

## TECNOLOGICA INNOVATION

## CONSTRUCTION AND VALIDATION OF EDUCATIONAL TECHNOLOGY FOR HIV/AIDS PREVENTION IN WOMEN DEPRIVED OF FREEDOM


### HIGHLIGHTS

1. Health education is an essential element in health promotion.
2. Perspectives for new studies with this theme.
3. Translating different knowledge about HIV/Aids in unhealthy places.
4. Prevention of STI/HIV/AIDS in female population deprived of freedom.

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### ABSTRACT

**Objective:** to describe the process of elaboration and validation of educational technology for prevention of Human Immunodeficiency Virus in female population deprived of freedom. **Method:** methodological study conducted in a prison complex in the Midwest of Brazil, from January to July 2019, using a four-point Likert scale. Data were analyzed with Cronbach's Alpha and KAPPA tests. A minimum Content Validity Index of 0.80 was considered for validation and minimum 75% agreement. **Results:** The items of the material were relevant with a total Content Validity Index of (CVI  $t=0.87$ ) for specialists and (CVI  $t=0.95$ ) for women. The specialists evaluated the booklet, classifying it with a "superior" degree of recommendation (average of 91%). There were adjustments, reaching, in the end, a concordance index higher than 88.7%. **Conclusion:** we believe that this technology represents an advance for Public Health, since it used reliable and appropriate measures and instruments for the target audience.

**DESCRIPTORS:** Educational Technology; Validation Studies; Prisons; Human Immunodeficiency Virus; Acquired Immunodeficiency Syndrome.

### HOW TO REFERENCE THIS ARTICLE:

Borges AVSS, Matos MA de, Souza JHB de, Freire KRFS, Sousa FR de, Florentino V de J. Construction and validation of educational technology for HIV/AIDS prevention in women deprived of freedom. Cogitare Enferm. [Internet]. 2023 [cited "insert year, month, day"]; 28. Available from: <https://dx.doi.org/10.1590/ce.v28i0.89509>

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## INTRODUCTION

There are global estimates that more than one million individuals acquire a Sexually Transmitted Infection (STI) every day, and that each year 500 million become infected with one of the curable STIs<sup>1</sup>. Worldwide, more than 37 million (95% CI: 30.8-42.9) people are living with the Human Immunodeficiency Virus (HIV)<sup>2</sup>, and in the last decade 247,795 cases of this infection have been identified in Brazil, with an increase in the female population. In relation to Acquired Immune Deficiency Syndrome (AIDS), the country has registered an average of 40,000 new cases annually in the last five years<sup>3</sup>.

Although Brazil is internationally recognized as a model in the management of HIV/AIDS<sup>3</sup>, some social groups remain on the margins of these investments, such as People Deprived of Liberty (PDL). Prisons are overcrowded, and risk behaviors, attitudes, and practices (CAP- in Portuguese) for STI/HIV/AIDS, such as same-sex sexual intercourse, violence, prostitution, drug use, and unprotected sex, are very common. Moreover, the contact of these individuals with the general population, through periodic intimate visits and the transfer of cells and prisons, increases the risk of dissemination of transmissible pathogens, given the perception of invulnerability and lack of knowledge about preventive measures<sup>4-8</sup>.

According to the National Survey on Penitentiary Information (INFOPEN), the incidence of AIDS is 138 times higher inside prison units, and studies indicate a higher prevalence of HIV among detainees than in the general population in Brazil. However, limited data are available to facilitate the development of effective interventions in this scenario of high transmission<sup>9</sup>.

In the epidemiological context, the female population in prison is equivalent to 5.31% of the total prison population. Nevertheless, the biological characteristics inherent to women, associated with gender issues, make them more vulnerable to HIV/Aids when compared to men, requiring specific policies. Commonly, men deprived of their freedom show resistance to the use of condoms for considering it only a contraceptive method, and for perceiving themselves as invulnerable, anchored in a hegemonic masculinity<sup>10-12</sup>.

It is essential to give more attention to the health of women deprived of their freedom, not only because of the biological risks inherent to sex and the vulnerabilities present in the prison environment, but also because of the lack of preventive actions offered by the Brazilian prison health system and that of most countries<sup>4,6,8</sup>. In this sense, it is essential to have Educational Technologies (ET) that consider the particularities of this emerging population segment<sup>13</sup>

It is known that it is essential to develop strategies to deal with sexually transmitted diseases, and health education has been systematically considered the gold standard in HIV/AIDS prevention and control<sup>14-16</sup>.

However, studies directed to the prison population are still incipient, most likely related to the environment considered hostile and unsafe, which most often does not instigate the scientific community. It is also associated with the lack of effectiveness and inability of health professionals in the prison system to use innovative technologies in health education<sup>8-9,12</sup>.

It is important to consider that, although PDL are in a fixed environment, it is still difficult to access and considered risky for in-person health education activities. Despite this issue, in the prison setting, printed educational materials may represent a tool of impact, considering that they are a cheap, accessible instrument, consented by the security of prison institutions, and with potential for transformation and awareness about individual vulnerability and health<sup>17</sup>.

For this, it is believed to be necessary that this health technology be developed and validated to ensure the effectiveness, efficacy, resoluteness and scientifically necessary for behavior change and risk awareness. To date, no educational tool on STI/HIV/AIDS specific to the People Deprived of Liberty (PDL) has been identified, and the present study is considered pioneering in the fields of scientific and technological investigations in health and education.

It is believed that the construction will provide results that will raise awareness of public health policies aimed at this vulnerable, stigmatized, and marginalized group, and that due to the condition of incarceration has difficulty in accessing health care<sup>18</sup>. Still, it can instrumentalize health professionals working in the prison environment, where investments in continuing education are incipient.

Considering the importance of these aspects, this research aimed to describe the process of elaboration and validation of an educational technology for the prevention of HIV/AIDS for the female deprived population.

## METHOD

This is methodological research developed in the period from January to July 2019, in a women's prison complex in the Midwest region of Brazil, where about 107 women are in prison. The research took place in three stages, namely: bibliographic survey; elaboration of the educational material; and validation of the material by experts on the subject and by women deprived of liberty. This type of study aims to develop, validate, and evaluate research tools and techniques, with the object of developing a material based on scientific evidence of impact and specific to the target population<sup>19-20</sup>. The educational technology was developed according to the recommendations for construct construction and construct validation, according to the items: content, scientific accuracy, literary presentation, illustrations, readability, and quality of information<sup>20</sup>.

For data collection, initially, three focus groups were conducted with up to 10 women deprived of their liberty to survey their doubts, myths, and knowledge about HIV/AIDS, where we could identify the Behaviors Attitudes and Practices (CAP) of individual, social and programmatic vulnerability to STIs. At first, one focal group was planned, but, considering the women's narratives, gestures, and expressions, we saw the need for two other groups, to meet their needs for dialogue and gregariousness. Each focus group, lasting approximately two hours, had a mediator with expertise in the area and took place in the courtyard of the wing, away from the prison security agents, aiming to minimize any discrimination or inhibition.

Then, to support the preparation of the material, a survey was carried out in LILACS, Medline/PubMed, and Scopus databases, using the descriptors present in Health Sciences/Medical Subject Heading (DECS/MeSH): "prisoners", "sexually transmitted diseases", "HIV", "health education" and "AIDS". The controlled descriptor "prisoners" was used through the Boolean operator AND associated with the descriptors above. All the design and layout of the educational technology was developed through the university extension project registered at the UFG's Pro-rector of Extension and Culture (PROEC – UFG in Portuguese) with the partnership of an illustrator researcher with expertise in design, using the programs Corel Draw Essentials, PowerPoint, and Adobe Photoshop.

It is worth mentioning that, after data collection, health education and counseling activities on STIs, benefits and harms of drug use and biosafety in the prison environment were carried out, as well as rapid testing for HIV, hepatitis B and C and syphilis infections. Positive cases and cases of drug abuse were referred to the health services of the prison system.

In the second stage, called validation, we used the concept of content and appearance validity, in which we evaluated how representative each element of the construct was in the view of experts and women deprived of liberty<sup>19</sup>. The evaluation protocol was divided into two parts: the first was focused on the specialists' sociodemographic and labor characteristics, and sociodemographic characteristics for the women; in the second part, the content, scientific accuracy, literary presentation, illustrations, readability, and quality of adapted information were evaluated<sup>20</sup>. Thus, the suggestions of the specialists, identified by (Specialist 1, 2, 3, 4, 5, 6, 7, and 8), are in chart (2-A), similarly, the suggestions of the women deprived of liberty, in chart (2-B), as (Woman 2, 3, 5, 6, 9, 13, and 16). The evaluation was in the form of a Likert-type scale, with a four-point scale score (1 = totally disagree; 2 = partially agree; 3 = agree and 4 = totally agree)<sup>19</sup>.

For the sample calculation, the formula  $n = Z\alpha^2 \cdot P(1-P)/e^2$  was used, where P indicates the desired proportion of experts, indicating the appropriateness of each item, and "e" represents the acceptable proportional difference. A confidence level of CI: 95% was considered, meaning that at least 70% of the experts classified the item as appropriate<sup>19-20</sup>.

The inclusion criteria were experts with experience in research on STI/HIV/AIDS and the penitentiary system in the last three years; experience in developing and validating instruments; publication on the topic; and affinity for educational technologies. To select the experts, the sampling technique called snowball sampling was used, in which an expert who met the inclusion criteria indicated another participant in his/her social network, and so on, successively, until the sample was reached<sup>20</sup>. For women deprived of freedom, the inclusion criteria were having been in prison for more than six months and being over 18 years of age. The sample was obtained in the prison unit in Goiânia, Goiás, using the same methodology, in other words, snowball.

The specialists were invited by institutional electronic e-mail, which contained information about ethical, legal, and operational aspects of the research as well as a preview of the educational material, the form with data from the construct evaluation and the Informed Consent Form (ICF). Similarly, the women received the first version of the educational instrument for handling and reading, a form with sociodemographic data, and a basic instruction manual. The researchers were trained to observe the reactions, comments, opinions, and suggestions of the women deprived of liberty, noting them in a specific field notebook. In case of functional illiteracy, a researcher was available for clarification.

The data were entered into the Statistical Package for Social Science (SPSS) version 20.0 software, and the agreement analysis was performed by adjusting the proportions of experts and women who agreed with the pertinence of the educational technology. The binominal test was employed, and p values < 0.05 indicated the proportion of experts and WPL who agreed with the pertinence of the technology produced.

To evaluate the reproducibility of the educational technology, the Kappa test was used whose agreement values were marked as: poor or weak when there was a range of zero to 0.2; slight, between 0.21 - 0.4; regular or moderate, from 0.41-0.6; good or substantial when they ranged from 0.61-0.8; and lastly, great, or excellent, between 0.81-1, 0.25. The 95% confidence interval for the Kappa test was also presented.

Cronbach's alpha test was used, to estimate the reliability of the educational technology, for which a score of  $\alpha \geq 0.70$  was considered. To evaluate the educational technology, the sum of all the CVI calculated separately and divided by the number of items in the instrument was used. In the literature used<sup>20</sup> the Content Validity Index ranges from -1 to 1 and considers valid the item whose agreement between the judges is equal or greater than 0.80<sup>19-20</sup>. As for the appearance validity performed by both the judges and the target audience, the items that obtained a minimum 75% agreement level in the positive answers were considered validated<sup>19-20</sup>.

The present investigation is part of a matrix study entitled "Evaluation of the social

and health vulnerability of individuals deprived of freedom and prison workers in the state of Goiás: a multicenter study” and was evaluated and approved by the Research Ethics Committee of the Federal University of Goiás with opinion number 2.500.582.

## RESULTS

The construction of the textual script of the educational material was based on the results of the selected articles and the data from the focus groups. The version of the educational material in booklet format, entitled “Beyond Bars: discussing STI/HIV/AIDS and human sexuality”, had its content divided into five parts: Presentation; Sex and healthy human sexuality; knowing STI/HIV/AIDS; Signs and symptoms of STI/HIV/AIDS; and Prevention and control measures of STI/HIV/AIDS in prisons.

From a total of 12 specialists, eight agreed to participate in the research. The average age was 36.6 years (SD=5.6), and six (86.7%) were female. Regarding the areas of knowledge, there was a biomedical doctor, a psychologist with a master’s degree, and a social worker, who worked in the prison. There were also five nurses, among them: one with a doctorate in nursing, one with a doctorate, and three specialists with a master’s degree.

The age of the 20 WPL participants in the study ranged from 22-49 years (mean 47 years). There was a predominance of black women, total of 17 (85.7%) and with low education (average of 10 years SD:2.9). One participant reported being bisexual and two, married, both with men also in detention.

In the validation process of the educational material, as shown in Chart 1, there was good internal consistency in both groups, with Cronbach’s alpha of 0.809 and 0.881 for the experts and for the women deprived of liberty, respectively. Also, the overall Content Validity Index (CVI) was 87.0% (K=0.76; CI:95%; 0.64-1.00) for the experts, and 95.1% (K=0.91; CI:95%; 0.87-1.00) for the women, indicating a good level of agreement between both raters.

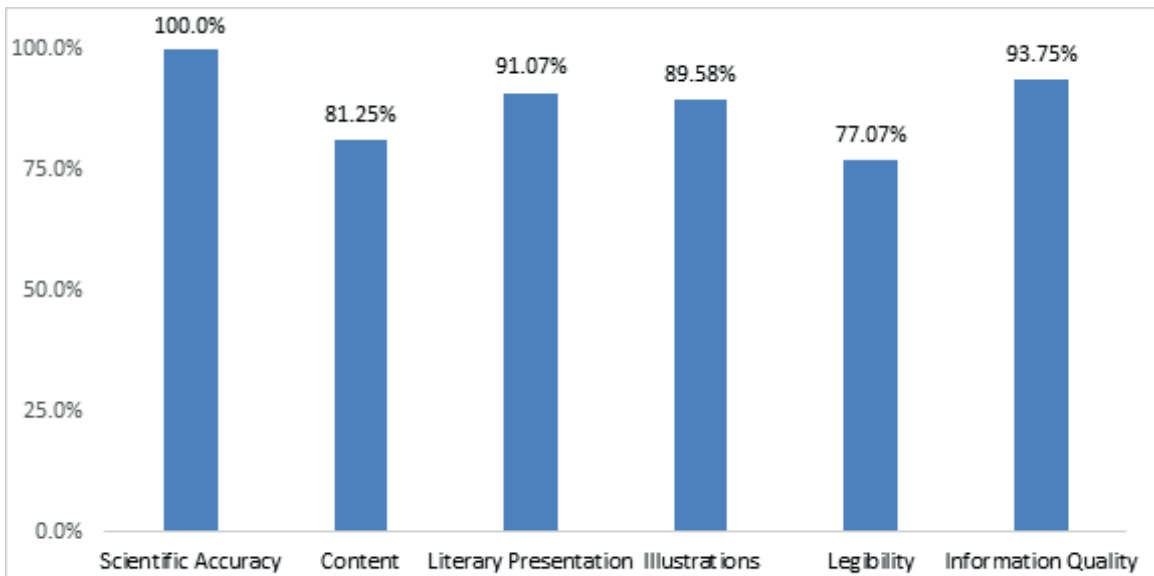
**Chart 1-** CVI, Weighted Kappa and Cronbach’s Alpha values of the experts and women deprived of liberty for the educational material. Goiânia, Goiás, Brazil, 2019

Evaluators	CVI-Total*	KAPPA	CI: 95%**	Cronbach’s Alpha
Experts	87.0%	0.76	0.64-1.00	0.809
Women Deprived of Liberty	95.1%	0.91	0.87-1.00	0.881

\*CVI: Content Validity Index; CI:95%: Confidence Interval.

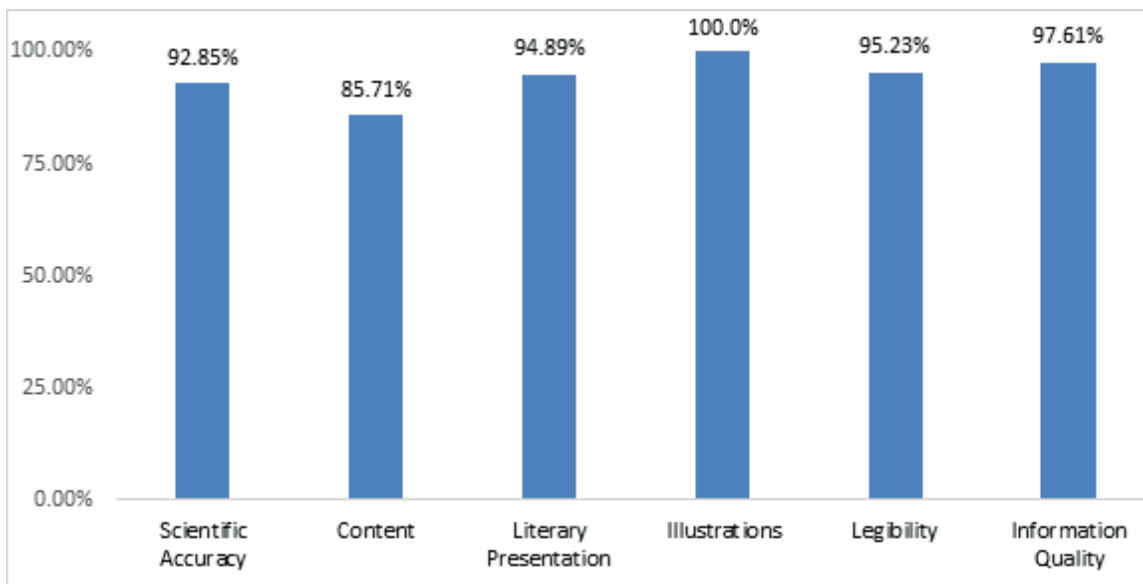
Source: authors (2019).

According to Figure 1, the level of agreement among the experts was high, ranging from 77.07% to 100%. Although the legibility index was low (77.07%), all levels are higher than the established minimum of 75%, which validates the educational technology on HIV/AIDS aimed at the population deprived of freedom.



**Figure 1-** Level of agreement among the experts by evaluative aspects. Goiânia, Goiás, Brazil, 2019

In women deprived of liberty, the level of agreement ranged from 85.71% to 100%, levels also higher than the minimum required of 75%, validating the educational material on HIV/AIDS aimed at the population deprived of liberty (Figure 2).



**Figure 2-** Level of agreement among women deprived of liberty by evaluative aspects. Goiânia, Goiás, Brazil, 2019

Despite the result of the CVI-Total of all domains being above 0.80%, both experts and women suggested some modifications for the improvement of the educational technology, all of which were evaluated and accepted by the group of researchers as pointed out in tables 2A and 2B.

**Chart 2A-** Experts' suggestions for educational technology on HIV/AIDS aimed at the female population deprived of freedom Goiânia, Goiás, Brazil, 2019

<b>Suggestions from the experts</b>
<b>Content</b>
<p><i>On the page where the nurse explains about HIV and AIDS, sometimes it would be interesting to emphasize that getting tested is very quick and easy. (Expert 1).</i></p> <p><i>It would be interesting to talk about the main symptoms and diseases associated with HIV/Aids. This makes it easier for them to understand the need for prevention and early treatment. (Expert 2)</i></p> <p><i>It is also very important to emphasize the sharing of pliers, nail clippers, and razors, since these are practices that are widely used by this population. (Expert 1)</i></p> <p><i>I suggest talking about the initial signs and symptoms of AIDS and the importance of the immunochromatography test, which is a quick, safe, confidential, and quick result-return test. (Expert 3)</i></p>
<b>Literary presentation</b>
<p><i>On the detainees page the transsexual's speech can already be informative (Expert 4).</i></p> <p><i>On the page about condoms, there is no written text about how to use the female condom. It would be worthwhile for each one to be on a page, or for them to be given more prominence for the role they play in prevention (Expert 5).</i></p> <p><i>Add the figure of the HIV-positive inmate in the background of the image where Moustache and his colleague are talking near the gym equipment (Expert 4).</i></p>
<b>Legibility</b>
<p><i>I would put a bigger font in the characters' lines because a lot of prisoners have visual problems (Expert 6).</i></p> <p><i>The nurse orientation page is with the letters too small and has too much content (Expert 1).</i></p> <p><i>When going to the last edition a tip is to send it to the SECOM of UFG; they help in editing and formatting. (Expert 7).</i></p>
<b>Quality of Information</b>
<p><i>Be careful not to use terms used by professionals, for example: "sterilization" and "aerosols". (Expert 8).</i></p>

Source: authors (2019).

**Chart 2B-** Suggestions of women deprived of liberty for educational technology on HIV/AIDS aimed at the female population deprived of liberty. Goiânia, Goiás, Brazil, 2019

<b>Suggestions of women deprived of their liberty</b>
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Yeah, but you know I can't take that vaccine, right? To "I'm trusting that I can't take that vaccine" (Woman 2).

No problem! He's treating HIV, man, relax! To "It's normal, man! He is treating. He's cool!" (Woman 3).

Relax? I won't even go near him; I don't want to get this stuff! To "I won't even go near him, I don't want to get this stuff" (Woman 5).

Girls, do you know what HIV and AIDS is, and how it is caught? To "Little sisters, do you know what HIV and AIDS is, and how to get it?" (Woman 6).

Who knew I would need to be in jail to get health education about HIV and AIDS!" To "Man, I can't believe that to get knowledge about HIV and AIDS I had to be in jail!" (Woman 9).

I would put more color and make the letters bigger (Woman 13).

#### Final suggestion of the educational material

No matter where we are, we do have the right to know what is harmful to our health. I believe that we must talk about HIV and AIDS in prison! (Woman 16).

Source: authors (2019).

## DISCUSSION

The national and international literature draws attention to the high risk of vulnerability to STI/HIV/AIDS among the population in prison, particularly the female population<sup>4-8</sup>. Prisons are characterized by unsanitary conditions, overcrowding, inadequate architectural infrastructure, and violation of basic human rights. Moreover, risky sexual practices are very common, such as unprotected intercourse with fixed or occasional partners<sup>4-8,12</sup>. In addition, there is the non-existence or inefficiency of adequate and sufficient medical and legal assistance<sup>9</sup>, and the hegemonic male culture that hinders the assistance to WPL, greatly increasing the susceptibility to sexually transmitted infections<sup>7-8</sup>.

It is believed that health education through innovative technologies represents a key element to achieve the objectives of health promotion, since it has the potential to sensitize the individual and the community, transforming their behaviors and empowering them to make decisions with lower health risks<sup>13</sup>. Different professionals in the areas of health and education agree on the premise that the so-called educational technologies are facilitators and complementary supports to the educational-pedagogical practice, especially when the subject is full of myths, stigmas, and aimed at populations with difficult access and lacking a resolute health system<sup>13,19</sup>. Studies with people living with HIV/Aids<sup>21</sup>, adolescents<sup>22</sup>, and blind people<sup>23</sup> confirm this assertion.

The material produced and validated in this research showed good internal consistency in both groups of evaluators. Thus, this research, in an unprecedented and promising way, presents a reliable and reproducible educational material that can be incorporated into the educational practice aimed at the prevention and control of STI/HIV/AIDS in the female deprived of freedom population. It is worth mentioning that all the material was validated, satisfying scientific criteria, and reliability is considered a respectable indicator of quality. Also, we used the congruence of responses, understanding that the consistency of the content comes from the agreement between the evaluators, in this case, the experts and the women deprived of liberty<sup>20-21</sup>.

The level of agreement was high among the evaluators as well as the women, validating the educational material, since all levels were higher than the minimum established 75%<sup>20-21</sup>. This finding highlights the relevance of including evaluators with different knowledge, to mutuality and interdisciplinarity. Thus, all research subjects contributed to the investigation



with their theoretical and practical knowledge and professional, clinical, and personal experiences, participation considered essential for the development and implementation of any public health policy or strategy.

It was noticed that the specialists were more attentive to scientific issues, especially regarding the readability of information and content. This phenomenon was already expected, considering their training and expertise, which ratifies the need for specialists with specific training in the area. However, reflections are needed, since the suggestions for improving the material were almost entirely focused on the biomedical model, and not on the assumptions of the Health Promotion Policy of the Ministry of Health and the Women's Health Policy. Health professionals should also, during their educational activities, consider the psychosocial, cultural and spiritual aspects, especially the issues of sex and gender, in the continuing educational process for both the individual and the collectivity, which results in better adherence to protective behaviors and acceptability of their condition.

Women in prison, on the other hand, evaluated the content of the material more consistently, always considering the particularities and specificities of the prison environment and the aspects inherent to the toxic masculinity issues. A fact corroborated by the 100% rate of consistency in the analysis of the illustrations. The women still reported stigmas that for years have permeated the condition of people living with HIV/Aids, requiring investments in specific strategies, where we believe, and according to the women's experiences, that the main instrument is the permanent educational process. In this sense, the material presented here is possibly opportune and effective to meet the demands of this population that remains on the margins of sexual and reproductive health policies.

Some statements during data collection and studies from around the world<sup>7,8,12,24</sup> state that one of the factors that hinder educational activities in prisons is the shortage of health professionals and barriers imposed by issues inherent to public safety. Therefore, educational technologies such as the material produced and validated here represent an important tool to face such difficulties. It is also ratified that women deprived of liberty are idle, accessible and have time for reading, and that education is one of the guidelines of the national health policy and re-socialization of the deprived population.

Despite the result of the overall CVI of all domains evaluated being above 0.80%, both specialists and women deprived of liberty suggested some changes to improve the material, all of which were evaluated and accepted by the group of researchers. Still, during data collection we received several positive feedbacks about the produced material, ratifying the interest in contributing to the construction of this type of educational technology.

It seems that, to strengthen health actions for the deprived population, considering the reduced number of health professionals in prisons, one can rely on educational technologies, such as printed materials, which allow reflections resulting from the experiences of those involved in the process. According to the National Survey on Prison Information, there are only 5,084 health professionals in the national prison system for a total prison population of 698,6009, most of them being nurses. Therefore, it is urgent to invest in educational technologies with broad dissemination power in the prison environment and guided by methodological rigor, and that nursing is the protagonist in the process of construction and validation, given its quality and impact as an educational agent.

It is believed that the product of this study has even more relevance and potential to contribute to the confrontation of HIV/Aids in times of health crisis, such as the current pandemic context we are experiencing. During the focus group and interviews with the WPL, the lack of health care in this period and the gender inequality in the access to information were evident<sup>24</sup>

Once this stage of the research is complete, we intend to conduct a randomized clinical trial using educational technology as an educational tool for women deprived of their liberty, evaluating its impact by means of the HIV Knowledge Questionnaire (HIV-KQ-18) scale, as already approved by the matrix project that originated this work.

The limitation of this research is the lack of studies on the subject, thus limiting the discussion, which could be observed during its elaboration and validation. Thus, its dissemination may help reduce this gap and encourage nurses to build and validate different educational technologies aimed at health promotion for individuals deprived of liberty.

## CONCLUSION

The study reached its objective by showing that the technology developed presents high reliability and good internal consistency, being considered suitable for educational practice. Some modifications were suggested by the WPL for the improvement of the material, ratifying the interest in its elaboration and the perspectives of new studies with this theme.

The present research allowed us to collectively produce and translate the different knowledge related to the prevention and control of HIV/Aids in an unhealthy and unsafe environment, marked by the scarcity of preventive projects. It is believed that this technology represents an advance for Public Health and nursing, since it used reliable and appropriate measures and instruments for the development and validation of educational technology according to the particularities of these women who, although they are in prison, have the right to specific, effective, and safe educational measures.

## ACKNOWLEDGMENTS

We thank the National Council for Scientific and Technological Development-CNPq and Coordination for the Improvement of Higher-Level Personnel- Capes for the financial support - Edital 3/2015 - First PPP Projects Program - FAPESP and Edital CNPq Universal 01/2016.

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**Received:** 09/02/2022

**Approved:** 14/10/2022

**Associate editor:** Dra. Tatiane Trigueiro

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Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work - **Borges AVSS, Matos MA de, Souza JHB de, Freire KRFS, Sousa FR de, Florentino V de J**; Drafting the work or revising it critically for important intellectual content - **Borges AVSS, Matos MA de, Freire KRFS, Sousa FR de**; Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved - **Borges AVSS, Matos MA de, Souza JHB de, Freire KRFS**. All authors approved the final version of the text.

ISSN 2176-9133



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