

Construction and Evaluation of an Educational Product: “HPV: Concept and Prevention”

Elizabeth Bacha¹, Almira Alves dos Santos², Lucyo Wagner Torres de Carvalho²

¹Centro Universitário Tiradentes (UNIT), Maceió, Brasil

²Universidade Estadual de Ciências da Saúde de Alagoas (UNCISAL), Maceió, Brasil

Email: elizabeth.bacha@hotmail.com, almira_alves@yahoo.com.br, lwtc@hotmail.com

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Abstract

Human Papillomavirus (HPV) is the main cause of cervical cancer. In the last decade, the mortality rate due to cervical cancer has increased alarmingly in the world, especially in some countries, such as Brazil. In the eyes of science, it is absurd to admit such a fact, since this is the only cancer that has a vaccine and is highly effective, in addition to being an easily diagnosed and treatable disease in its early stages. A failure in communication related to HPV and its forms of prevention is evident. **Materials and Methods:** In the present study, the objective was to build and evaluate an educational product (video) on the Human Papillomavirus, to demonstrate the construction of an educational product following the specifications of the CTM3 Method, as an alternative in the construction of educational products and to identify whether the video “HPV: concept and prevention” was able to positively influence students’ learning about the topic addressed. **Result:** Thus, a clinical trial was carried out in a higher education institution in Alagoas (Brazil), with students from the first period of the medical course. In the first phase of the research, the structured video was built using the CTM3 Method, which was later validated. In the second phase, an assessment was applied on HPV, in the format of an Objective Structured Clinical Examination (OSCE) for the students. The exam was reapplied by the students after viewing the structured video with the CTM3 Method on HPV. **Conclusion:** There was a significant improvement in learning ($p < 0.0001$), with an increase of 92.3% in the average grades, pointing to an alternative of apparent effectiveness and scope in the structuring of educational products in the health area and placing another instrument (HPV video) in the battle against cervical cancer.

Keywords

Health Education, Communication, Methods, HPV, Educational Products

1. Introduction

The Human Papillomavirus (HPV) infection is the main cause of sexually transmitted viral diseases. There are over 150 subtypes of HPV, some of them are related to various types of cancer (cervix, vulva, vagina, penis, anus, and oropharynx) and others are responsible for anogenital warts in both sexes. This correlation is high when it comes to cervical cancer: it is estimated that 99% of cases are caused by oncogenic HPV subtypes (Federação Brasileira de Ginecologia e Obstetria (FEBRASGO, 2020)).

Cervical cancer is the fourth most common cancer in women, with about 90% of estimated deaths worldwide occurring in low- and middle-income countries (LMICs) (World Health Organization, 2022).

In Brazil, between 2008 and 2018, the mortality rate due to cervical cancer increased by 33%, according to data from the Ministry of Health (INSTITUTO NACIONAL DO CÂNCER, 2020). Scientifically, this increase is not admitted, since this is the only cancer that has a vaccine and is highly effective, in addition to being an easily diagnosed and treatable disease in early stages (FEBRASGO, 2020).

In August 2020, in order to reduce morbidity and mortality from the disease, the World Health Organization (WHO) developed a campaign aimed at eliminating cervical cancer in the world by 2030 (World Health Organization, 2022).

There is a feasible concern that Brazil will not reach this goal, since our vaccination rates, especially for the second dose, are low and we have not shown effectiveness in increasing them (Moura, 2019). In Brazil, we are walking slowly, with little or no information about the importance of vaccination against HPV. In addition, parents or guardians have difficulty talking about it with their children (de Carvalho et al., 2019).

According to the WHO, Health education presupposes health literacy, encouraging the adoption of healthy living standards, for the individual and collective good, even leading to the judicious and careful use of the health services available to them (CDC, 2021).

Levy et al. (1997) claim that health education is related to the population's desires and expectations for a better life and the government's projections to offer more efficient health programs.

The production of educational products is one possible way to promote health education, according to Freitas et al. (2009). It constitutes any and all educational equipment or technologies used in a teaching process, aiming to encourage and bring the student and/or target audience closer to the content.

Videos are examples of types of educational products. As Moran et al. (2016) demonstrated, in a randomized study, video is an exceptional alternative for people with low literacy, especially when it comes to a narrative; that is, it has a comprehensive character. Furthermore, rapid changes in media and technology have made videos increasingly accessible and almost a routine in contemporary life.

The CTM3 Method, created by dos Santos (2019a), emerged as a potentiator in the teaching and learning process, precisely for the development of educational products. He describes this method in three steps (Figure 1).

CTM3 C-Step

- Conception of the product (C)—is the initial planning, in which its fundamentals: the choice of theme, which type of educational product and which elements best suit its purpose, and, mainly, who will be the target audience and its characteristics, age group, the means of dissemination and the feasibility of executing the product.

CTM3 T-Step

- Theoretical Reference (T)—consists of the basis for the theoretical foundation to be used on the topic and on the nature of the chosen educational product.

CTM3 M3-Step

- Methodological Framework (M)—the methodological framework of the CTM3 is what distinguishes it and gives it scope, it is structured in three theories that must be referenced; for that reason, there is the numeral that accompanies the letter M in CTM3:

1) Transactional Analysis—is a theory developed by a Canadian psychiatrist, naturalized American, Eric Berne, who studied and analyzed interactions (verbal and non-verbal transactions) between individuals. In this theory, the personality structure is composed of three elements called Ego States: Parent, Adult and Child Ego State (Kertész, 1987).

2) Neurolinguistics—for Figueira (2014, p. 17), “Neurolinguistic Programming (NLP) teaches us to become aware that our experience in the world is not the world and that our perception is influenced by filters, such as beliefs and values”. Therefore, when communicating, we don’t just use spoken or written words, but an arsenal of tools, sometimes correlated with our feelings and memories like anchors. Anchors are, then, any element that gives access to an emotional state, or a memory. Whenever the individual comes into contact with the anchor, he will be, consciously or unconsciously, returning to the original message, reinforcing it (O’connor & Seymour, 1995).

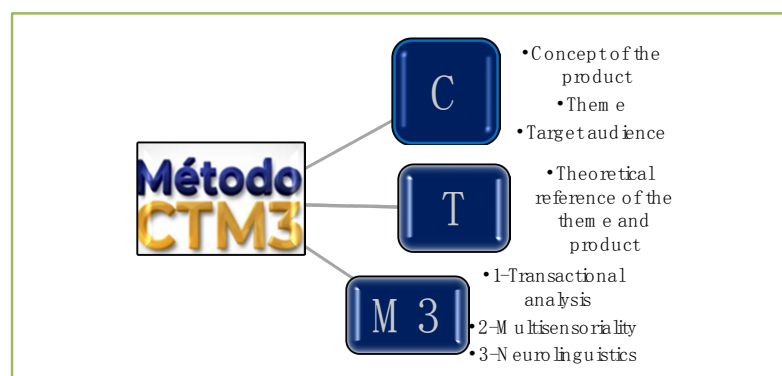


Figure 1. CTM3 method. Source: authors.

3) Multisensory—the senses are the channels through which information is captured and, even though vision and hearing are the most used, [Lindstrom \(2012\)](#) asserts that, when communication can access the five senses, there is a greater receptive potential, as 80% of established impressions are non-verbal. The search must therefore be for the exploration of all the senses (sight, hearing, touch, smell and taste) with the purpose of “persuading” people in a more complete and interactive way ([Fujisawa, 2006](#)).

Thus, an educational video structured in this method was produced, whose topic is of great importance—HPV—responsible for cervical cancer, one of the main causes of death in women, one of the few types of cancer that can be prevented by a simple vaccine that is about 100% effective.

We propose to demonstrate the construction of an educational product following the specifications of the CTM3 Method, as an alternative in the construction of educational products and to identify whether the video “HPV: concept and prevention” was able to positively influence students’ learning about the subject, topic addressed, creating yet another instrument to collaborate in the campaign against cervical cancer.

2. Materials and Methods

The production, validation and evaluation of the educational product were carried out in 03 stages, namely: 1) Production of the educational video based on the CTM3 Method, and 2) Validation of the video, 3) Evaluation of the educational product through the OSCE.

2.1. Video Production Stage


[Bacha & dos Santos \(2022\)](#) observed, during the production of a video, that there is a dialogue that takes place between two friends: one a doctor and the other a businesswoman and mother of a nine-year-old girl. The conversation begins with the friend’s concern about the appearance of a lesion in the groin. The doctor refers to the Human Papillomavirus (HPV) infection, emphasizing the concept and prevention, explains about the HPV subtypes and their consequences and warns of the need for vaccine and gynecological consultation (for early detection and treatment).

The proposal was to insert, in the video, all the precepts verified in the CTM3 Method ([Table 1](#)).

2.2. Video Validation Phase

The validation took place during the II Session of Technical Educational Production of the Professional Master’s Degree in Health and Technology Education at UNCISAL, held in partnership with the Fundação de Amparo à Pesquisa do Estado de Alagoas (FAPEAL); took place on December 3, 2020, when PhD professors (ad hoc committee) participated as evaluators, with the video being validated. After validation, the video “HPV: concept and prevention” was inserted

Continued

Hearing	<ul style="list-style-type: none"> ● Character voices. ● The dog's bark. ● The devils laugh. ● The music in the background.
Smell	<ul style="list-style-type: none"> ● Image of steaming coffee (smell). ● Character's speech: <ul style="list-style-type: none"> – Hmm...it smells good! ● Coffee, fruits on the table, chocolate. ● Doctor's speech: <ul style="list-style-type: none"> – delicious, I love chocolate. ● Doctor's speech: <ul style="list-style-type: none"> – a very tasty coffee...
● gustatory	
● Synesthetic	<ul style="list-style-type: none"> ● The smoke coming out of the coffee. ● Mother's speeches: <ul style="list-style-type: none"> – Friend, I'm so worried about a wart that appeared on my crotch... – Hummmm... ● Doctor's statements: <ul style="list-style-type: none"> – Cool your head... – Yummy, I love chocolate. – A nice hot cup of coffee.

^aSource: adapted from dos Santos Júnior et al. (2021).

into the eduCAPES platform

(<http://educapes.capes.gov.br/handle/capes/586434>) (Figure 2).

2.3. Video Evaluation Phase

For the evaluation phase, the clinical trial of the type before and after was used.

Step 1: OSCE application

During a workshop on the OSCE, developed by the researcher at UNIT/AL, a proposal was presented for students of the first period of the medical course to participate in the research. Among the 45 presents, in the universe of 80 students enrolled in the first period of this course, 17 accepted, signed the informed consent and participated in all stages of the research.

The Objective Structured Clinical Examination (OSCE) or Objective Structured Clinical Examination (OSCE) was chosen and applied to students on the human papillomavirus (HPV). The questions were asked using a questionnaire already validated on HPV, by Waller et al. (2013) and adapted to the format of an OSCE.

In the OSCE of this study, 10 questions were formulated divided into three stations, with values of up to 1 point each, totaling a maximum score of 10. The first and third stations had 3 questions and the second station had four questions.

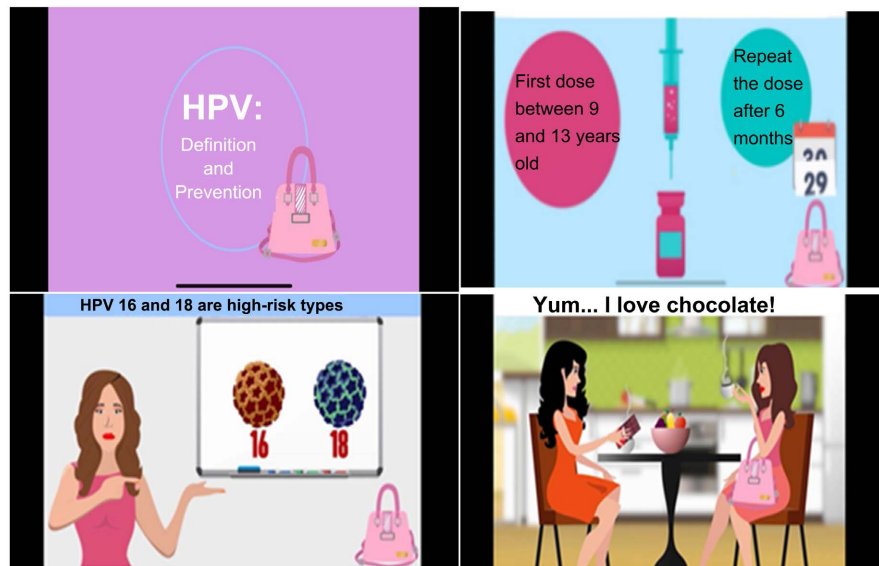


Figure 2. Screens of the final version of the video “HPV: concept and prevention”.

The students remained at each station for five minutes, given the signal, changed stations until they passed all three, then answered the 10 questions (Figure 3). The template (with the possible correct answers and proper scoring), along with the checklist, was delivered to the evaluator at the beginning of the OSCE. The student, upon entering the room, informed his full name so that the evaluator could identify him. In each station, there was an evaluator (gynecologist/obstetrician professors who experience the OSCE in their academic routine). Once the answers were collected, the grades of each student in the first stage were added up. To carry out this entire procedure in the same day, it was necessary to double the number of rooms (where the stations were) and thus the number of professors, totaling 6 rooms and 6 professors (Figure 3).

To evaluate the educational product (video), the t test was used, paired for intragroup comparisons. Data were analyzed using IBM SPSS Statistics 22.0 software for statistical analysis. The normality of the tests was previously verified by the Shapiro-Wilk test, in the same software.

Step 2: watch the video

After the first stage, the students watched the video “HPV: concept and prevention”, structured in the CTM3 Method, which was only made available at that moment to ensure that this information was not accessible in advance.

Step 3: repeat OSCE

The entire OSCE process was repeated in step three, with the same questions and evaluators. The comparison was made between steps 1 and 3. It should be noted that the three steps (Table 2) took place on the same day, in order to prevent the student from coming into contact with external information.

3. Results

In the evaluation phase, 17 students from the first period of medical graduation

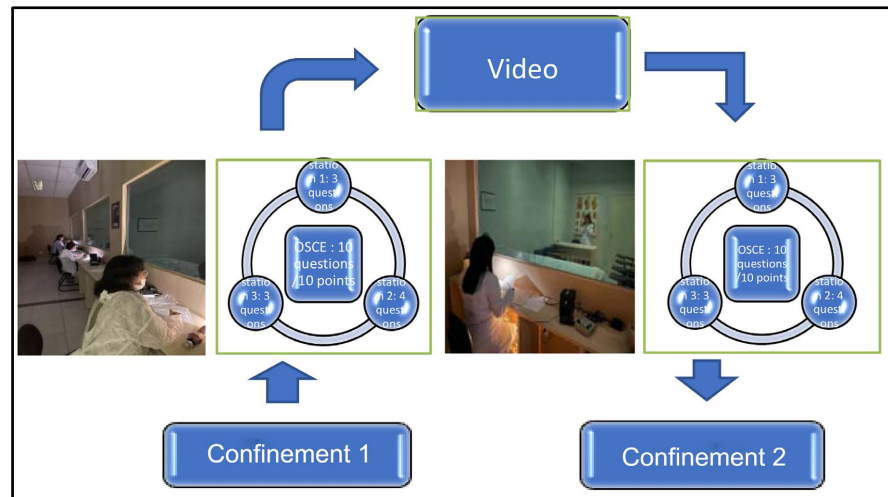


Figure 3. OSCE flowchart. Source: authors (2022).

Table 2. Steps of evaluation phase. Source: author, 2021.

Procedure	Step 1	Step 2	Step 3
	OSCE	Video	OSCE

participated. Most participating students were female (73.5%). The mean age found was 19.7 years, with a standard deviation of 2.3 years.

Shapiro-Wilk tests were performed to assess normality. The means of the tests performed by the students showed a value greater than the significance level ($p > 0.05$), both in OSCE 1 (before the video) and in OSCE 2 (after the video) and, therefore, follow normal distribution (Table 3).

Regarding prior knowledge, participating students demonstrated limited knowledge about HPV, and the average grade was low (4.56) in OSCE 1. To assess content learning, a comparison was made between the number of correct answers in the pre-test (OSCE 1) and the post-test (OSCE 2). The group average at the post-test (OSCE 2) was 8.77. It is noteworthy that the group had a significantly higher performance in the post-test, in which the average of correct answers obtained a grade gain of 4.2 (92.3%), which reflects great learning ($p < 0.0001$) (Table 4).

4. Discussion

When comparing medical students' knowledge about HPV before and after viewing an educational video, "HPV: concept and prevention", the average of correct answers obtained a grade gain of 92.3%, which reflects great learning ($p < 0.0001$), pointing out that information communicated in a more adequate and comprehensive way may be able to produce important results. Such results, at first in agreement with the proposal of the CTM3 Method in being another instrument in this incessant search for quality learning starts from the point of being a way to make the elaboration of more comprehensive educational products

Table 3. Normality test applied to the group before and after the intervention (video).

Moment	Shapiro-Wilk (<i>p</i> -valor)
Before the intervention	0.331
After the intervention	0.320

Table 4. Comparison of learning before and after the intervention.

	Pretest (OSCE1)	Posttest (OSCE2)
n	17	17
Average	4.56	8.77
Standard deviation	2.39	0.73
<i>p</i> -valor (between the pre and post test) ^a		<0.0001

^aTest t paread.

(involving all Ego States and sensorialities) and attractive (having its theme and content well established and using anchors), presuppositions of this Method.

Corroborating our findings, [dos Santos et al. \(2014\)](#) carried out an experimental study to evaluate the effectiveness of an educational toy as a teaching-learning strategy in children aged 6 to 12 years at a public school in Alagoas (Brazil), emphasizing changes in hygiene-related habits. The OSCE was used before and after the production of an educational resource. It consisted of a doll that had a booklet in its backpack containing information on how and when to wash hands. We presented Items such as multisensory, the three states of ego and anchor (the doll itself) in this educational product. Regarding hand washing at meals, of the 62 subjects evaluated, 12.90% washed their hands before applying the educational instrument and 93.55% after applying the educational instrument, 9.68% washed their hands after using the bathroom before the application of the tool and 85.48% after its application.

Likewise, specifically on multisensory, [Santos et al. \(2016\)](#), in a study, carried out weekly workshops with the elderly stimulating the five senses and realized that, in addition to improving the learning process, working with multisensory is a strategy to stimulate memory, as it provides memories and vivid memories and contributes to the reasoning ability, attention and perception.

The video used in this study is a narrative, [Moran et al. \(2016\)](#) found, in a randomized study with 774 subjects, using two films about HPV, that those who watched the video with a narrative gained greater knowledge than those who watched the other video with the same theme, but not being a narrative.

The choice of the video's theme is in line with the WHO's own warning, emphasizing that HPV is a preventable cause of cervical cancer (a disease with high morbidity and mortality among women); and established, in 2020, a campaign for the extermination of cervical cancer in 2030.

The academics of the medical course of this study demonstrated in the initial phase of the research to have limited knowledge about HPV. This finding cor-

roborates the results of other investigations, such as that of [Silva and Monteiro \(2016\)](#), who carried out a cross-sectional study with 100 first year (G1) and sixth year (G2) medical students. In this group, only 28% of G1 were vaccinated against HPV and 14% of G2 concluded that these medical students are not properly educated about HPV infection and warned about the risk of this misinformation leading to a reduction in vaccination coverage, in addition to allowing an increase in HPV-induced diseases in the population. Also, [Panobianco et al. \(2013\)](#) reported the lack of knowledge about HPV among 58 adolescent nursing students, of which only 20.7% said they knew some of the signs and symptoms of the virus and 54.3% of adolescents said they did not know what the virus can cause.

The choice of the video's theme is in line with the WHO's own warning, emphasizing that HPV is a preventable cause of cervical cancer (a disease with high morbidity and mortality among women); and established, in 2020, a campaign for the extermination of cervical cancer in 2030.

In the current health context, it is relevant that people learn about HPV prevention and vaccine, either for their own knowledge, or especially as important replicators of this information.

Concurrent with the growing number of professional master's degrees in Brazil, there is an increase in the development of educational products. As the CTM3 Method was initially created, in the author's own words, [dos Santos \(2019b\)](#), with the aim of helping to make more effective educational products, its use may be increasingly common.

Some educational resources structured in the CTM3 Method have already been evaluated, in addition to the video of this study. [Rocha \(2019\)](#), [Soares \(2019\)](#), [Toledo \(2019\)](#), [Carvalho Filho \(2021\)](#), [Medeiros \(2021\)](#), [Meneses \(2021\)](#) and [Warren \(2021\)](#) had educational resources structured in the CTM3 Method in their dissertations that were evaluated and validated by various means, including through the master's board.

However, according to [Polit and Beck \(2011\)](#), validation is almost an endless process, that is, the more evidence that can be gathered that the instrument is having the proposed result, the greater the confidence that researchers will have in its validity.

Since the beginning, society is in constant search for more effective communication. In teaching, especially in the health area, an attempt is made to get closer to perfection and, thus, to facilitate the understanding of what would be essential for health to be achieved, a very old, but also very current, dream of science being understood.

5. Conclusion

We structured the educational product "HPV: concept and prevention" following the precepts of the CTM3 Method. The educational video positively favored the absorption of knowledge inserted in it. We believe that the spread of this

video, especially in the waiting rooms of offices and outpatient clinics, can collaborate in the promotion and prevention of health, especially regarding HPV. We hoped that this study can also stimulate the use of the CTM3 Method in the development of educational products.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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