data collection and analysis and final writing of the text. Purim KSM - Design of the study, participated in the supervision and final revision of the text.

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