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ORIGINAL ARTICLE

Process evaluation of a school-based HIV/AIDS intervention in South Africa

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Abstract

Aims: This paper presents a process evaluation that assessed the fidelity and quality of implementation, as well as the acceptability and subjective evaluations of a HIV/AIDS intervention among students and teachers. *Methods:* The process evaluation was conducted as part of a cluster randomized controlled trial of a theory- and evidence-based school HIV/AIDS intervention in Cape Town. The intervention was designed for grade 8 high school students and delivered by teachers over a six-month period. Twenty-six schools participated in the trial, 13 in the intervention group and 13 in the control group. *Results:* The success of implementation was varied within and across the schools, with some teachers implementing the intervention with more fidelity than others. This was influenced by a combination of individual characteristics and institutional factors. The factors that aided implementation included compliance with the current outcomes-based education approach; provision of teacher training; provision of teacher manuals with detailed information and instructions about the lessons and activities; continued monitoring and support for teachers; and student enthusiasm for the lessons. Proper implementation was hindered by large class sizes; too many activities in the intervention; teacher resistance to and inexperience in using participatory methods; teacher turnover; the low status of life orientation compared to other subjects; and a general disregard for life orientation among students. ***Conclusions:*** **These findings are important for improving the intervention and contextualizing the results of the outcome evaluation; and to better plan for further large scale dissemination of school-based HIV/AIDS intervention programmes**.

Key Words: *HIV/AIDS, process evaluation, adolescents, school, South Africa*

Introduction

There are relatively few evaluation reports of school-based HIV/AIDS interventions in Sub-Saharan Africa, and even fewer studies report on process evaluations [1,2]. Hence, little is known of the implementation processes and the complex social contexts in which these interventions occur [3] and their influence on observed outcomes. Literature from South Africa and elsewhere has shown that contextual factors both within and outside the school, such as absence of support from the principals, undisciplined teachers, the low status of sexual education and lack of resources, can impede implementation and render interventions ineffective in changing behaviour [4–6]. This article describes a process evaluation that was conducted as part of a randomized controlled trial (RCT) to evaluate a high school-based HIV prevention intervention.

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It contributes to the move towards embedding detailed process evaluations in the design of RCTs to help understand why and how interventions and outcomes may be related [5] by providing data that are not readily available in outcome evaluation. Findings are presented on the factors that had an impact on the implementation. Options to improve future design and implementation of school-based HIV interventions are provided.

Aim

The aim of the process evaluation was to document the implementation process at the intervention schools so as to: (1) assess whether the intervention was implemented as planned; (2) assess the quality of the implementation; (3) understand the impeding and enabling factors for implementation; (4) assess acceptability and subjective evaluations of the intervention among the students and teachers; and (5) provide information that could assist in the interpretation of the behavioural outcomes. The process evaluation was conducted during and after implementation.

The intervention

The intervention was part of a project aimed at promoting sexual and reproductive health among adolescents in **S**outh **A**frica and **T**an**z**ania: the SATZ-project [7]. The aim was to develop and evaluate theory-, evidence-based and culturally sensitive sexual and reproductive health interventions targeting school-going adolescents. At each of the three sites, Cape Town and Mankweng (South Africa) and Dar es Salaam (Tanzania), local teams designed interventions specific to the needs of their settings.

The intervention delivered in Cape Town was developed following the guidelines of Intervention Mapping, a framework for programme design on the basis of (1) needs assessments and capacity analysis, (2) theory about behaviour and behaviour change, (3) collaborative planning [8,9]. Teachers, representatives from the education department, a curriculum developer, school HIV/AIDS coordinators, students and representatives from non-governmental organizations participated in the design of the intervention either as expert panel members or in an advisory capacity.

The behavioural and learning objectives of the intervention were informed by situation analysis data [10]. A systematic review of existing intervention material for adolescents, input from teachers and the project team informed the selection of theory-based intervention methods and implementation strategies. The intervention was compatible with the Outcomes-Based Education (OBE) approach currently used in South African schools, and fitted into Life Orientation (LO), a compulsory lifeskills subject and learning area taught at all public high schools [11,12]. Sexuality and HIV/AIDS education form part of the five focus areas of LO. Four teachers participating in the expert panel piloted four lessons each in their regular LO classes at schools that were not part of the RCT.

The intervention objectives were: (1) to delay sexual debut or postpone subsequent sexual intercourse; (2) to increase correct and consistent condom use. The design, implementation and evaluation of the programme were based on a modified version of the Theory of Planned Behaviour [13,14].

The intervention consisted of the 16 lessons presented in Table I. English, Afrikaans and Xhosa are the three main languages spoken in Cape Town. Each student received a workbook in English or Afrikaans. A student workbook in Xhosa was also available for reference. The teachers recommended that their manual be provided in English only. The manual provided easy to follow instructions on planning, presentation and assessment of each lesson. In keeping with the OBE format it contained the specific and critical outcomes, as well as knowledge, skills, values, behavioural changes and attitudes that students should gain from each lesson.

The schools sent to the training at least two teachers who were enthusiastic about sexual education and would be available to teach grade 8 students. Final revisions to the workbooks were made after teachers' feedback at the training. The training is described in greater detail elsewhere [15].

The intervention was delivered to all the grade 8 classes at 13 intervention schools between March and August 2004, during which there were 73 school days. Thirteen control schools implemented their existing LO curriculums. There was no monetary incentive for participating in the project. The project team monitored implementation and provided ongoing support to the teachers. An hour-long booster workshop was also delivered to the students at each intervention school to reinforce the programme objectives. The booster was delivered six months after the intervention by university students trained as HIV/AIDS educators. Approximately 3,542 grade 8 students, average age 14 years, were exposed to the intervention.

Ethical procedures

The study was approved by the Faculty of Health Sciences, University of Cape Town, the Western Cape Education Department, and the relevant

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Table I. The SATZ intervention.

Lesson number	Lesson title	Methods/strategies
1	Values clarification with regard to adolescent sexuality	Student developed questionnaire for parents/guardians; homework; role-plays; whole class discussion
2	Self-esteem and sexual decision-making	Small group activity; individual activity
3	How our bodies function reproductively	Lecture; single sex small group activity; homework
4	Dimensions of sexuality	Small group discussion
5	Boys don't cry! Girls are soft!	Role-play; small mixed group discussion
6	Responsible decisions for sexual safety	Individual activity
7	Promoting the sexual health of young people	Individual, small group and whole class discussion
8	How do I handle this?	Single-sex small group activity; role-plays
9	Situations that carry the risk of sexual intercourse	small group and whole class discussion; role-play
10	Coercion and violence in romantic relationships	Small group discussion
11	Not for me, not now!	Individual activity
12	How to use condoms	Role-play; condom demonstration
13	Negative consequences of sexual intercourse	Role-play
14	HIV and AIDS and the future	Individual activity; small group discussion
15	Substance use and sexual decision-making	Individual or small group activity; role-play
16	Self-esteem	Small group activity
	Additional sections	
	Glossary	
	Sexual and reproductive rights of young people	
	Sexually transmitted infections	
	HIV/AIDS: The facts and myths	
	Resource directory	

ethical committee for medical and health research in Norway (since the project is coordinated by the University of Bergen, Norway). Schools agreed to be randomized to the intervention or control group. Information about the project was sent to guardians or parents of all eligible students. Declining parents returned the attached form to the researchers or the school. Students also signed an assent form agreeing to participate in the study. Students whose parents declined participation were excluded from the research but not the intervention as LO is a compulsory subject.

Methods

Sample

The schools participating in the study were representative of the diversity of schools in Cape Town with respect to language, gender and race. The process evaluation student sample consisted of students from 12 intervention schools. Students from one school were unable to participate due to examinations. Convenience sampling was employed in selecting students from different classrooms at each school, who had been exposed to the intervention. The teacher sample consisted of the 25 implementing teachers who were still at the schools at the end of the implementation period.

Data sources

Teacher lesson logs. The lesson log was a diary-like document completed by the teachers at the end of each lesson. Part one of the log contained six to nine questions for each of lessons 1–8. Based on their feedback of completing this first part, teachers suggested that Part two of the log should contain fewer questions to increase the likelihood of completion. Three open-ended and six closed-ended questions were asked for lessons 9–15. We issued 30 lesson logs at the start of implementation, one for each teacher. We received back 18 completed logs from 12 schools. One school did not return any of their lesson logs, and at some schools the implementing teachers left without completing the logs fully.

Classroom observations. We conducted a total of 26 classroom observations at the thirteen schools. Each teacher was observed during one lesson. This involved observing without interruption everything that was taking place in the classroom and recording this on a standard form for each observation. The lessons observed were dependent upon the availability of the researchers and timetabling of the LO lessons.

Interviews with teachers. The semi-structured interviews explored the teachers' views of the intervention and its impact on the students and school environments. Eleven individual interviews were conducted, while 14 teachers were interviewed either in pairs or

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in threes depending on their availability. Fifteen female and 10 male teachers at 12 schools participated in the 40–60 minute interviews. Teachers at one school could not make the interview due to other commitments.

Focus group discussions with students. One mixed-sex focus group was conducted with 7–10 participants at 12 schools. At one school, the teachers were unable to organize a group due to examinations. A total of 122 students participated in the focus group discussions. The discussions lasted an hour to an hour and a half and dealt with students' experiences of the intervention and perceptions of its impact. The discussions were conducted in the students' language of choice.

Data analysis

Descriptive analyses were performed on the coded lesson log data using Statistical Package for Social Sciences (SPSS 13.0). Open-ended questions from the logs and data from observations were coded thematically. All interviews and discussions were transcribed and translated into English where necessary. The lead author analysed the transcripts line-by-line and coded them thematically, using QSR NVivo (7.0) [16]. Reliability was enhanced by coding and re-coding each transcript at least twice within a three-week period.

Results

The school contexts

Information about the school contexts was obtained from our observations and interviews with teachers. The schools were located in the Cape Town metropole, most of them in working class areas. They all followed the Department of Education's curriculum for public schools, but differed from each other in many ways, largely due to a history of racial segregation, economic inequalities and cultural differences that characterize South African society. The daily operations were influenced by available resources such as physical infrastructure and the presence of trained teachers. One school was an Afrikaans language medium school with a majority white student population; eight had a predominantly coloured student population with English and/or Afrikaans as the medium of instruction; four consisted of majority black students with English as the medium of instruction. Although the majority of the black students understood Xhosa better than English, teachers felt it was much easier to teach sexuality in English as the words did not sound as "rude" in English as they would in Xhosa, and the sexual lingo among the students differed depending on what area of Cape Town they lived in. Hence they suggested that the learner workbooks be produced in English. The students for whom Afrikaans or English was the home language on the other hand were advantaged by having the intervention implemented in these languages.

The Afrikaans medium school had classes of 23 students each, better facilities, and greater teacher stability. In comparison, many of the other schools were overcrowded, some with more than 70 students per class. Several schools did not have basic essentials for learning such as furniture and science laboratories or facilities for extracurricular learning such as playing fields, and teacher turnover was high. Twenty-four male and female teachers aged 24–59 years attended the first four-day training workshop. Some of them left the schools before the start of implementation, hence an additional training workshop was conducted. The implementation started with 30 trained teachers. Because of further teacher losses, another training session was conducted to accommodate new teachers. In the end, a total of 38 teachers were involved in implementing the intervention. A fuller description of the teachers, the training and evaluation thereof is published by Ahmed et al. (2006).

Eight of the thirteen schools experienced change of teachers due to illness, transfers, pregnancy or move to another grade. One school had five different teachers over the six-month implementation period. Three classes at another school had the entire intervention implemented by a teacher who did not attend any of the training workshops. Each school however had at least one trained teacher who provided support to those who did not attend the entire training. Only five schools had the same teachers deliver the entire intervention. The overall fidelity and quality of implementation was better at these schools compared to those where teachers changed. At some schools, lessons were missed, and at others they were delivered by substitute teachers, some of whom attended a one-day training course. Student absenteeism was also high in some schools; hence exposure to the intervention was varied. These factors posed challenges for implementation.

Fidelity of implementation

The intervention was delivered over 26–55 periods depending on the number of periods allocated to LO and each teacher's pace. Each period was 45–55 minutes. Early into the implementation, the project staff realized that the six-month duration was too

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short for completion. Teachers were requested to omit the last lesson on self-esteem if they did not have sufficient time, as it was aimed at reinforcing an earlier lesson. The intervention designers also selected one or two activities each for lessons 5–15, keeping those activities that required a shorter implementation time. Table II presents results of the number of lessons implemented at each school.

The importance of implementing the intervention as planned was stressed throughout the training and implementation period. Teachers were asked to report any modifications besides those made by the programme designers. In the log, teachers indicated whether they implemented the lessons as planned. The response options were scored from 0 if the lesson was not implemented, to 4 for implementation exactly as planned. The scores were summed up to obtain a mean score for each lesson or activity. As shown in Table III, the teachers reported that they implemented most lessons almost exactly as planned.

Table IV presents other mean scores of the teacher's evaluation of the implementation. Although these means cannot be compared, the scores provide the teachers' general impression of the intervention. The results indicate that the teachers found the intervention relatively easy to implement and rated highly the fidelity and quality of their delivery. Further exploration in the interviews and findings from our observations did not concur entirely with these views.

In one school, we observed an outside facilitator implementing the lesson on self- esteem and sexual decision making. In another, the reproductive functions lesson was delivered by a biology teacher, while a nursing sister from an outside organization delivered the lesson on condoms at another school. The intervention contained seven lessons with role-play activities. Based on the teachers' mostly negative experiences of the first role play, the intervention designers recommended that further role plays be omitted. However, some teachers used their discretion and continued to implement role-plays, while others substituted them with a video or asked students to write a dialogue. The teachers did not discuss these adaptations with the project team beforehand.

Lesson 12 was on correct condom use and included a demonstration using a dildo. One teacher skipped the demonstration, citing religious beliefs that prohibited him from teaching about condoms. At another two schools, this lesson was not implemented. The teachers at one of these schools felt that

Table II. Teachers' reports of number of lessons implemented at each school.

School	Number of students at the start of intervention	No. teachers involved in implementation[a]	No lessons implemented/ total	Comments
1	208	5	15/16[b]	Lesson 12 (condom use and demo) not implemented
2	340	3	16/16	Three classes had the intervention delivered by a teacher who did not attend any of the SATZ training
4	256	3	16/16★	Lesson 12 implemented by an outside facilitator (nurse)
7	153	1	16/16[c]	The same trained teacher delivered the intervention from beginning to end
8	410	3	15/16	Lesson 16 omitted as requested by programme designers
9	364	4	16/16	
11	254	5	15/16	Lesson 16 omitted as requested by programme designers
12	109	2	14/16[bc]	Lesson 12 (condom use & demo) not implemented; No lesson logs completed; no focus group discussions with students; The same trained teachers delivered the intervention from beginning to end
13	238	4	15/16	Lesson 16 omitted as requested by programme designers
18	208	1	16/16[c]	The same trained teacher delivered the intervention from beginning to end
22	313	2	16/16	2 classes had the intervention delivered by a teacher who did not attend any of the SATZ training
23	241	2	16/16[c]	The same trained teacher delivered the intervention from beginning to end
26	184	3	16/16	

★Lesson 12 implemented by an outside facilitator (nurse).
[a]All except schools 12, 18 and 23 experienced teacher changes during the six-months implementation period.
[b]Lesson 12 (condom use and demo) not implemented.
[c]The same trained teacher delivered the intervention from beginning to end.

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Table III. Teachers' mean scores on fidelity of lesson implementation: $n = 13$ lesson logs[a]. To what extent were the lesson/activities implemented as planned?

		Activity or lesson*					
		Mean (SD)[b]					
Lesson		1	2	3	4	5	6
1.	Values clarification with regard to adolescent sexuality	3.5 (0.53)	3.4 (0.7)	2.6(0.9)	2.7(0.9)	2.4(1.2)	2.0(1.7)
2.	Self-esteem and sexual decision-making	3.7 (0.47)	3.4 (0.7)				
3.	How our bodies function reproductively	3.4 (0.7)	3.3 (0.6)				
4.	Dimensions of sexuality	2.7 (1.4)	2.1 (1.4)				
5.	Boys don't cry! Girls are soft!	3.6 (0.5)	1.8 (1.8)				
6.	Responsible decisions for sexual safety	3.5 (0.7)	2.2 (1.8)				
7.	Promoting the sexual health of young people	3.5 (0.7)	2.6 (1.4)				
8.	How do I handle this?	3.2 (0.8)	2.2 (1.7)				
9.	Situations that carry the risk of sexual intercourse	3.8 (0.4)					
10.	Coercion and violence in romantic relationships	3.2 (0.4)					
11.	Not for me, not now!	3.5 (0.8)					
12.	How to use condoms	3.0 (1.5)					
13.	Negative consequences of sexual intercourse	3.2 (0.8)					
14.	HIV and AIDS and the future	3.5 (0.8)					
15.	Substance use and sexual decision-making	3.5 (0.8)					

*For lessons 1–8, rating is for each activity; for lessons 9–15, rating is for each lesson.
[a]There was no response to this question on five lesson logs.
[b]0 did not implement this lesson/activity; 1 – not at all as planned; 2 – only to a small extent; 3 – to a large extent; 4 – exactly as planned.

"the children were not ready for that lesson", yet they also believed that most of their grade 8 students were sexually active. The school lost about 50 girls annually due to pregnancy, most of them in grade 9 or during the transition period from grade 8 to 9. Three grade 8 students at the school became pregnant during the implementation of the SATZ intervention. Yet the teachers insisted on "abstinence, that is what we taught, and if you don't you going to die, cause you going to get the virus, AIDS and you going to die" [Male teacher, school 12]. The teachers at this school had introduced the message that AIDS equals death, which was inconsistent with the content conveyed through the intervention.

Various other activities at some schools interfered with the implementation of the SATZ intervention. These included talks by people living with HIV, peer counselling workshops, and visits by HIV educators from various organizations. These activities were not classroom-based, but some occurred during LO periods, further shortening the duration available for the intervention. It is also possible that the content of these activities may have complemented or contradicted that of the SATZ intervention.

The fidelity with which the intervention was implemented differed across and within the schools as a result of the contextual circumstances and individual teachers' characteristics. Although all the teachers attempted at least 14 of the 16 lessons, only a few of them implemented the intervention as intended. The teachers may have rated their

Table IV. Teachers' assessment of implementation: $n = 12$ lesson logs.[a]

Measure/question	Response format (coding)	Mean (SD) score
To what extent do you think you have implemented the intervention as per the expectations put forward during your training?	Not at all as expected–Completely as expected (1–5)	3.7 (0.8)
Implementation of SATZ was easy/difficult	Very difficult–very easy (1–4)	3.0 (0.8)
Overall, how would you evaluate the quality of your implementation?	Very low quality–very high quality to (1–4)	3.3 (0.6)
How often did you have to use additional material besides that provided?	Most of the time–never (4–0)	1.3 (0.7)
On a scale of 1–5 how successful do you think, was the implementation of the following activities?[b]	Not successful at all–very successful (1–5)	
Role-plays		2.8 (1.5)
Small group activities		3.3 (1.1)
Homework		3.0 (0.9)

[a]Only logs that provided answers to these questions were included.
[b]Teachers who did not implement any of the activities checked an appropriate box indicating so.

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implementation highly because they were using strategies that were new to many of them, which they considered an achievement.

Acceptability of the intervention

The implementation was summed up as very challenging and demanding, but also an enjoyable experience for both the teachers and students. Teachers appreciated the manual and monitoring from the SATZ team, which kept them committed to completing the programme. Many teachers found the intervention relatively easy to implement, because

> *"the outline was very clear, it was very specific, the exercises were also fairly clear". [Female teacher, school 18]*

Others were challenged to become more student-centred:

> *"you had to be committed . . . to think of ideas of making it interesting . . . it was not just a question of standing there and giving them information, you had to be involved emotionally as well, try and be part of them, step down from the level of adulthood and get into their shoes, in order to understand them. I had now to look at things from students' point of view and not from my point of view, of what I like and what I don't like, I had to change my attitude, and know that the centre is the learner and not me." [Female teacher, school 8]*

The suggested duration for implementing the intervention was 17 hours. Prior to implementation teachers indicated the number of periods they anticipated for each lesson. Both the intervention designers and teachers had underestimated the duration of the lessons. There was great variation in the amount of time it took each teacher, and most rushed through the last few lessons. For example, the recommended duration for the first lesson on values clarification was two hours, but it took some teachers up to six hours. This was attributed to the number of the activities, and students' cognitive difficulties in understanding the terms "norms" and "values". Teachers also felt that the vocabulary was too advanced for grade 8, given what they perceived as lower than average literacy levels at grade 8. The majority of the teachers felt that proper implementation required a minimum of one year.

Although the intervention was not intended as a complete LO curriculum, it was criticized for addressing sexuality only, leaving little time to teach other LO focus areas. However, because there was no standard LO curriculum issued to all the schools in Cape Town, teachers appreciated that the SATZ intervention saved them time and effort spent putting together a curriculum from different materials. All the teachers intended to use all or parts of the intervention in the future even though the research was not complete. Some were already using it with their grade 9 classes, and one school had made sufficient copies for the following years' grade 8 students.

The role of training. The two teachers who did not attend any training struggled with the lessons, but received support from their colleagues who had been trained. Even the teachers with previous HIV/AIDS training acknowledged that it would have been challenging to implement the intervention without training:

> *"In the beginning I thought it was crazy . . . I didn't want to go, I was very upset but I tell you, for me the person that I was before going to Slanghoek [the location of training] and myself ending up at the end having done what I did this year and saying what I said, am very glad that I went to that training . . . this programme must be implemented countrywide and every white, black, pink school must get it". [Male teacher, school 23]*

Although some teachers still expressed discomfort around the subject of condoms, for others, the training boosted their confidence to implement this lesson:

> *"The initial training, and the update, without that I would not have coped that well, I would have thought this is nonsense. Being old and cynical I wouldn't have tackled this. As I said at the time, I'm not going to show the children in front of a mixed [gender] class, how to put on a condom. In the end it was no problem at all, I was blatant enough." [Male teacher, school 26]*

Implementation strategies

Role-plays. Four teachers did not attempt any role-plays, either because they did not want to, or because the students were shy. Students were especially hesitant to participate in role-plays that involved a romantic relationship as this may have undesirable consequences:

> *"They didn't want to be teased about who they chose so most people in my class didn't do it and others were gossiping and so others are shy and don't want to be talked about and they were afraid." [Female student, school 8]*

Sexually inexperienced students also had difficulties identifying with role-plays depicting sexual relationships. Some of the role-plays were designed to be conducted in single-sex groups but teachers did not implement them in this way. At several schools, the role-plays were not focused on the topic and there was no discussion afterwards, hence the objective of the activity and its bearing on the lesson was lost. Some teachers were resistant to this different approach to teaching:

> *"What works in our situation, is the kind of passion type [didactic approach] of teaching methods where your kids sits and you teach, and giving the information to the kids using your teaching skills. We use that type of teaching. To emphasize, role-playing in our situation doesn't work." [Male teacher, school 12]*

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The teachers that attempted role-plays found them too time consuming, but time was also lost due to inadequate preparation and a rotation system that required students to move from one class to another for each subject. The system was highly ineffective at schools with large class sizes and insufficient furniture, so students moved around with their bags and furniture.

We also observed some well-facilitated role-plays. At two schools a few students prepared the role-plays in advance. This saved time, but the dialogue was not spontaneous, and other students did not have an equal opportunity to participate in the role-play. As the teachers were aware in advance that they would be observed during a particular lesson, the possibility that the lessons were planned to impress the observers could not be ruled out.

Small group discussions. Small group discussions were also difficult to implement due to large class sizes. Some teachers found it difficult to keep the groups focused on the discussion topic due to poor discipline. One teacher overcame this by pre-assigning students to groups to which they remained until the end of the intervention. This minimized the disruptions, but it limited students' interaction to only a few of their classmates. This however was one of the schools where we observed this strategy working well as the students were focused and the groups competed with each other.

In classes with older students (some had students aged 20 years and above), the classroom dynamics were further complicated by both age and sexual experience. It was difficult to have small group discussions where older and sexually experienced students were mixed with the younger and sexually inexperienced. Some teachers put older students into separate groups. Others got the sexually experienced students to assist with lessons such as the condom demonstration, while some tried to create a class atmosphere where the students did not feel embarrassed or judged because of their sexual (in)experience.

Homework. The intervention contained three homework activities, but this was unsuccessful at all schools. Students expressed a strong dislike for homework, preferring classroom group activities. Teachers attributed this to laziness, disregard for LO and absent or disinterested parents/guardians. This dislike for homework was not unique to particular subjects, but it was worse with LO because as a non-examination subject at grade 12, students considered it

> *"a fun subject, it's a class where you talk all the time … it's discussed, it's an easy non threatening subject, so, homework, is seen as something strange." [Male teacher, school 26]*

One teacher, however, viewed the problem as emanating from teachers who did not instil a sense of seriousness into homework:

> *"Homework becomes a major problem when a teacher does not check the book. If you give them homework today, make it the point that you want it tomorrow, even if you are not going to read, you are just going to sign it, and then you still have another day to mark it, and go through it, as long as they know that you give them homework today, you are not going to go back to it, they will tend to relax." [Female teacher, school 11]*

Parental involvement

The intervention was designed for classroom implementation, but an attempt was made to involve parents early in the process. In lesson 1, the aims of the project were summarized as "the SATZ Story". The students' homework was to tell the story to their guardians, answer any questions and record this interaction on a sheet in the workbook. This exercise was unsuccessful as the majority of the students did not conduct it with any adults. The reasons for this included: fear of a possible negative reaction from parents; parental inhibitions; lack of prior communication about sexuality; and discomfort around the subject of sex.

A few parents expressed their displeasure with the intervention, and a few students did not take their workbooks home for fear of their parents' reactions. However, parents were still viewed as the most credible source of sexuality information

> *"I think if you are in doubt about certain issues, the best source would be your parents as they would be most capable to give it to you." [Male student, school 23]*

Students who conducted this exercise with their parents/guardians gave positive feedback and said the project had fostered communication between them.

Students' experiences of the intervention

Overall, students enjoyed the intervention, especially because it did not dwell much on well-known facts around transmission and prevention of HIV/AIDS. They particularly enjoyed the lessons on values, self-esteem, the reproductive system and assertiveness:

> *"In primary school there was a lot of intention brought upon premarital sex, and AIDS and all of that crap but in this programme, it also made us aware of the other side, like your values, and morals, like if your values and morals are in place then it will also assist you in your decision making. [Male student, school 23]*

The lesson on values was mentioned in a few of the discussions as one that the students remembered most, probably because it was the first lesson. This

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however was also the lesson that most teachers struggled with. A few suggested it should be omitted, while others viewed it as the essence of any programme on sexuality.

Lectures were the least liked activity, while role-plays were enjoyed most, because they allowed the students to express their opinions. Some students who did not have the opportunity to participate in role-plays said they felt neglected. At schools where teachers changed during implementation, students felt that they did not have sufficient time to forge a relationship with the teachers, and had received contradictory messages. The students' suggestions for improving the intervention were more pictures, simpler language and no homework.

The students were generally satisfied with the way their teachers implemented the intervention. As the programme progressed, it became easier to participate in the activities and to talk to their teachers about relationships, sexuality, HIV/AIDS and other issues that concerned them. Some teachers corroborated these views. Most students nevertheless recognized that ultimately they had a responsibility:

> *"Throughout the programme, it was about choices, and decisions that you take, I thought it was very cool about this programme, nobody forced you, to do this or that, because of the different cultures and many different people and as every person is different from one another, you were only made aware of the facts of what you can do, or what you can say, and even though you may differ, but at the end of the day you will bear the consequences of your decisions." [Female student, school 23]*

Gender differences in student responses to the intervention

The teachers and students agreed that girls were more mature in their participation in the intervention. Boys were reportedly "childish" and "immature"; they "giggled" during the lessons, "made jokes and thought it was funny". At one school, however, the boys also felt that teachers were generally partial to girls. One example they used was in queuing to get into classrooms, where girls always got to go first and boys were not allowed to question this procedure. Girls were said to be taking advantage of this preference and got away with actions such as physically hitting the boys.

Teachers' views on the potential impact of the intervention

Many of the teachers thought the intervention had increased students' participation in class and boosted enthusiasm for LO, but this was not evident in our observations at some schools. At one school, most students did not have their workbooks, while others faced the back of the class disinterested in the lesson. In a different class and with a different teacher at the same school, the students were attentive, had their workbooks and participated fully in the lesson. Although the teachers attributed this to the fact that one was English and the other an Afrikaans medium class, these stark differences in the same school point to the role that the teacher–student relationship can have on the delivery of an intervention.

According to the teachers, the lesson that resonated most with the students was on substance use. In group discussions, students mentioned this as a topic on which they would like to have more information. Teachers were concerned that the intervention contained only one lesson on substance use because they saw this as a more immediate problem and the entry point to other risky behaviours in their communities. Within the vicinity of one school, there were 11 *shebeens* (informal pubs, some of which operated from residential homes) and the only pleasure available according to the teachers was alcohol and drugs, which they linked to unprotected sexual activities. Nevertheless, most teachers were confident that the intervention would have an impact on sexual behaviour.

At the school level, participation in the SATZ project got teachers thinking about issues such as a school HIV/AIDS policy, and supportive measures for students living with HIV. Of the 13 schools, only one had a school HIV/AIDS policy at the time of participating in the project.

Discussion

Overall, the SATZ intervention was well received by both teachers and students. This was encouraging in the current context where previous studies have reported AIDS information fatigue among South African youth [17]. However, it was not implemented with high fidelity at many schools, and the quality of delivery, and therefore the extent to which the students were exposed to the intervention, varied considerably.

Among the factors that facilitated implementation were (i) the intervention's compliance with the outcomes-based education philosophy; (ii) providing all required teaching materials and instructions; (iii) a participatory training that took into account the teachers' diverse views and experiences and targeted their attitudes, skills and self-efficacy to implement the intervention; and (iv) involving teachers in developing and piloting the lessons, and reviewing the research instruments. This last point was particularly important as schools are inundated with requests to participate in interventions and research,

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results of which they rarely receive. Thus, while they welcome the opportunity for interventions, research is generally viewed as a disruptive intrusion with little benefit to the schools. Involving the teachers in revising the intervention also facilitated a sense of ownership among them. This is discussed in more detail elsewhere [10].

It was reasonable to expect that teachers would adapt bits of the programme to suit their circumstances. Other studies have also reported an association between personal characteristics and teachers' adoption of sex education programmes [18,19]. Sex education is a sensitive topic and teachers are cautious of what and how they teach in case they experience negative reactions from the community [1,2,20]. It may be useful therefore that in developing interventions, the broader communities in which schools are located are involved. The SATZ intervention unsuccessfully attempted to create a school-parent link where, at most schools, none existed. A HIV/AIDS intervention was probably not the best means of doing this as many students had not established communication about sexuality with their parents.

Implementation was worse with the skills-based activities such as role-plays. While most adaptations attempted to maintain the core aims of the activities, more drastic modifications like substituting role-plays for a written activity reflected a lack of understanding of the theoretical underpinnings of learning through practice and social modelling [21–23]. It is also likely that the teachers did not report adaptations that they considered minimal but which may have impacted on the delivery of the intervention. If intervention implementation is to be properly documented, the research component should include a more thorough implementation monitoring process.

As has also been found in other studies, [6, 24,25], most teachers struggled with participatory strategies even after what they considered high quality training and continued support according to their needs, which ordinarily is not available to them. Some of the teachers had anticipated these difficulties during the training [10]. The teachers were not fundamentally opposed to participatory learning, and most attempted it in the most unsuitable of classroom conditions, and a background teaching training that is not based on this approach. Some of these difficulties can be addressed through continued training. However, given the school contexts the inclusion of role-plays in the intervention should have been taken into greater consideration during the piloting phase. Although it is not possible to tailor standardized interventions to each school, the lessons should be piloted in a variety of schools with circumstances similar to those of the intervention schools to assess feasibility.

Young people generally enjoy participatory activities as was evident in the preference for role-plays in the SATZ intervention. Yet intervention designers recommended that these be omitted due to difficulties with facilitation and time constraints. This could have had implications on the extent to which students participated in the lessons. It was also clear from teacher and student reactions to role-plays that curriculum designers and teachers should be sensitive to gender and heterosexism, as well as sexual experience. The gender-differentiated responses to the programme may require that future interventions consider a mixture of single- and mixed-sex groups, recognizing that sexuality is in part shaped by gender-specific socialization [26].

Making LO an examination subject is an option that may require further exploration. This would have potential advantages such as bringing about more structure and clarity of content and common messages into the curriculum. It would also elevate the status of LO as an important subject and instil into it a greater sense of seriousness from both schools and students. However, it will need to be accompanied by specialized training for future LO teachers, and school-level changes to accommodate participatory learning, such as manageable class sizes. These factors have implications for the fidelity, sustainability and impact of interventions.

The SATZ intervention contained many of the characteristics associated with successful interventions to delay sexual intercourse and promote condom use. These included training of teachers, a duration longer than 14 hours, specific focus on changing sexual risk-taking behaviours, focus on social pressures, clear messages about unprotected sex, basic accurate information, teaching various skills necessary for healthy sexual behaviours, and theory-driven activities [27]. The intervention received favourable responses from students and teachers, but personal and contextual factors that influenced implementation highlight some of the difficult conditions under which school-based HIV/AIDS interventions have to be implemented. These findings will be important for designing future interventions and planning for large-scale dissemination of school-based programmes. Given the differential implementation, it is hoped that the process findings will assist in interpreting the relationships between the implementation and the observed outcomes.

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