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HIV/AIDS Preventive Education amongst Biology Teachers: Assessing Knowledge and Attitudinal Change

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Abstract

This study aimed to ascertain the effectiveness of HIV/AIDS Preventive Education that employed the Five-Phase Constructivist Teaching Sequence among Biology teachers on their understanding and attitudinal change. The participants in this study consisted of 42 Biology teachers (9 males and 33 females) who represented 29 MARA Junior Science Colleges in Malaysia. A mixed-methodological design was used. The qualitative data from participants' self-reported views in elicitation and review phases, and quantitative data from the one-group pretest-posttest design as measured by a 43-item questionnaire with sufficient content validity and adequate KR-20 reliability of 0.77, were compared and interweaved to provide a fuller and deeper understanding of the phenomenon at hand. The analysis of the quantitative dataset using the t-test for paired samples indicated that the posttest mean percentage score for knowledge and understanding (91.19) was statistically significantly higher ($t = 15.25$, $p < .001$) than the pretest mean percentage score (70.24), and that the +2.52 effect size obtained was educationally significant. Such markedly increase in knowledge was triangulated by the self-reported views of the Biology teachers in which the qualitative data analysed through a recursive process resulted in the emerging of four overarching key themes in terms of what the Biology teachers have learnt about HIV and AIDS which they did not know prior to the intervention: modes of HIV transmission, the concept of window period, the concept of CD4 cell count, and HIV status by look. Equally, the paired samples t-test for attitudinal change indicated that the posttest mean percentage score (74.18) was statistically significantly higher than the pretest mean percentage score (66.67) and that the +0.52 effect size obtained was educationally significant. Finally, a reflection on this study was given in terms of problems encountered and lessons learnt, culminating in a discussion of implications for future research.

Keywords *HIV and AIDS, preventive education, Five-Phase Constructivist Teaching Sequence, Jigsaw-II*

BACKGROUND

Statistics as of 2007 indicated that there were 33.2 million people living with the Human Immunodeficiency Virus (HIV) and more than 25 million people have already died of HIV and AIDS (UNAIDS, 2006, 2007). In the context of Malaysia, Datuk Seri Liow

Tiong Lai, the Health Minister, expressed his concern about the rising number of HIV/AIDS cases in Malaysia, especially amongst the youths, attributing such phenomenon to drug abuse and free sex. In a convention on healthy programme for students in Kota Bharu, he was quoted as saying, "a total of 84,630 HIV cases had been reported in the country since 1986 until 2008. Of that, 3,692 HIV cases were reported last year, and what worried us was that 78.4 per cent (of the total since 1986) or 66,418 people were between 13 and 39 years old" (Bernama, 2009). Accordingly, he stressed the importance of embarking on various strategies to enhance public awareness on HIV/AIDS.

Historically, the idea of sex education in Malaysian schools was mooted in 2005 as a joint effort between Education Ministry and the Women, Family and Community Development Ministry. Despite receiving the Cabinet's green light in December 2006 to introduce sex education with the aims of educating the young to respect gender and sexuality, and ultimately reducing sexual crimes, sex education had been denied as a school subject in Malaysia due to unfavourable reaction from various quarters purportedly on religious and cultural grounds. Recently, it was reported that after a six-year delay, sex education, officially renamed or repackaged as social and reproductive health education (SRHE), is likely to be taught to Year Six and Form Three students in 2012 as a pilot project in several schools in the country (Letchumy Tamboo, 2011). While training modules are provided, how SRHE should be operationalised, nevertheless, is left to the discretion of the teacher. Furthermore, the extent to which HIV/AIDS preventive education is incorporated in SRHE remains unclear.

UNESCO has contributed substantially in the area of HIV/AIDS preventive education as evident in the publication of numerous materials related to HIV and AIDS in multiple languages. These materials have been compiled in the CD-based Library Collection and are accessible freely through the web at the UNESCO HIV and AIDS Education Clearinghouse (http://hivaidsclearinghouse. unesco.org). Nevertheless, none of these materials has been published in the Malay language; hence the urgency of developing curricular materials on HIV/AIDS in the Malay language for local consumption. In response to such scarcity, the Malay-version curricular material of "Basic Science on HIV and AIDS" was developed by the author at the bequest in the form of a project grant from the UNESCO Bangkok. Pedagogically, the developed curricular material should be delivered in a constructivist manner in tune with the current trends in the teaching and learning of science.

CONSTRUCTIVISM IN SCIENCE

Constructivism, the "buzzword of the decade" (Colburn, 2007, p.10), has been the leading theoretical position in science education for the past three decades. It has impacted on the science curriculum development in many countries including Malaysia.

A constructivist view of learning, according to Scott (1987), "perceives students as active learners who come to science lessons already holding ideas about natural phenomena, which they use to make sense of everyday experiences. Learning science, therefore, involves students in not only adopting [or developing] new ideas, but also

in modifying or abandoning their pre-existing ones. Such a process is one in which learners actively make sense of the world by constructing meanings" (p.7). The main tenet here is that students come to science lessons with their own ideas about natural phenomena and these ideas do influence their construction of meaning within the context of the provided experiences (e.g., practical work or group interaction) and information (e.g., through texts or direct instruction).

Accordingly, in a constructivist view, students' heads are not empty vessels waiting to be filled with scientific knowledge. Neither should they be viewed like human video camera, passively and automatically recording the information transmitted by teachers and textbooks. They are not absorbing sponges. They have pre-instructional ideas on any topic at hand in the teaching and learning process.

Ausubel (1968) crystallizes all the maxims and rules of thumb in teaching into one guiding principle which has been a much-cited overview of educational psychology: "If I had to reduce all educational psychology to just a single principle, I would say this: Find out what the learner knows and teach him [or her] accordingly" (p.337). In view of that, eliciting students' ideas should be an important consideration for one's teaching. For students, making their ideas explicit is important because it helps them to be aware of their own starting point relating to a particular phenomenon in the learning process. Beginning with something familiar would contextualise the learning, set the scene and arouse their interest. By uncovering a possible range of different ideas on a phenomenon among the students will also make them more inquisitive as to which idea seems to parallel the school science view. For teachers, knowing students' existing ideas will provide them (the teachers) an indication of "where the students are" and correspondingly, suitable activities and experiences could be planned and provided.

Therefore, if one were to review the constructivist teaching approaches such as the Five-Phase Constructivist Teaching Sequence (Needham & Hill, 1987), Interactive Teaching Model (Faire & Cosgrove, 1988), Generative Learning Model (Osborne & Freyberg, 1985), The Learning Cycle (Stephens, Dyche, & Beiswenger, 1988), elicitation of students' pre-instructional views about the concept at hand seems to be the common initial phase across all these constructivist teaching models. Research has shown that teachers could capitalise on research-based and research-validated strategies such as interview-about-instances, interview-about-events, survey, concept mapping, concept cartoon, and post-box techniques in order to elicit and uncover students' pre-existing views or knowledge on the concept to be taught. By understanding these pre-existing views, teachers could then plan appropriate learning experiences so as to help restructure students' understanding to that of school science view.

Given this review, it was decided then that the Five-Phase Constructivist Teaching Model (Needham & Hill, 1987) would be employed in the delivery of the curricular materials used in the HIV/AIDS Preventive Education. Furthermore, such model has been the exemplary and recommended model for science teaching practices at Universiti Pendidikan Sultan Idris (UPSI) as well as the entire Teachers' Training Institutes across Malaysia where science-major student teachers are expected to be knowledgeable at, familiarized with, and subsequently, be able to demonstrate the knowledge and skills in operationalising this particular model during the teaching practice.

PURPOSE OF THE STUDY AND RESEARCH QUESTIONS

This study aimed to test the developed curricular materials on HIV/AIDS in the Malay language amongst Biology teachers from MARA Junior Science Colleges across Malaysia to ascertain the effectiveness of the constructivist-based pedagogical approach employed in the HIV/AIDS Preventive Education in terms of knowledge gained and attitudinal changes. Accordingly, it sought to illuminate the following questions:

1. To what extent does the HIV/AIDS Preventive Education build capacity in terms of HIV/AIDS knowledge amongst the Biology teachers?

2. To what extent does the HIV/AIDS Preventive Education influence participants' attitudes in terms of their feelings toward those infected by HIV, and/or affected by HIV/AIDS?

METHODOLOGY

Research Design

Given its purpose as described in the preceding section, this study employed a mixed-methodological design which entails comparing, integrating, and interweaving quantitative and qualitative methods. This led to a triangulation of quantitative and qualitative data which purports to provide a fuller and deeper understanding of the phenomenon at hand (Bogdan &Biklen, 2003; Denzin & Lincoln, 2000) – in this case, the impact of HIV/AIDS Preventive Education.

In view of the exploratory nature of this research to determine the impact of the HIV/AIDS Preventive Education that integrates the Five-Phase Constructivist Teaching Sequence, the "one-group pretest-posttest design" (Gay & Airasian, 2000, p.389) was deemed appropriate. This design involved a single group that was pretested, exposed to a treatment, and posttested. Additionally, qualitative responses in terms of discussion and written responses were gathered so as to illuminate what had been learnt by the Biology teachers.

Sampling

As shown in Table 1, a total of 42 Malay Biology teachers (9 males and 33 females) with 5-10 years of teaching experience from 29 MARA Junior Science Colleges across Malaysia participated in this research project. MARA is an acronym for *Majlis Amanah Rakyat,* or its English equivalent, Council of Trust for the People, which is an agency placed under the purview of the Ministry of Rural and Regional Development. The relevant website is accessible at http://www.mara.gov.my/ web/guest/home.

Table 1 Descriptive Statistics of Participants by Gender

	Frequency	Percent
Male	9	21.4
Female	33	78.6
Total	42	100.0

Instrumentation

The pretest and posttest inventories that were adapted from Baker (2009) and UNESCO Bangkok (2000) are basically identical inventories, consisting of 43 dichotomous items that gauge two dimensions: (i) the knowledge and understanding of HIV and AIDS as measured by items 1–30, and (b) the attitudinal change (i.e., how one feels about those who are infected with, and/or affected by HIV/AIDS) as measured by items 31-43.

This inventory has sufficient validity in that every single item subsumes within the content coverage of HIV/AIDS Preventive Education. Meanwhile, the internal consistency reliability of this inventory, established by using Kuder-Richard split half test (KR-20) with a sample of 14 Biology teachers in the state of Penang, was found to be at 0.68 for the cluster of items 1–30 measuring knowledge and understanding of HIV and AIDS, and at 0.72 for the cluster of items 31–43 measuring one's feelings/ attitudes. A KR-20 of 0.77 was computed for the overall 43-item questionnaire measuring knowledge and attitudes. These reliability values indicate an acceptable level of internal reliability for research purposes since they achieved at least the minimum level of 0.7 recommended by Nunnally (1978) and De Vaus (2001).

Intervention

"*Sains Asas Tentang HIV dan AIDS*" (The Basic Science on HIV and AIDS) – the Malay-version of the curricular material in a booklet form – was developed by the author and used in the HIV/AIDS Preventive Education through the employment of Five-Phase Constructivist Teaching Sequence (Needham & Hill, 1987) conducted at the Tanjung Bungah Hotel, Penang on 20-21 June 2011. This curricular material was developed on four major areas, namely (a) HIV in the Human Body, (b) What is AIDS, (c) the Modes of HIV Transmission, and (d) the Non-Transmission Modes of HIV. Through the trialling, the booklet was found to be *user-friendly, easy to understand, and adequate in terms of content* coverage.

The Five-Phase Constructivist Teaching Sequence comprises the following 5 phases, namely (1) Orientation; (2) Elicitation of Ideas; (3) Restructuring of Ideas; (4) Application of Ideas; and (5) Review (or Reflection). In essence, the orientation phase aims to arouse students' interest and set the scene while the elicitation phase endeavours to enable students and teachers to become aware of prior ideas. Meanwhile, the restructuring phase intends to create an awareness of an alternative viewpoint – the scientific one – so that students could then modify, extend, or replace their pre-instructional conceptions with a more scientific view. Application phase

aims to reinforce the ideas learnt in familiar and novel situations. Finally, the review/ reflection phase seeks to invoke the awareness of change of ideas and familiarisation with learning process to allow the students to reflect upon the extent to which their ideas have changed.

The specific activities in the HIV/AIDS Preventive Education Programme using the 5-Phase Constructivist Model are described below:

Orientation Phase: Facilitator showed pictures/slides of diseases associated with HIV such as Pneumocitis Pneumonia and Karposi Sarcoma to provoke interest, curiosity and communication among participants (i.e., the 42 Biology teachers).

Elicitation Phase: Facilitator elicited participants' ideas about HIV/AIDS by: (a) administering a pretest questionnaire on HIV/AIDS, and (b) showing photographs of 4 men and 4 women and the participants were asked to guess if they could identify which of them had HIV and why.

Restructuring Phase: Three main activities were carried out.

In Activity One, the facilitator briefed the participants that all the men and women in the photographs were infected by HIV (i.e., HIV-positive serostatus). The main message was that it is not possible to tell the HIV status of a person simply by one's look.

In Activity Two, "Water Game" (Baker, 2009) was played. This aims to simulate the exponential spread of HIV through unprotected promiscuous sex.

In Activity Three, participants were divided into groups of 4 and Jigsaw-II method (Slavin, 1980) was employed. For resources, facilitator provided each group with the curricular material on "*Sains Asas Tentang HIV dan AIDS*" which was intentionally being divided into four sections so that each student in Groups of Four could be an expert in one of the sections. Besides, a Compact Disk (CD) entitled "Building knowledge about HIV and AIDS: An interactive course for educators" (UNESCO and Japanese Funds-in-Trust, undated) was distributed to each expert group as additional resources to an Internet-accessed environment.

In Jigsaw-II method, the following steps were taken:-

a. In the HOME GROUP, participants cursorily browse the 'entire' section, before concentrating on their respective areas of expertise.
b. Participants go into EXPERT GROUPS, discussing and mastering the content, using the questions as a guide for breadth and depth of discussion.
c. In the HOME GROUP, participants RoundRobin, taking turn to report to their teammates.
d. Individual QUIZ (e.g., a posttest).

Application Phase: Participants were asked to create a poster presentation, highlighting an important aspect/message of HIV/AIDS Preventive Education which they would like to bring back to their students at their respective MARA Institutions.

Review Phase: Student teachers reflected on their newly constructed knowledge, identifying how it differs from their pre-instructional views. The following question was used as a tool to promote meta-cognition in the review phase: What are the ***three*** new things about HIV/AIDS which I didn't know before this workshop but now I know?

RESULTS

Exploratory Data Analysis

The results of analyses for normality are shown in Table 2. All the values of skewness, which ranged between –0.91 and 0.19, fall within the acceptable range of not more than +1.00 or not less than – 1.00 (Morgan, Griego, & Gloeckner, 2001), suggesting that none of the distributions was markedly skewed and consequently, none warranted the use of nonparametric statistics. Furthermore, all the dependent variables have acceptable kurtosis values that fall within the acceptable range of not more than +1.00 or not less than –1.00 (Morgan et al., 2001), suggesting they were neither too peaked with long tails nor too flat with too many cases in the tails.

Table 2 The Results of Analyses for Normality

	N	Mean	SD	Skewness	Kurtosis
PreKnowledge	42	21.07	2.49	.19	-.50
PostKnowledge	42	27.36	1.53	-.43	-.35
PreAttitude	42	8.67	1.87	-.40	-.69
PostAttitude	42	9.64	1.19	-.91	.96
PreKnowPercent	42	70.24	8.31	.19	-.50
PostKnowPercent	42	91.19	5.09	-.43	-.35
PreAttPercent	42	66.67	14.38	-.40	-.69
PostAttPercent	42	74.18	9.12	-.91	.96

Impact on Knowledge and Understanding

Table 3 Results Obtained from t-Test for Paired Samples

Pretest (PreKnowPercent)			Posttest (PostKnowPercent)					
N	Mean	SD	N	Mean	SD	t	p	Δ^+
42	70.24	8.31	42	91.19	5.09	15.25	<.001	2.52

As shown in Table 3, the t-test for paired samples yielded a t of 15.25 which was statistically significant ($p < .001$) and a "large" (Cohen, 1988) effect size of 2.52 that was educationally significant. The mean percentage obtained in the posttest (91.19) was statistically significantly higher than the percentage mean obtained for the pretest (70.24). Therefore, the posttest mean percentage for the group of 42 Biology teachers shows an appreciably higher degree of knowledge in HIV/AIDS than did their pretest mean percentage.

Impact on Attitudinal Change

Table 4 Results Obtained from t-Test for Paired Samples

Pretest (PreAttPercent)			**Posttest (PostAttPercent)**					
N	Mean	SD	N	Mean	SD	t	p	Δ^+
42	66.67	14.38	42	74.18	9.12	3.49	.001	0.52

As shown in Table 4, the t-test for paired samples yielded a t of 3.49 which was statistically significant ($p < .05$) and a "medium" (Cohen, 1988) effect size of 0.52 that was educationally significant. The mean percentage obtained in the posttest (74.18) was statistically significantly higher than the mean percentage obtained for the pretest (66.67). Therefore, the posttest mean percentage for the group of 42 Biology teachers shows an appreciably higher degree of attitudinal change than did their pretest mean percentage.

Qualitative Analysis

When the Biology teachers (i.e. the respondents) were asked in the review phase to write down what they now knew which they did not know prior to the HIV/AIDS Preventive Education, the analyses indicated the emergence of the following three themes which underscore their knowledge and understanding of HIV and AIDS:-

A. Modes of transmission

Many Biology teachers had a restricted knowledge on the modes of HIV transmission. Restricted in the sense that, while they were generally aware that HIV was transmitted via unprotected sex, many were not aware that HIV could also be transmitted through other means besides unprotected sex, such as mother-to-child through breastfeeding or mother's milk (if the mother is infected with HIV). Meanwhile, some participants indicated that prior to the HIV/AIDS Preventive Education workshop, they had the misconception that HIV could be transmitted through insect/mosquito/dog bite which they now knew that it was not the case. Such an enlightenment has, undoubtedly, "opened their eyes" as indicated by the group of respondents who share quotes of similar meaning as to the following:

Before the lesson, I didn't know that HIV can be transmitted via breast milk.

[Teachers 1, 3, 4, 6, 7, 8, 9, 10, 11, 12, 17, 18, 20, 22, 23, 24, 26, 27, 29, 30, 33, 36, 41]

Before this, I thought that bites from vectors such as mosquitos and dogs would cause the transmission of the virus. Now I know that mosquito/insect bite does not transmit the HIV virus.

[Teachers 2, 3, 4, 6, 21, 26, 30, 36, 37, 38, 39]

Before the workshop, I thought that HIV could be transmitted via saliva; but now I know that it would not be possible.

[Teachers 2, 21, 38, 40]

I didn't know that HIV could even be transmitted via menstrual blood; but now I know that it could.

[Teachers 2, 15, 16]

B. The concept of window period

Prior to the lesson, many respondents indicated resoundingly that they knew not about the concept of "window period" as it was unheard of, and unavailable in, their lexicon. At the end of the workshop session, they realised that the term used to describe the period of time between *HIV* infection and the production of antibodies at a detectable level, that during such a period of time an antibody test may give a 'false negative' result (i.e., the test will be negative, even though she/he is infected with HIV), and that she/he can still transmit the virus to others during such period of time, is called a ...

window period.

[Teachers 1, 5, 7, 8, 9, 10, 11, 13, 15. 17, 18, 19, 20, 24, 25, 28, 29, 32, 33, 34, 35, 36, 37, 38, 39, 40, 42]

C. The concept of CD4 cell count

Majority of the respondents indicated that through this workshop, they now knew about the target and ways in which HIV attacks the body defence system, and that the body immune system has started to deteriorate when

CD4 cell count is below 200 cells/mm^3

[Teachers 4, 6, 10, 12, 16, 17, 19, 20, 23, 24, 27, 34, 35, 42, 32]

Scientifically, HIV targets only one type of the white blood cells called 'CD4 cells' or 'helper TCells' which play a key role in defending the body against diseases. Their role is to direct the army of 'killer cells' (or, CD8 cells) in the blood as to what to look for and what to attack. Without the CD4 cells, the killer cells can't fight and the body's immune response becomes less and less effective.

While the HIV viruses use these host cells as 'factories' to produce new copies of themselves to attack more CD4 cells, the body, in response, will fight back and produce more CD4 helper cells, killer cells and antibodies. Nevertheless, without treatment (i.e., with antiretroviral therapy or ART), HIV gradually destroys so many CD4 cells that the body is no longer able to replace them. At this stage, the number of CD4 cells in the blood is below 200 cells/mm^3. This number is called the 'CD4 count' and is a useful measure of a person's immune response. A normal CD4 count in a healthy adult who is not infected with HIV is usually between 500 and 1500 cells/mm^3. These are the facts that many respondents indicated that they now knew.

Meanwhile, when eight photographs were shown in the elicitation phase and respondents were asked to predict those whom they thought were infected by HIV, the analysis of respondents' predictions revealed many stereotypical and/or biased mind-sets of an HIV-infected person simply by virtue of one's looks. From the crystallisation of the respondents' written predictions, the respondents generally contended that an HIV-infected person may look ...

(A) skinny
(B) sexy
(C) clubby
(D) gayish
(E) flirtatious
(F) sociable
(G) promiscuous
(H) wild
(I) weak,

or may look like a ...

(J) drug addict
(K) guest relation officer
(L) prostitute
(M) playboy
(N) seducer

However, after the programme, they now knew that such a status could not be determined by a person's looks.

CONCLUSION AND DISCUSSION

The findings of this study indicated that the HIV/AIDS Preventive Education that employed the Five-Phase Constructivist Teaching Sequence and that capitalised on the use of the Malay-version of the curricular material of the "Basic Science on HIV and AIDS" were effective in promoting understanding and attitudinal change. The understanding, quantitatively assessed through a questionnaire, indicated that the posttest mean percentage score for knowledge on HIV and AIDS (91.19) was

statistically significantly higher ($t = 15.25$, $p < .001$) than the pretest mean percentage score (70.24), and the effect size (+2.52) obtained was educationally significant. Such a marked increase in knowledge was further supported by the qualitative data that were assessed through the responses given in the elicitation and review phases. In fact, the analysis of the qualitative data through a recursive process resulted in the emerging of four overarching key themes in terms of what the Biology teachers have learnt about HIV and AIDS which they did not know prior to the intervention, namely modes of HIV transmission, the concept of window period, the concept of CD4 cell count, and HIV status by look.

In terms of attitudinal change, the paired samples t-test indicated that the posttest mean percentage score (74.18) was statistically significantly higher than the pretest mean percentage score (66.67) and that the effect size (+0.52) obtained was educationally significant.

In reflection, the HIV/AIDS Preventive Education was initially intended for a group of 16-year-old students, but was then switched to, or replaced by, a group of 42 Biology teachers from the MARA Junior Science Colleges. The switching was done because it was felt that familiarisation has yet to be established between the researcher and the students. Such a situation might seem problematic simply because the students would be in an uncomfortable position when workshop on HIV/AIDS involves discussion about sex.

In retrospect, giving a tweak in the problematic sampling was indeed beneficial because by targeting the Biology teachers, empowering them with the knowledge and skills in the HIV/AIDS Preventive Education, they (i.e., these Biology teachers) could then cascade the knowledge and skills learnt to their respective Form 4 students in MARA Junior Science Colleges. Furthermore, it is better for the Biology teachers whom the students are acquainted with, to integrate the HIV/AIDS Preventive Education in their science lessons, or maybe as an activity of their Science Club. Consequently, the "net" or coverage for HIV/AIDS Preventive Education would be much wider, since the selected Biology teachers are from all over Malaysia, including Sabah and Sarawak, and that they are able to promote HIV/AIDS Preventive Education in their respective MARA junior science colleges.

The review of the literature failed to isolate local studies done on HIV/AIDS Preventive Education, let alone the employment of the pedagogically sound five-phase constructivist teaching sequence that integrates a Jigsaw-II method in the restructuring phase. Hence, this explains the novelty and distinctiveness of this study that sought to establish the impact of HIV/AIDS Preventive Education on knowledge and attitudinal change. Nevertheless, the findings of this study were derived from 42 Biology teachers and there was no comparison group involved, hence its limited generalisability. As such, further studies investigating similar impact of HIV/AIDS Preventive Education using a comparison group and a more representative sample are recommended in order to examine the validity of such generalization.

Besides, given that the HIV/AIDS materials were developed in the Malay language and that such materials were intended for the upper secondary students in the quest to promote awareness amongst the youths, it would contribute significantly to the research and literature if further studies could aim at assessing the impact of

HIV/AIDS Preventive Education on students' understanding and attitudinal change in MARA Junior Science Colleges by the Biology teachers who participated in this study. This could be executed by replicating the methodology used in this study. Alternatively, a training module on HIV/AIDS Preventive Education which integrates a sound pedagogical approach could be developed and subsequently be employed by practicing teachers in their respective spheres of educational environment.

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