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ORIGINAL PAPER

The Cross-Cultural Validation to Measure the Needs and Practices of Educators Who Teach Sexuality Education to Learners with a Disability in South Africa

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Abstract Literature shows that learners with disabilities lack access to sexuality education in Africa and are therefore at increased risk of sexual abuse and exploitation as well as exposure to HIV. Teachers in special schools struggle to provide sexuality education to learners with disabilities. However, the challenges and how they are shaped by the teachers' knowledge, attitudes and practice in regards to the subject are little understood. This paper reports on the process of developing, culturally validating and piloting a questionnaire that assesses the teachers' knowledge, attitude and teaching practices. The questionnaire validation used the cultural equivalence testing framework from Stevelink and van Brakel testing for conceptual, item, semantic, operational and measurement equivalence using expert advice, literature, a sensitivity questionnaire and focus group discussions. The validation process provided crucial pointers toward improving and culturally adjusting scales. This has developed a robust tool with the exception of the knowledge scales. In the further process the latter will be refined and adjusted. This tool helps to identify teachers' challenges around sexuality education and has informed the development of a curriculum innovation and toolkit that supports teachers to effectively deliver sexuality education to learners with disabilities.

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Introduction

Various authors agree [1–8] that learners with disabilities in Africa lack access to comprehensive HIV and sexuality education. This lack of sexuality education contributes to the increased vulnerability of people with disabilities (PWD) to sexually transmitted diseases such as HIV as well as to the increased risk of sexual abuse [6, 7, 9–16]. However, even if some type of sexuality education is provided, it focuses mainly on abstinence. [5, 17]. Chappell argues that negative images around disability and sexuality dominate perceptions of PWD and therefore these people lack positive images related to a fulfilling sexual life [18]. His work also highlights that young PWD are able to engage in a discourse around sexuality and develop their own sexual identity if they are given the space to do so. While Chappell's study reveals pathways in informal discussions, very little is known about formal ways such as sexuality education within schools for learners with disabilities. In particular, knowledge of the perspective of the teachers in these schools in Africa is sparse. For instance, Aderemi's [2] interviews with twelve teachers in Nigeria revealed that these teachers viewed learners with intellectual disabilities as 'hypersexual' and not able to have intimate relationships. The study showed that, on the one hand, teachers felt confident about delivering sexuality and HIV education but on the other hand, felt that they lacked skills on how to provide sexuality education in accessible formats [2].

Similarly, a study conducted by Rohleder et al. [4, 5] in South Africa indicated that teachers recognised the need for sexuality education, but experienced anxiety and uncertainties as a result of believing that sexuality education could be harmful or lead to inappropriate sexual behavior. The authors argue that there is little sexuality education material available in South Africa that is tailored to the specific needs of learners with disabilities. This suggests that educators face several obstacles in teaching sexuality education to learners with disabilities, but there is very little understanding of the reasons and possible solutions, since data is largely absent. In contrast to research with mainstream teachers, there exist no survey data with culturally validated scales assessing the knowledge, attitudes and practices of educators teaching sexuality education to learners with disability in Africa. Hence, it is difficult to perform a reliable assessment of teachers' needs, knowledge, attitude and practice in regards to HIV and sexuality education. Consequently with this lack of scientific evidence we struggle to understand how educators construct teaching behavior in regards to sexually education. There is also little insight into the barriers and enablers that teachers experience. This knowledge is necessary to develop targeted interventions.

This paper tries to fill some of these gaps and presents the cultural validation of a teacher questionnaire developed to investigate the knowledge, attitude, self-efficacy, practice and professional preparation of teachers in schools of learners with disabilities in South Africa. To the knowledge of the authors it is the first of its kind in Africa.

The Teacher Sexuality Education Questionnaire (TSE-Q)

In order to assess teachers' needs, knowledge, attitude, practice and self-efficacy a questionnaire was created by the research team. The Teachers' Sexuality Education Questionnaire (TSE-Q) was developed in line with the adapted theory of planned behavior

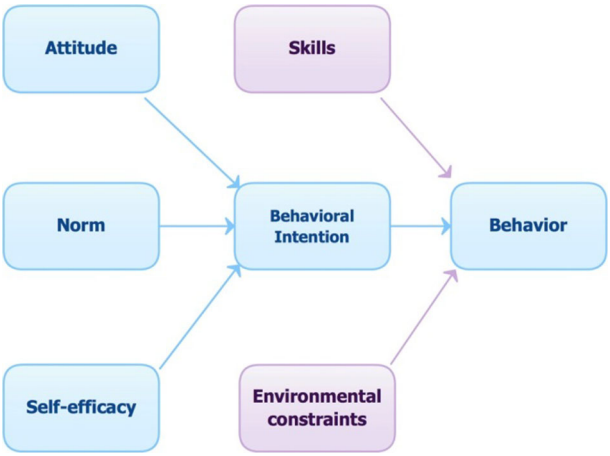


Fig. 1 Adapted version of the Theory of Planned Behavior. Adjusted from U.S. department of Health and Human Service

[19]. This theory postulates that the behavior of an individual is determined by his/her intention to perform that behavior, which in turn is determined by a person's knowledge/skills, beliefs/attitude, self-efficacy and perceived subjective norms. In addition, the environment is believed to influence what behavior is practiced and what is not (see Fig. 1).

Prompting concepts from this theory, the questionnaire examines the following components:

- *Demographics*
- *Knowledge of teachers* (40 items for 6 sub-scales), investigating the technical knowledge of STI and HIV/AIDS transmission, symptoms, diagnosis and prevention and teachers' understanding of and attitudes towards sexuality issues specific to PWD,
- *Beliefs and teaching practices* (29 items for 5 sub-scales), which examines the beliefs of teachers on which subjects of sexuality education should be taught to their learners and questions regarding the actual teaching practices of the teachers,
- *Perceived subjective norms* (5 items for 1 scale), examining teachers' perceptions of social normative pressures, or the beliefs of other people that sexuality education should not be taught to learners with disabilities,
- *Self-efficacy and confidence* (14 items for 1 scale), which observes the self-efficacy and confidence the teachers had in delivering their lessons on sexuality education, and lastly
- *Materials and professional preparation* (10 items for 1 scale), looking at the environmental constraints that teachers experienced at their school, the skills they possessed to teach sexuality education, and how educators prepared for the lessons and the materials currently at their disposal for teaching sexuality education.

With the exception of the HIV-Knowledge scales, those that were utilised in the study were either from previous studies or self-developed. Therefore, these scales had to be culturally adapted for the South African context. The table below provides an overview of the scales that were used in the questionnaire (Table 1).

Methods

The validation of the TSE-Q forms part of the *Breaking the Silence* project which develops a sexuality education intervention in three phases: (1) needs assessment, (2) development of intervention and (3) pilot and evaluation of the intervention. The TSE-Q and the tools for the validation of the questionnaire were developed in phase one during the needs assessment, which included a survey with the questionnaire as well as focus group discussions (FGD). The results from these two study components are presented elsewhere [21–23]. This paper presents the validation of the questionnaire.

Cross-Cultural Validation Design

In order to further develop the instrument, cross-cultural validation, also known as cultural equivalence testing, was carried out. In this context Stevelink and van Brakel [24] elaborate that direct use of an instrument in another culture poses difficulties for its validity, because concepts that questionnaires use are not necessarily similar across cultures. Furthermore, they emphasize that direct translation or application can provide challenges, hence scales need to be validated directly with people from the target country and cultural background [24, 25]. As the TSE-Q included a number of scales that were self-developed or were not from African countries, cultural validation was necessary.

For this purpose the cross-cultural validation framework of Herdman and Fox-Rushby [25] was used which prompts the following concepts: conceptual equivalence, item equivalence, semantic equivalence, operational equivalence and measurement equivalence. Stevelink and van Brakel [24] operationalized the types of cultural equivalence by creating criteria to evaluate the equivalence of studies. The combined work of Herdman and Fox-Rushby and Stevelink and van Brakel was used as a guide in the validity testing of the questionnaire. Both qualitative and quantitative methodologies were used in the process of validating the TSE-Q. In addition to the theoretical framework the study tools included key stakeholder engagement, FGD and a validity questionnaire prompting face, content validity and ease of usage of the questionnaire. The cross-cultural validity consisted of a sensibility analysis as well as a scale reliability check. The sensibility of a questionnaire refers to whether the questionnaire makes sense on a basic level and can be tested by experts or by the target population. This process of validation usually answers a number of questions about various aspects of the questionnaire, for instance whether all the items were understandable. Essentially, it is a method used to test whether an instrument is meaningful to respondents [26]. The components used for the cross-cultural validation in this study can be seen in Table 2.

The fieldwork was conducted in KwaZulu-Natal, South Africa, after being granted ethical approval by the University of KwaZulu-Natal. The study team collaborated directly with the KZN Department of Education (DoE) and a local Disabled Peoples Organisation.

Participants and Recruitment

Participants were recruited in two phases. In the first phase five special schools varying in disability types and geographical location were purposely selected for the cultural validation of the TSE-Q ($n = 49$). Participants for this study had to have been a permanent employee or volunteer at one of the schools for at least 6 months and teachers who taught some form of sexuality education (formally or informally). In the second phase an

Table 1 Concepts of Teachers Sexuality Education Questionnaire (TSE-Q) [20]

Variable	Number of items	Source	Adapted	Sample Item	Response format*
Teachers' Knowledge (sum of 6 sub-scales)					1
HIV clinical diagnosis and characteristics	7	Knowledge Attitude and Practice (KAP) questionnaire for educators and school administrators	n/a already from KZN	A saliva test can show whether someone has HIV/AIDS	1
HIV transmissions	6	KAP questionnaire for educators and school administrators	n/a already from KZN	One can get HIV: from a mosquito	1
Condoms	7	KAP questionnaire for educators and school administrators	n/a already from KZN	Condoms are easy to obtain	1
HIV spread and cure	5	KAP questionnaire for educators and school administrators	n/a already from KZN	HIV/AIDS: can be cured with medication	1
HIV prevention	4	KAP questionnaire for educators and school administrators	n/a already from KZN	One can prevent getting infected with HIV by: using contraceptives (the pill)	1
Disability and sexuality	6	Self-designed	n/a new	People with a disability are virgins or asexual	1
Sexuality of PWD compared to people without disabilities	5	Self-designed	n/a new	Learners with disabilities are more likely to be sexually abused compared to learners without disabilities	2

Table 1 continued

Variable	Number of items	Source	Adapted	Sample Item	Response format*
Beliefs (A) and Practices (B) in teaching sexuality education (sum of 5 sub-scales)					
Human development	5	[29]	Yes	A. Please indicate if you think the topic *puberty* should be taught to your learners B. Do you teach this topic to your learners?	3
Relationships	6	[29]	Yes	A. Please indicate if you think the topic *marriage* should be taught to your learners B. Do you teach this topic to your learners?	3
Personal skills	6	[29]	Yes	A. Should the topic *communication* (about sexuality) be taught to your learners? B. Do you teach this topic to your learners?	3
Sexual behavior	7	[29]	Yes	A. Please indicate if you think the topic *masturbation* should be taught to your learners B. Do you teach this topic to your learners?	3
Sexual health	5	[29]	Yes	A. Please indicate if you think the topic *sexual abuse* should be taught to your learners B. Do you teach this topic to your learners?	3
Perceived subjective norms	5	[32]	No	Do you think the learners expect you to conduct HIV/AIDS education?	3
Self-efficacy and confidence	14	[32]	Yes	As an educator I will be able to conduct a role-play whereby learners practice how to tell a friend that they might be infected with an STD, and that they should go to be tested	3
Material and professional preparation	10	Self-designed	n/a new	The available sexuality and HIV education material is suitable for my learners with disabilities	4

* Response formats

1. 3-point scale (1 = disagree, 2 = agree, 0 = don't know)
2. 3-point scale (1 = less, 2 = the same, 3 = more)
3. 5-point scale (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree

Table 2 Cultural equivalence and validity framework [20]

	Definition	Criteria for adherence	Use in this study
Conceptual	"The questionnaire has the same relationship to the underlying concepts in both cultures, primarily in terms of domains included and the emphasis placed on different domains" Source: [25] (324)	1. An assessment of the local population's conceptualization of the construct 2. An assessment of the appropriateness of the measure in the target setting 3. Theoretical arguments questioning or accepting conceptual equivalence. Source: [24] (202)	1. Conceptual framework used to guide the questionnaire development 2. Focus group with target population/interview with special education expert about meaning of the concepts: sexuality, sexuality education and PWD 3. Focus group with target population/interview with special education expert about the clarity, acceptability and appropriateness of the questionnaire at special schools in South Africa
Item	"Item equivalence exists when items estimate the same parameters on the latent trait being measured and when they are equally relevant and acceptable in both cultures" Source: [25] (325)	1. Assessment of relevance or acceptability of the individual items to the target population 2. Item discussed in light of any qualitative or quality analyses results 3. Discussion of adaptations made based on findings regarding individual items Source: [24] (203)	1. Focus group with target population/interview with special education expert about the clarity, acceptability and relevance of the individual items 2. Items which were unclear, irrelevant or unacceptable were either adjusted or noted for further discussion 3. Relevance and acceptability of items was included in validity questionnaire
Semantic	"The transfer of meaning across languages, achieving a similar effect on respondents who speak different languages" Source: [25] (326)	1. Contact with developers 2. Use of translation guidelines, or user manual including translation instructions 3. Description of translation procedure 4. Meanings of key words and phrases 5. Description of any problems or difficulties encountered during the translation Source: [24] (203)	1. Not applicable. Target population and educational expert insisted on not translating the questionnaire 2. Understandability of the language of items was included in the validity questionnaire

Table 2 continued

	Definition	Criteria for adherence	Use in this study
Operational	"The possibility of using a similar questionnaire format, instructions, mode of administration and measurement methods" Source: [25] (329)	1. An assessment of missing data 2. Discussion on administration format 3. Pre-testing of the instrument Source: [24] (204)	1. Instrument was pre-tested on target population 2. The questionnaire format was discussed in the focus group 3. Questionnaire format was included in the validity questionnaire
Measurement	"The psychometric properties of the adapted version of the questionnaire are equivalent" Source: [25] (330)	1. Assessment of content validity 2. Assessment of construct validity 3. Assessment of test–retest reliability and agreement 4. Assessment of floor and ceiling effects 5. Assessment of interpretability 6. Assessment of responsiveness 7. Application of IRT analysis Source: [24] (205)	1. Content validity addressed in extra questionnaire and in the interview with the expert and focus group with target population 2. Internal consistency of scales was tested as a measure of reliability

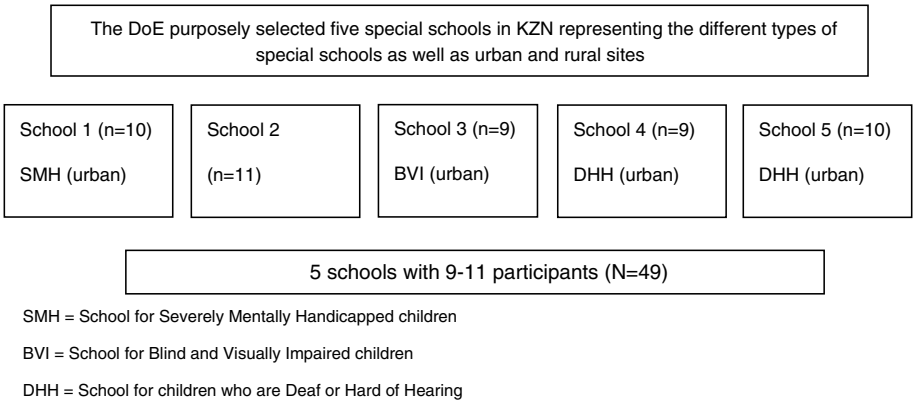


Fig. 2 Sampling wave one of needs assessment

additional 52 teachers (from another five schools) were recruited for the full pilot of the questionnaire including the reliability tests.

The figure below illustrates the sample of the validation study according to disability type and locality (Fig. 2).

In total, 49 educators participated in the first phase of the validation study (and 99 were recruited from ten schools for the whole pilot study). Written informed consent forms were signed by all the participants of the study. Data was collected between April and June 2012. The validation was conducted in three steps: (1) theoretical framework and expert consultation, (2) face, content validity and ease of usage in the validity questionnaire and (3) scale reliability test.

Expert Consultation (FGD)

Firstly, the study team interviewed a special education expert who had had experience with teaching at special schools in Kwazulu-Natal for many years and was also fluent in the local language isiZulu. The expert agreed to a face-to-face, semi-structured interview to discuss the questionnaire. Secondly, a semi-structured FGD was conducted with seven teachers discussing the cultural validity (face and content) and ease of usage of the questionnaire.

For the expert consultation, notes were made during the interview and later analyzed. The focus group was, with the teachers' consent, audio recorded. The tape was transcribed and coded according to the different types of cross-cultural validity (conceptual, item, semantic and operational). Additionally, there was an open code for any additional comments that did not fit in the equivalence framework. The results were used to improve the questionnaire. Thereafter the TSE-Q was tested with the first wave of teachers (N = 49) using the sensibility questionnaire.

Validity Questionnaire

The validity questionnaire was used after piloting the TSE-Q with the 49 teachers. This validity questionnaire has been used in a similar study [26]. It was adjusted to focus on elements of the TSE-Q. Only one question was not relevant in the cross-cultural validity

framework and was therefore excluded ("I felt that answering the questions helped me in some way"). Responses were scored from 1 to 7, with 1 representing 'highly agree' and 7 'highly disagree'. Seven of the questions were reverse coded so a low score indicates a high sensibility level. Two of the questionnaires were excluded because the respondents had only answered half of the questions. The data of the two questionnaires was entered into Statistical Package for the Social Sciences (SPSS). An overview of the questions and their place in the cross-cultural validity framework can be seen in "Appendix". The questionnaire includes 16 questions on Likert like scales.

The mean scores for all the items of the questionnaire were calculated and seven items were reverse scored to ensure that lower scores indicated higher validity. Additionally, once the questionnaires were submitted, there was an opportunity for additional oral feedback.

Reliability Testing

The reliability testing of the TSE-Q included the full sample of wave one and two in this pilot study (total N = 99). The standard questionnaire's cross-cultural validity, as well as reliability tests of all the TSE-Q scales was conducted. This consisted of the calculation of Cronbach's alphas, which measures the internal consistency for every scale. In addition to this, individual item analyses were carried out in order to detect which items were responsible for potential overall low reliability of the scales. In this way, the scales' reliability could be improved, if necessary.

The commonly accepted [27] reliability threshold of $\alpha = 0.7$ was used as a benchmark for the internal consistency of the scales of the TES-Q. These tests were run in SPSS.

Results

Validity of TSE-Q

Seven teachers participated in the FGD of the validation. In addition, 47 of 49 respondents who taught at one of the five special schools in the first wave completed the cross-cultural validity questionnaire.

Conceptual Equivalence

The FGD revealed that teachers considered sexuality education an important topic, but many educators experienced difficulties in teaching issues related to the sexuality of learners with disabilities and felt that issues such as sexual abuse and HIV were not sufficiently recognized in South Africa. Therefore teachers perceived the questionnaire as "very relevant for special education schools in KwaZulu-Natal", and identified it as being appropriate for the target setting. In terms of the 'teacher's beliefs about sexuality education' scale, the teachers felt that it would be unnecessary to assess educators' beliefs about what they should teach, as they considered their beliefs to be irrelevant to what they taught. The teachers felt that it was not their decision to identify what to teach the learners. Moreover, they expressed the feeling that it would be unethical for teachers to impose their personal beliefs on learners as they believed that teachers were obliged to follow the DoE's guidelines. However the theory of planned behavior very clearly explains how beliefs are

related to practice and that these connections are not always conscious ones. The belief scale was therefore not dropped.

Regarding the concept of disability there was some discussion on whether the questionnaire was to be completed with a particular type of disability in mind, or for all types of disability. This was perceived as especially relevant because different types of impairments are associated with different problems regarding the learners' sexuality. The concept of disability itself was mainly discussed in terms of the learners' impairments. Besides intellectual, sensory, hearing and physical impairments, teachers also categorised learners with learning difficulties as disabled. The questionnaire was therefore altered to prompt teachers in regards to the learners they are currently teaching.

Lastly, all interviewees agreed that the terms 'sexuality education' and 'sex education' should not be used interchangeably. Teachers understood 'sex education' to be about sexual intercourse specifically, while 'sexuality education' usually referred to the wider aspects of sexuality, not just intercourse. The questionnaire was therefore adapted to use only the term 'sexuality education'.

Item Equivalence

Item equivalence assessed whether the items of the TSE-Q were appropriate and understandable. Teachers in the FGD pointed out that some of the items of the TSE-Q scales about teachers' beliefs and practices were too vague or unclear. In addition, the group pointed out items that included topics such as 'masturbation', 'abortion' and 'the distribution of condoms at schools' could be seen as controversial and deemed as taboo by the target population. The educators felt that these topics would not be part of the Life Orientation curriculum, thereby making them perhaps irrelevant for the questionnaire. The discussion participants noted that the role of parents in teaching sexuality education is an item that should be incorporated into the questionnaire. The questionnaire was, therefore, adapted to be more specific and clear and to incorporate parents. Culturally sensitive topics such as masturbation were, however, kept in the questionnaire as they form part of comprehensive sexuality education.

The FGD also discussed language issues. Although 80.9 % of residents of Kwazulu-Natal [28] speak isiZulu as their first language, teachers felt that the TSE-Q should not be translated into isiZulu because all teachers in KwaZulu-Natal have to teach their subjects, including 'Life Orientation', in English. Teachers were perceived as being accomplished in speaking and writing in English and they thought that translation of the questionnaire would be experienced as an insult. Therefore, the TSE-Q was kept in English.

Operational Validity

In the FGD there was a consensus that using both Howard-Barr's [29] 'teacher's beliefs' and 'teacher's knowledge' scales separately was too repetitive. As a result, the suggestion to combine them was made. More generally, it was suggested that the questionnaire be made applicable for non-life orientation teachers as well, since other educators who are not directly involved in teaching life orientation as a subject, still dealt with the sexuality education of learners. Lastly, the interviewees thought that the questionnaire was too long and that the language used was too complex at times. Hence the TSE-Q beliefs and knowledge scales were incorporated into one set of questions prompting first their beliefs

and then actual practice. Language was adjusted where it was considered too long or complicated. Altogether, this shortened the questionnaire considerably.

Validity of TSE-Q using the Validity Questionnaire

All questions of the validity questionnaire assessing the TSE-Q scored a mean between 2.0 and 3.5, which was indicative of a positive response from participants. Overall the questionnaire prompted the following concepts (Table 3).

Regarding the content validity of the TSE-Q only two questions on the validity questionnaire scored over 3. These were associated with the repetition of some of the items on the TSE-Q that could possibly be omitted. The questions in the additional validity questionnaire about face validity, dealing with the clarity of instructions and the adequacy of response options, scored well. Additionally, it was asked whether the questionnaire was confusing or too complicated in terms of language—the results of means around 2 indicated that the TSE-Q was sensible and understandable. The validity questions about ease of usage received average to good scores. The lowest score was for the question 'I felt that the questionnaire made me think about things that I would have preferred not to have thought about', reflected in the group discussion feedback about the discomfort of teaching certain topics, such as 'masturbation'. Other questions with relatively low scores were related to the time and effort that it took to complete the questionnaire, which was also reflected in the group discussions and discussed previously.

Reliability of the Questionnaire

The performance of the scales used in the TSE-Q varied from having a poor internal consistency to moderate internal consistency when using the original versions of scales.

The knowledge scales from the 'KAP Questionnaire for educators and school administrators', although previously used in KZN, all had a low alpha, ranging from 0.17 to 0.65 even after adaptations. The self-developed knowledge scales about sexuality and disability also performed poorly in terms of internal consistency. Both of the scales had negative alpha scores (-0.05 and -0.11), indicative that some of the items within the scales correlated negatively. Even after adaptation these scales only reached an alpha of 0.41 and 0.04 respectively.

The teacher's beliefs scales of Howard-Barr and colleagues [29] performed initially moderately on internal consistency, with alphas between 0.4 and 0.7. However the reliability of the teaching beliefs scales was improved through omitting items such as 'sexual identity and orientation', 'assertiveness' and 'human sexual response'. After adaptations (by means of item exclusion) all scales achieved a very good internal consistency. The teaching practices scales scored very good internal consistency in their original version and needed no adaptation. However, as items were changed in the teaching beliefs scales these items had to be omitted in the teaching practices scales as well, since the two scales were designed to match each other. The teaching practice scales still scored very good internal consistency after this adaptation.

The sub-scales on the 'perceived subjective norms' scale had moderate internal consistency with an alpha of 0.52. It was possible to improve this alpha through scale adaptation to 0.84. The original scales for 'self-efficacy and confidence' scored a Cronbach's alpha of 0.91 and needed no further adaptation. The self-developed checklist on 'materials

Table 3 Results of the validity questionnaire

	Questions	Mean*
Face validity	I was able to answer all of the questions	
	2.57	
	The instructions were clear and easy to understand	2.31
	The questions were clear and easy to understand	2.36
	The overall questionnaire makes sense	2.02
	The response categories for the questions were adequate	2.38
Content validity	The *sexuality and HIV education to PWD* questionnaire was intended to capture the knowledge and experiences of educators in teaching sexuality and HIV to PWD. The questionnaire captured these elements	2.53
	The instrument included important items that are necessary to describe how I view teaching sexuality and HIV to people with a disability	2.46
	The instrument included items that were repetitive or redundant**	3.15
	There were items missing in this questionnaire that should be included**	3.40
	Some of the questions seemed out of order**	2.72
	I was able to find my answer in the list of possible answers to the questions	2.83
Ease of usage	I felt uncomfortable answering some of the questions because I did not want to have anyone know my answer**	2.80
	I felt that the questions made me think about things that I would have preferred not to have thought about**	3.54
	The questionnaire took too long for me to complete**	3.04
	The survey required too much effort to complete**	3.04
	This questionnaire is useful in describing the experience of teaching sexuality and HIV to people with a disability	2.43

* Response format

** Items were reverse-coded before being analysed

5-point scale (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree

and professional preparation' was designed as a checklist and not a constant scale. Hence, a reliability test was not appropriate.

Upon examination of the inter-item correlation matrix of each scale it became clear that some items caused the low alpha due to their negative correlation within the scales. After excluding these items from the scales, with the exception of the 'knowledge' scale, the reliability of the scale improved into an acceptable range. The results of the initial reliability results and the improved alpha scores can be compared in the following Table 4.

Discussion

The TSE-Q was designed to assess the needs and experiences of educators who teach sexuality education to learners with disabilities in South Africa. As far as is known, the TSE-Q is the first of its kind in Africa in terms of being based on a conceptual framework and being culturally validated. With this it provides a first attempt to professionalise the investigation around challenges of sexuality education for teachers of learners with disabilities in Africa. Being African-based, this investigation had to tackle issues of scale development, cultural adjustment and acceptability simultaneously. The theory of planned behavior provided a useful guiding tool in the development of the questionnaire, particularly with regard to identifying relevant scales from other surveys. However, the study experienced particular challenges in identifying strong scales related to knowledge. The cultural validation framework from Herdman and Fox-Rushby [25] provided a useful framework in order to prompt different concepts of equivalence and to choose the right tools for investigation. The approaches chosen in this paper as well as the challenges experienced by the authors can therefore be seen as important pointers for future disability research in Africa.

The validation in this study involved a careful act of weighting theory and expert opinion. For instance teachers in the FGD held strong opinions in regards to the teaching beliefs scales. They experienced these as not necessary as they felt teachers' beliefs are not allowed to interfere with the obligations from the departmental curriculum. However, the theory of planned behavior emphasised a strong possible link between beliefs/attitudes and behavior, which encouraged the authors to maintain the inclusion of this scale. This seems to have been a good choice as the results from the pilot have shown the beliefs of this group of teachers were strongly associated to teaching behavior [17]. However, in most cases expert opinion of the FGD helped in simplifying the questionnaire by addressing issues around time, content, face validity and ease of usage. The validation pointed towards the appropriate language (English), opportunities for simplifying and shortening the questionnaire through changing the layout and arrangement of questions (combination of belief and practice scale) and the identification of redundant items or items that needed rephrasing to be understood and culturally acceptable.

The study identified inconsistencies of scales and items that did not fit into a scale. For instance most 'Knowledge' scales did not get much criticism during the educational expert interview and FGD, yet they scored low on internal consistency and most of them could not be adapted enough to achieve acceptable reliability scores. As a result these scales will need to be developed further. Through further analysis of the disability and sexuality scales the authors assumed that some of these scales were too long-winded while others were misleading in the way that two answers could have been appropriate. Hence, these scales should be rewritten to simpler, less ambiguous items and retested.

Table 4 Reliability test and Cronbach's alpha of scales

Variable	Number of items	Adapted from previous studies	Original reliability alphas	Alpha after cultural adjustments
Teachers' knowledge (sum of 6 sub-scales)				
HIV clinical diagnosis and characteristics	7	No	$\alpha = 0.06$	$\alpha = 0.17$
HIV transmissions	6	No	$\alpha = 0.46$	$\alpha = 0.47$
Condoms	7	No	$\alpha = 0.58$	$\alpha = 0.65$
HIV spread and cure	5	No	$\alpha = 0.30$	$\alpha = 0.55$
HIV prevention	4	No	$\alpha = 0.41$	$\alpha = 0.41$
Disability and sexuality	6	n/a	$\alpha = -0.05$	$\alpha = 0.41$
Sexuality of PWD compared to people without disabilities	5	n/a	$\alpha = -0.11$	$\alpha = 0.04$
Beliefs in teaching sexuality education (sum of 5 sub-scales)				
Human development	5	Yes	$\alpha = 0.52$	$\alpha = 0.85$
Relationships	6	Yes	$\alpha = 0.62$	$\alpha = 0.84$
Personal skills	6	Yes	$\alpha = 0.60$	$\alpha = 0.84$
Sexual behavior	7	Yes	$\alpha = 0.41$	$\alpha = 0.86$
Sexual health	5	Yes	$\alpha = 0.66$	$\alpha = 0.72$
Practices in teaching sexuality education (sum of 5 sub-scales)				
Human development	5	Yes	$\alpha = 0.92$	$\alpha = 0.86$
Relationships	6	Yes	$\alpha = 0.96$	$\alpha = 0.80$
Personal skills	6	Yes	$\alpha = 0.98$	$\alpha = 0.80$
Sexual behavior	7	Yes	$\alpha = 0.96$	$\alpha = 0.86$
Sexual health	5	Yes	$\alpha = 0.96$	$\alpha = 0.80$
Perceived subjective norms	5	No	$\alpha = 0.52$	$\alpha = 0.84$
Self-efficacy and confidence	14	Yes	$\alpha = 0.92$	$\alpha = 0.91$
Material and professional preparation	10	n/a	n/a	n/a

For all the other scales it was possible to adjust the questionnaire in such a manner that good internal consistency could be achieved. According to Field [30] the strength of the scale might be improved by adding to or deleting items from the scale. The analysis of the teaching beliefs and practices scales showed initially that the teaching beliefs scales scored substantially lower on internal consistency than those of teaching practices. However, the reliability of the teaching beliefs scales was improved through omitting items and then adjusting the practice scale as well.

The scale on perceived subjective norms, which originally scored low on internal consistency, was improved through excluding one item. However as suggested in the focus group the perceived subjective norms of parents were added to this scale in order to improve the questionnaire.

The investigation provided important linguistic pointers. Teachers had strong beliefs that in a country like South Africa, where English is a medium of instruction at higher educational institutions, questionnaires for teachers do not need to be translated. Indeed in the pilot teachers did not experience any challenges with the language. Challenges around wording were addressed prior to the piloting of the questionnaire. Hence, with the exception of the disability scales, no new linguistic adjustments were necessary after the pilot.

There are some limitations to this study. Because of the large number of questions in the TSE-Q, it became challenging to link the feedback in regards to the length of the questionnaire to specific items on the questionnaire – the questionnaire was often discussed in more general terms. The authors have changed the layout of the questions in regards to beliefs and practice to save time and change the appearance of repetition. However, after the pilot teachers still felt that there was some room for shortening the questionnaire. Further adjusting the questionnaire might ameliorate this. In addition, the sample size of this study was relatively small. After further development this questionnaire should be retested with a larger number of participants.

Conclusion

The TSE-Q in its current form is a culturally sensible and acceptable tool that can investigate teachers' attitudes, practice, self-efficacy and perceived subjective norms. It falls short in determining teachers' knowledge and the scales associated with it require re-development. The need for and ways in which the questionnaire can be revised have been highlighted, guided by the reliability results as well as the feedback from the expert interview and group discussion. Following the adaptation of the questionnaire, it can be used to measure the sexuality and HIV education needs and experiences of educators of learners with disabilities.

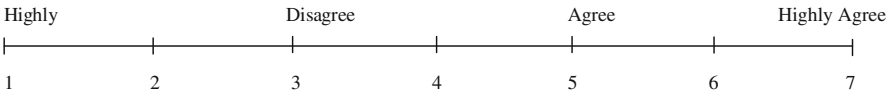
The next steps in this project include the adjustment of the research instrument as well as the design and development of an intervention including a curriculum innovation and toolkit aimed at educators who teach sexuality education in South African special schools. This intervention will be delivered by means of a workshop and will be combined with operational research. The adjusted TSE-Q will be further adjusted and used for this investigation. Thereafter, it is envisioned to use the TSE-Q with a larger sample of educators.

Appendix: Validity Questionnaire adapted from Rowe and Oxman [31] and O'Brien [26]

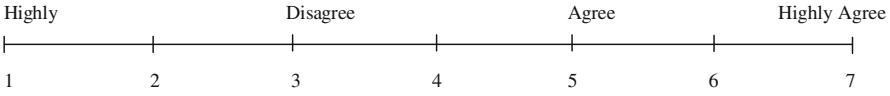
You have just completed the *sexuality and HIV education to people with disabilities* questionnaire. The goal of the questionnaire is to describe the knowledge, confidence, attitude and practice of educators teaching sexuality and HIV lessons to PWD. We would like to get your feedback on its use. Please circle the most appropriate numeric answer on the scale in response to each of the following statements pertaining to the *sexuality and HIV education to children with disabilities* questionnaire.

Face Validity

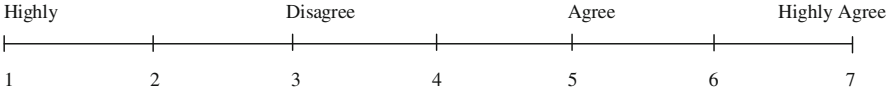
1. I was able to answer all of the questions.



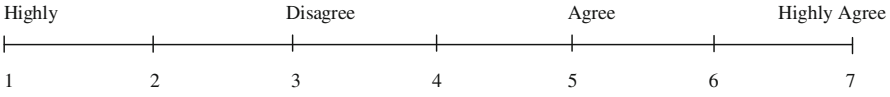
2. The instructions were clear and easy to understand.



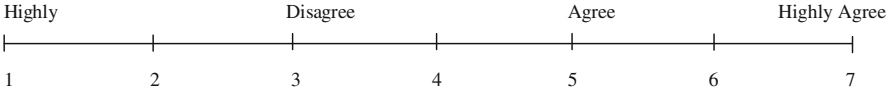
3. The questions were clear and easy to understand.



4. The overall questionnaire makes sense.

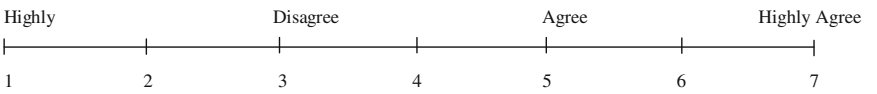


5. The response categories for the questions were adequate.

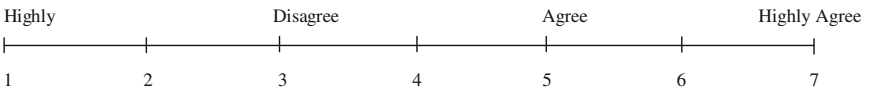


Content Validity

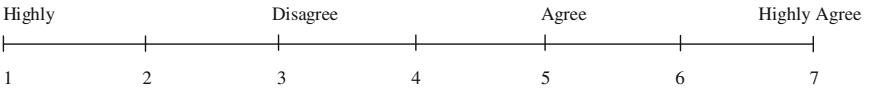
6. The *sexuality and HIV education to people with disabilities* questionnaire was intended to capture the knowledge and experiences of educators in teaching sexuality and HIV to people with disabilities. The questionnaire captured these elements:



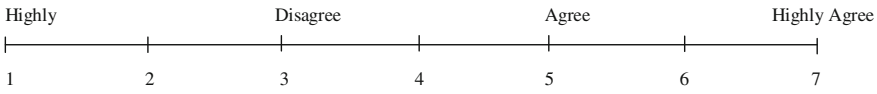
7. The instrument included important items that are necessary to describe how I view teaching sexuality and HIV to people with a disability.



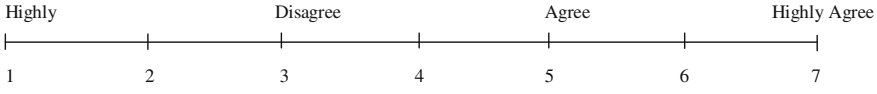
8. The instrument included items that were repetitive or redundant.*



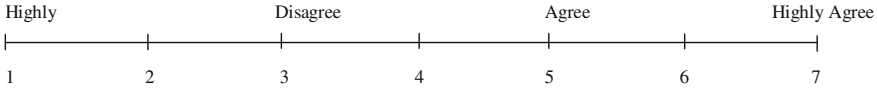
9. There were items missing in this questionnaire that should be included.*



10. Some of the questions seemed out of order.*

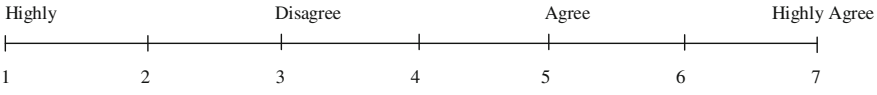


11. I was able to find my answer in the list of possible answers to the questions

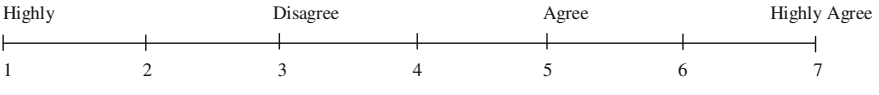


Ease of Usage

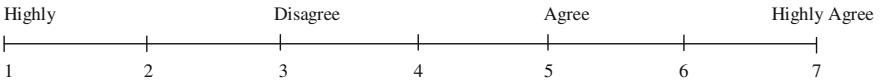
12. I felt uncomfortable answering some of the questions because I did not want to have anyone know my answer.*



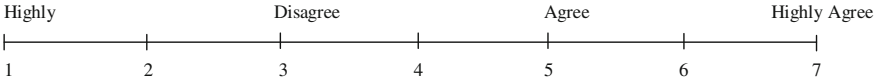
13. I felt that the questions made me think about things that I would have preferred not to have thought about.*



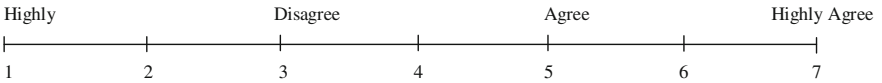
14. I felt that answering the questions helped me in some way.



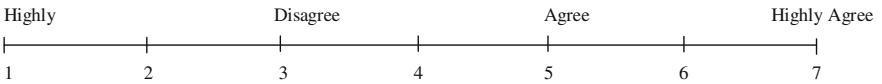
15. The questionnaire took too long for me to complete.*



16. The survey required too much effort to complete.*



17. This questionnaire is useful in describing the experience of teaching sexuality and HIV to people with a disability.



*items reversed scored.

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