



ISSN: 2617-6548

URL: [www.ijirss.com](http://www.ijirss.com)



## Knowledge, attitude, and self-efficacy of pre-service teachers in response to sexuality education to children

Yumo Ding<sup>1\*</sup>, Kamariah Abu Bakar<sup>2</sup>, Nurul Khairani Ismail<sup>3</sup>

<sup>1,2,3</sup>Universiti Kebangsaan Malaysia, Bangi 43600, Malaysia.

Corresponding author: Yumo Ding (Email: [p121482@siswa.ukm.edu.my](mailto:p121482@siswa.ukm.edu.my))

### Abstract

Sexuality education plays a crucial role in promoting individual sexual well-being and social welfare. However, teachers' understanding of and engagement in sexuality education are still insufficiently studied, especially in the Chinese cultural context. The present study aimed to explore pre-service teachers' knowledge, attitudes, and self-efficacy regarding children's sexuality education and bridge the existing research gap with empirical data. A quantitative research method was employed to gather data from 458 pre-service teachers in China through an online questionnaire, and the data were analyzed through descriptive statistical analysis and PLS-SEM. The findings indicated that while many pre-service teachers had relatively positive attitudes towards children's sexuality education and expressed moderate to high levels of self-efficacy in teaching school-based sexuality education, they showed significant weaknesses in their knowledge of sexuality education with overall poor knowledge levels. Furthermore, the study found that there were significant positive effects of participants' knowledge on attitudes, attitudes on self-efficacy, and knowledge on self-efficacy. The study emphasizes the necessity of systematic training for pre-service teachers at the higher educational level to facilitate the effective implementation of school-based sexuality education by raising teachers' understanding of sexuality-related topics and improving their attitudes toward sexuality education. Future studies are proposed to further address the interaction of multiple influencing factors, adopt a mixed research approach, investigate longitudinal influences, and make cross-cultural comparisons to construct a more comprehensive framework. Such findings have yielded valuable insights for policymakers and educators to formulate and develop a more effective framework for sexuality education.

**Keywords:** Attitude, Knowledge, Pre-service Teacher, Self-Efficacy, Sexuality Education.

**DOI:** 10.53894/ijirss.v8i3.6844

**Funding:** This study received no specific financial support.

**History:** Received: 25 April 2025 / Revised: 28 April 2025 / Accepted: 2 May 2025 / Published: 7 May 2025

**Copyright:** © 2025 by the authors. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

**Competing Interests:** The authors declare that they have no competing interests.

**Authors' Contributions:** All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

**Transparency:** The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

**Acknowledgement:** I would like to express my sincerest gratitude to my supervisors, Dr. Kamariah Abu Bakar and Dr. Nurul Khairani Ismail, for their priceless guidance, patience, and encouragement during the process of my research. Their profound expertise and insightful feedback have been instrumental in improving my research and academic skills. In addition, as this paper is part of my doctoral

thesis, I would also like to extend my deepest appreciation to Universiti Kebangsaan Malaysia as well as the Faculty of Education for providing me with a stimulating academic environment and the necessary resources to complete this work.

**Publisher:** Innovative Research Publishing

## 1. Introduction

Sexuality education refers to the delivery of age-appropriate, culturally relevant knowledge about sexuality and human relationships through the provision of scientifically accurate, factual and unbiased information [1]. As a vital public health and social development measure, sexuality education not only enhances an individual's sexual health literacy and sense of self-protection but also effectively decreases the health risks and social issues caused by a shortage of sexual knowledge [2, 3]. Globally, sexual violence, sexual abuse, sexually transmitted diseases, underage pregnancy, unsafe abortion, discrimination against the LGBTI community, gender inequality and other issues are becoming increasingly serious, which has led to the popularization and quality enhancement of sexuality education becoming a highly topical issue for the international community [1, 4, 5]. These issues are similarly severe in Chinese society.

As an example, the prevalence of child sexual abuse in China is as high as 18.2%, which is far exceeding the international average, and the age of the victims is gradually decreasing, with the youngest being as young as 2 years old [6, 7]. Social stigmas, cultural barriers, and inadequate policies may result in an actual incidence rate much higher than the official statistics. Not only are approximately 70% of adults unaware of how to recognize, confront, and cope with child sexual abuse, but also children in China do not have the knowledge base and critical ability to be aware of abusive behaviour and therefore fail to report the incident and are unable to seek appropriate and professional help [7, 8]. The occurrence of sexual abuse is intimately related to a lack of knowledge, and the introduction of sexuality education in the school curriculum could empower children with the knowledge and skills to identify and recognize sexual abuse and respond to the signs of its existence [1, 3, 9]. Meanwhile, the issues of gender stereotyping and gender inequality are also widespread in early years education in China. Not only do gender stereotypes and traditional gender norms persist in China's early childhood education, which affect teachers' unconsciously guiding children to form personalities conforming to societal gender expectations in their daily teaching, but also face a severe gender imbalance among educators [10-12]. Evidence suggests that children are capable of recognizing and being able to apply gender biases and stereotypes, while inappropriate information and misconceptions about sexuality education might further limit the diversity of gender role models and potentially affect children's gender perceptions [11, 13]. Thus, the systematic promotion of school sexuality education has the potential benefit of helping children establish correct gender perceptions and promoting gender equality, in addition to boosting the overall gender awareness of the society [1, 3, 14].

Multiple studies have shown that starting sexuality education from childhood is effective in reducing sexual abuse, increasing gender cognition, avoiding unwanted pregnancies and unsafe abortions during youth, as well as decreasing sexually transmitted diseases [15-17]. Against this background, the authors argue that the promotion and implementation of comprehensive sexuality education within China has become a pressing mission. While China's localized adaptation of UNESCO's International Technical Guidance on Sexuality Education in 2022 with the support of UNESCO (Comprehensive Sexuality Education Technical Guidelines - Adaptation of Global Standards for Potential Use in China (First Edition)), which incorporates China's laws, policies, cultural contexts and unique national conditions to systematize the development of sexuality education in China [18] as well as revised legislation at the early childhood education stage (the 2020 version of the Law of the People's Republic of China on the Protection of Minors) that explicitly emphasizes "schools and kindergartens should provide age-appropriate sex education for minors and improve their awareness and ability to protect themselves against sexual abuse and harassment" [19] there are still struggles in moving forward with the implementation of sexuality education in schools, especially in the building of professional teams.

Professional competence and quality of the educators play an absolute role in the outcome of school-based comprehensive sexuality education. An educator's own awareness of the necessity of sexuality education and the attention they pay to the topic dramatically affects their ability and willingness to carry out sexuality education effectively and to guide personal development correctly. In China, not only is there an absence of professionally trained sexuality education specialists and educators in schools, but there is also insufficient sexuality education in teacher training curricula, nor comprehensive sexuality education programs designed for childhood education [20-22]. Since it is not mandatory in the Chinese education system to introduce and deliver sexuality education subjects as an independent discipline at any stage of education, it is obvious that, as a non-primary component of the educational framework, sexuality education has been given less attention than it should have been in most of the pre-school program's curriculums developed by the Chinese education authorities and universities [1, 23].

A recent study notes that more than half of teachers in China have not received any form of systematic training in sexuality education [22, 24], leaving them ill-equipped to conduct sexuality education. In addition, due to the deep-rooted cultural influences passed down from China's long and rich history, many people still have a strong sense of social stigmatization on sex-related topics, making it a great challenge to provide comprehensive sexuality education that addresses the diverse needs of children [15, 25]. Parents and teachers as two important parties in childhood education and teachers are expected to be more knowledgeable and skilled to better communicate effectively with children's parents. The collaborative educational efforts of parents and teachers would encourage children to have a sound understanding of sexuality and establish proper sexual values. Thus, programs targeting teachers are essential for the successful implementation of sexuality education.

Being teacher-preparatory, the systematic training in sexuality education that teachers could receive during the higher education stage would not only enable them to carry out sexuality education more scientifically in their future professions but would also assist them in formulating a more liberal and positive educational attitude. Hence, understanding the knowledge, attitudes, and self-efficacy of Chinese early childhood educators in sexuality education provides not only a useful insight for assessing the status of sexuality education implementation but also a scientific foundation for future development of better teacher training and policy interventions. Thus, the study aims to explore pre-service teachers' knowledge of and attitudes towards sexuality education and their teaching self-efficacy in sexuality education, as well as the relationships between them, with a view to promoting the sustainable development of Chinese sexuality education for children by enhancing teachers' professionalism.

## **2. Methodology**

### **2.1. Participants**

Grounded in the positivism that emphasizes the use of empirical observation and the scientific approach to obtaining knowledge [26, 27] this research employed a quantitative research methodology as it allows for the numerical testing of pre-service teachers' knowledge, attitudes, and self-efficacy regarding sexuality education through the investigation of the relationships between variables [28]. To clarify, the target population of pre-service teachers in this study is defined as those who are majoring in pre-school education at a public higher education institution accredited with a college or bachelor's degree. The study sampled tertiary institutions in two cities, Dandong, Liaoning Province, and Ganzhou City, Jiangxi Province, in China. Reasons for choosing these two cities can be categorized as geographic location, educational policies, local government support, and cultural characteristics. The selection criteria of schools included: a) being registered with the Chinese Ministry of Education; b) being comprehensive, full-time, public higher education institutions; and c) having a pre-school program that had been offered for more than four years (ensuring that each grade level has students).

The cluster sampling technique was applied to this study since universities and colleges in China randomly assign students to classes during enrollment according to the school's own standards, which are generally fixed and remain constant from admission to graduation. The inclusion criteria for participants in this study were as follows: a) being Chinese; b) being an adult aged 18 years or older; c) being a student currently attending a pre-school education program at a public institution of higher education with an accredited college or university degree; and d) being a voluntary participant in this study. The minimum sample size was calculated to be 385 for this study based on Cochran's formula [29]. Taking into account the return rate of the online questionnaires, the researchers sent out invitations for filling out the questionnaires randomly to all students of fourteen classes as a way of avoiding the eventual valid data capable of analysis being less than the minimum sample size. A total of 497 questionnaires were received, with 458 valid responses.

### **2.2. Measurement**

The authors finalized the instrument, building on previous scales and the extensive research literature. The 69 questions were divided into four sections: socio-demographics; knowledge of sexuality education; attitudes toward sexuality education; and self-efficacy in teaching sexuality education. The first section of the questionnaire requested socio-demographic information containing general information on age, gender, year of attendance, race, religion, marital status, and whether or not they had received school-based sexuality education.

#### **2.2.1. Pre-Service Teachers' Knowledge**

Respondents' knowledge of sexuality education was evaluated with the Sexuality Knowledge Scale. There are 24 questions in six constructs of the scale (Cronbach's  $\alpha = .932$ ). Topics are mainly derived from the facts shown in the UNESCO ITGSE and guidance from additional relevant literature [1, 30]. The six constructs are: Sexuality Education, Values Rights and Culture, Understanding Gender, Staying Safe and Keeping Wellbeing, Human Body Development, Sexual Behaviour and Reproductive Health. There are three options (correct, incorrect, not sure) for all items.

#### **2.2.2. Pre-Service Teachers' Attitude**

An Attitude toward Sexuality Education Scale was used to monitor respondents' attitudes toward sexuality education. It was primarily adapted based on an adaptation of the questionnaire, Teachers' Attitude and Comfort Scale (TACS), which was developed by Perez et al. [31] for measuring teachers' attitudes and their comfort level toward delivering sexuality education to youth [31]. There are four components of the scale: concerns about sexuality education in schools, comfortableness with sexuality teaching, sexual values, and concerns of educational agents. Considering the study context, the dimensions and items were rewritten or rephrased to better fit the objective, and a few items have been added (e.g. 'School sexuality education should be obligatory for pre-service students enrolling in educational program.'; 'School sex education should not be incorporated with parents.'; and 'It is valuable to start talking openly about sexuality in early childhood'). It is a 5-point Likert scale (1 = Strongly Disagree, 2 = Somewhat Disagree, 3 = Neutral, 4 = Somewhat Agree, and 5 = Strongly Agree) with 18 questions. The internal reliability of this scale was up to standard (Cronbach's  $\alpha = .964$ ).

#### **2.2.3. Pre-Service Teachers' Self-Efficacy**

The Sexuality Teaching Self-Efficacy Scale was utilized to gauge perceived confidence in teaching children about sexuality education in the future. Drawing on Bandura's Teacher Self-Efficacy Scale, it was modified, rewritten, and integrated based on the conceptual framework and the Chinese context [32]. It contains 16 items covering four dimensions of communication skills, professional capabilities, environmental management, and instructional strategies on a 5-point

Likert scale (1 = very unconfident, 2 = somewhat unconfident, 3 = average, 4 = somewhat confident, 5 = very confident). The internal reliability of this scale met the criteria (Cronbach's  $\alpha = 0.933$ ).

### 2.3. Data Collection Procedure

Considering the adaptation of the instrument in this study, the authors conducted a pilot test by pretesting the questionnaire with 99 pre-service teachers prior to the official data collection. Several minor changes were made in response to the feedback from this process. After meeting the standards of reliability and validity, a formal release of the questionnaire to the target group was conducted through an online survey platform for data collection. The invitation link was valid for 14 days, implying that the invitees could fill in the questionnaire only within 14 days. The authors placed a separate page prior to the commencement of the survey which explained participants' rights, anonymity, confidentiality, and data management, and also stated that they could cease and withdraw from answering the questionnaire at any time if they no longer wanted to take part. To ensure the validity of the collected data, participants were required to click on the agree button to the consent form; otherwise, they were not eligible to fill out the questionnaire.

### 2.4. Data Analysis

The data analysis was performed using three software programs, Excel, SPSS 29.0, and Smart PLS 4.1.0. Descriptive statistics were used to determine the demographics of the sample and the response rate to the questions. PLS-SEM was employed for building the mediation model and testing the hypotheses.

## 3. Results

There are five parts to the results section. The first provides a basic description of the demographic information. Next, information about pre-service teachers' level of knowledge regarding sexuality education and the related topics covered is provided. Moreover, information is given regarding how pre-service teachers think about sexuality education. It also offers insights into how much confidence pre-service teachers have in themselves to handle the sexuality education program. Lastly, the way in which pre-service teachers' attitudes mediate their knowledge mastery levels and self-efficacy is also considered.

There were 426 females (93.01%) and 32 males (6.99%) pre-service teachers involved in the survey. Their mean age was 19.5. The proportion of participants from Ganzhou City and Dandong City were 61.35% and 38.65%, respectively. The main age group of the respondents was from 19-21 years old, which involved 343 individuals. Around 60% of the respondents were sophomores (270), followed by freshmen (108), juniors (64), and seniors (16). The results revealed that pre-service teachers expressed a strong desire to receive something formal about sex-related knowledge at the tertiary level, of which 416 (90.83%) of them referred to the expectation of receiving proper and scientific instruction about sexuality. It reflects their high level of demand. The information is shown in Table 1.

**Table 1.**  
Socio-Demographic Information

Category	Profile	Frequency	Percentage (%)
			(N=458)
Location	Jiangxi	177	38.65
	Liaoning	281	61.35
Gender	Male	32	6.99
	Female	426	93.01
Age	16-18	97	21.18
	19-21	343	74.89
	22+	18	3.28
Ethnicity	Han	385	84.06
	Zang	28	6.11
	Zhuang	24	5.24
	Others	21	4.33
Year of Study	Freshman	108	23.58
	Sophomores	270	58.95
	Junior	64	13.97
	Senior	16	3.49
Willingness to Learn Sexuality	Yes	416	90.83
	No	42	9.17
Experience of being taught about sexual-related information	Yes	304	66.38
	No	154	33.62

The frequency of responses to the question "Which of the following components have you been taught in school?" is shown in Table 2. A total of 304 participants responded that they had experienced sex-related knowledge in school, of which only three topics, Puberty and Adolescent Development, Self-Protection and Communication Skills, were penetrated more than half of the responses, with 90.13%, 65.46%, and 53.62%, respectively. The four least selected topics were Abstinence,

Access to Reproductive Health Services, LGBTQIA+ Community, and Media Influences on Sexuality, with only 18, 23, 23, and 27 participants, respectively, choosing these items.

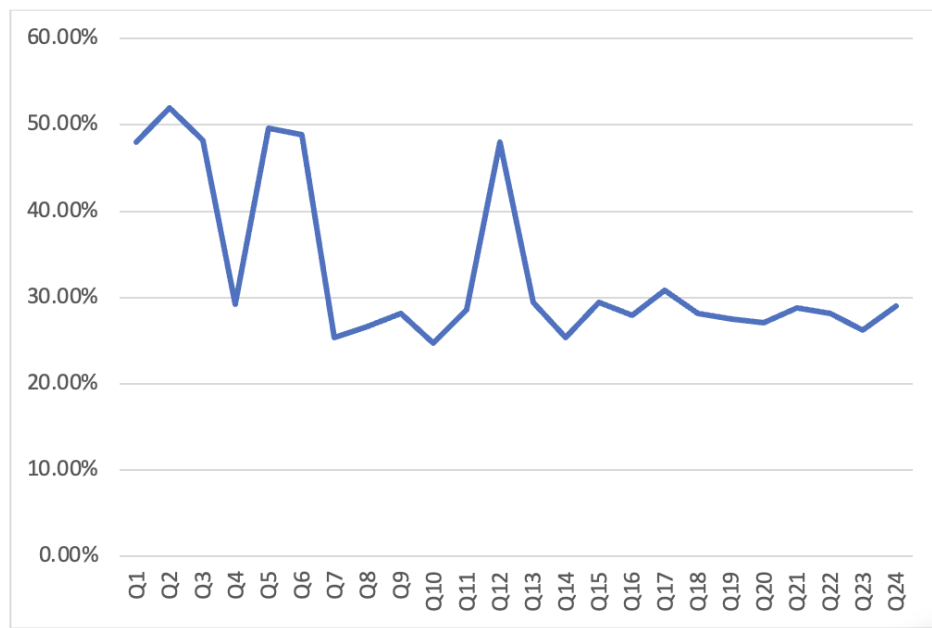
**Table 2.**  
Involved Topics from Schools.

Items	Response		Penetration rate (N = 304)
	N	%	
Anatomy and Physiology	127	7.89	41.78
Puberty and Adolescent Development	274	17.02	90.13
Contraception	104	6.46	34.21
Communication Skills	163	10.12	53.62
Sexual Assault / Sexual Abuse / Sexual Violence	83	5.16	27.3
Self-Protection	199	12.36	65.46
Individual Sexuality Rights	117	7.27	38.49
Understanding Own Personal Values about Sexual Relationships	104	6.46	34.21
How to Decide if You Are Ready to Have Sex	50	3.11	16.45
Understand Gender	112	6.96	36.84
LGBTQIA+ Community	23	1.43	7.57
Media's Influence on Sexuality	27	1.68	8.88
Pregnancy, Reproduction, and Abortion	52	3.23	17.11
Sexually Transmitted Infections (STIs) and HIV	134	8.32	44.08
Where to Seek Reproductive Health Services	23	1.43	7.57
Abstinence from Sexual Activity	18	1.12	5.92

### 3.1. Pre-Service Teachers' Knowledge

Results indicated that there was a weakness in the participants' knowledge of school-based sexuality education and knowledge related to sexual behaviors and reproductive health, especially in terms of the concept of sexuality education, the age of applicability, and whether and how to provide young children with knowledge about reproductive health. While over half of the respondents were mindful of the importance of cultural sensitivity in sexuality education, their interpretation of human rights and sexual values expressed considerable hesitation and uncertainty. For example, about two-thirds of respondents were unsure or gave incorrect answers to the question "Sexuality values and human rights should not be covered in early childhood sexuality education." It was also found that nearly 70% of the respondents had misconceptions and uncertainties about the content of knowledge on safety and well-being (67.79%) and human body development (66.54%). The correct response rate for items on gender cognition and equality was also unsatisfactory, such as only 28.17% opted for the correct answer to the question "Most children are able to tell the difference between males and females by the age of two."

From the distribution of the overall percentage of correct answers, many of the items had a concentration of 25% to 30%, reflecting a poor overall performance (Figure 1). Most respondents tended to either choose "not sure" (score of 1) or provide incorrect answers (score of 0), representing not only a weak level of knowledge about sexuality education, but also a failure to have a clear understanding of certain core concepts and facts. The finding is consistent with previous research that pre-service teachers generally have deficiencies in their knowledge of sexuality education and hold ambiguous views on certain topics [33-36] but is in contrary with the study conducted by Ademuyiwa et al. [37] in Nigeria.

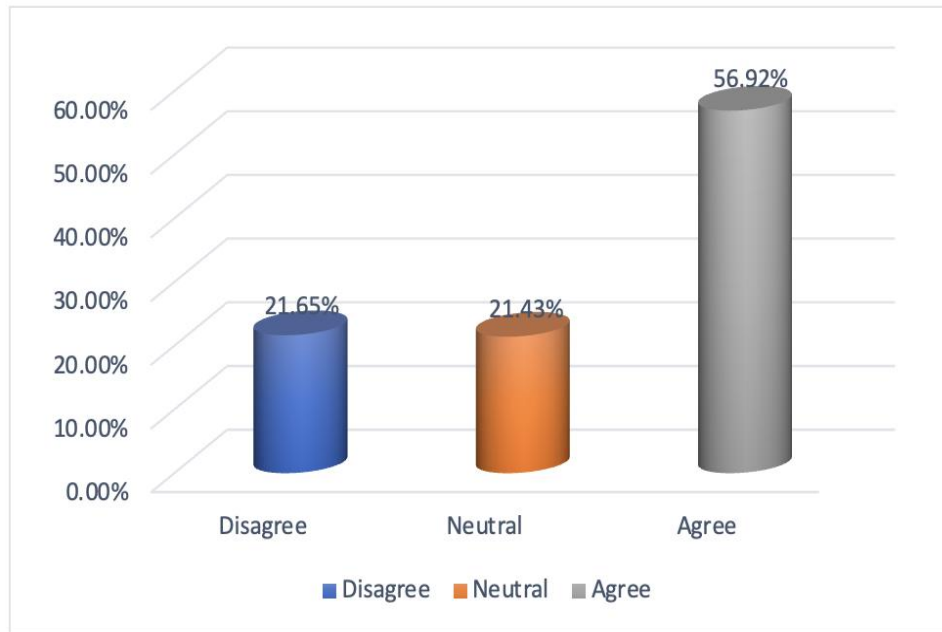


**Figure 1.**  
Respondents' Correct Responses Rate on Knowledge Questions.

### 3.2. Pre-Service Teachers' Attitude

Regarding the acceptance of discussing sex-related topics in the classroom or school context, the results showed only about one fourth (27.07%) of the respondents agreed for such topics to be covered in the school or classroom, whereas 55.59% of them were explicitly opposed to the introduction of sexuality education in the school. Though a number of respondents believed in the educational value of openly talking about sexuality from an early age, over half of those surveyed remained reserved or even negative in their attitudes toward sexuality education for children, arguing that passing on sexuality knowledge to children would make them feel embarrassed and uncomfortable, in addition to a 60.48% of them mentioning of talking about sexuality itself as a difficult task for them. Notwithstanding their negative feelings about giving information about sexuality, around 60% of the respondents indicated a strong willingness to receive relevant training and considered themselves personally in high demand for more knowledge about sexuality and adequate instruction on how to implement appropriate sexuality education in school settings.

The overall distribution of respondents' ratings on this attitude scale (Figure 2) showed that they had relatively positive attitudes toward children's sexuality education ( $M = 3.48$ ,  $SD = 0.80$ ). The result is consistent with the findings of some of the previous studies [38, 39]. While there were still some who perceived it as embarrassing and uncomfortable to discuss sexuality with children, in general, a trend towards more open and positive attitudes towards children's sexuality education was noted among the pre-service teachers. However, on certain specific topics, the results of this study diverged from previous research. For instance, while previous studies pointed out that parents and teachers should work together and share the responsibility for children's sexuality education [40] our findings suggested that approximately 60% of the respondents agreed either parents ought to take the main responsibility for children's sexuality education or that experts in various fields, such as doctors, nurses, psychologists, and sexuality education specialists, should be invited to conduct school-based sexuality education, which has nothing to do with general teachers. Such tendency to shift responsibility mirrors the avoidance mentality of pre-service teachers on the topic of sexuality education, in that they may lack sufficient knowledge reserves or be resistant to sexuality education, which further emphasizes the need to strengthen training related to sexuality education in the process of preparing teachers, to help pre-service teachers correctly understand the importance of children's sexuality education and boost their willingness and capacity to shoulder the responsibility of sexuality education in their teaching practice.

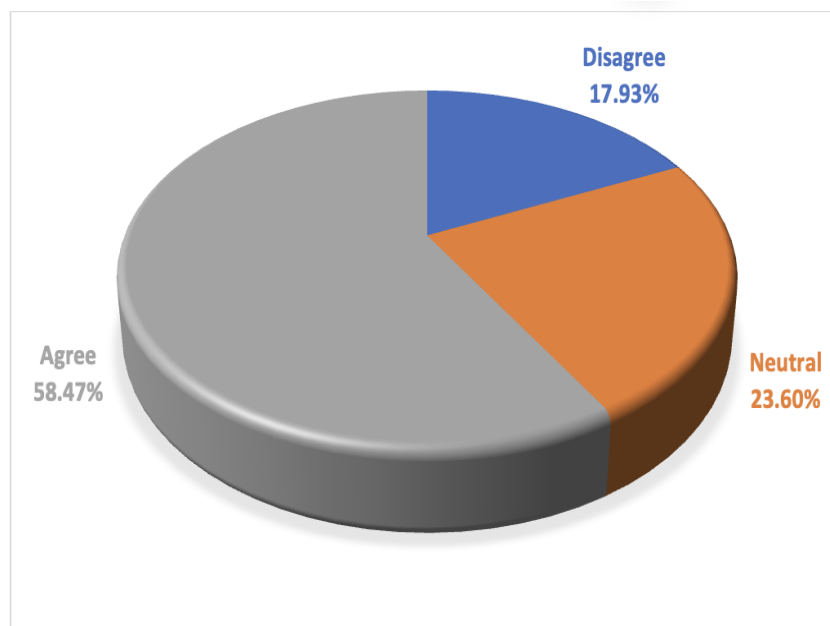


**Figure 2.**  
Respondents' Attitudes toward Sexuality Education.

### 3.3. Pre-Service Teachers' Self-Efficacy

On communication skills with parents, students and colleagues, the majority of respondents demonstrated a high level of self-confidence and ability to effectively communicate on sexuality education issues. Roughly 60% of the respondents felt that they were able to establish sound communication with parents and were able to adequately explain sensitive topics of sexuality to children. Though some two-thirds of them expressed high confidence in their ability to overcome challenges and satisfactorily complete most tasks related to sexuality education as well as to foster favourable learning environments for children's sexuality education so as to sustain the school being the safe place for children to express their feelings, about one-quarter of them still raised worries about their limited competence in carrying out the curriculum arrangements for sexuality education (e.g., unable to obtain the necessary materials and equipment for delivering school-based sexuality education).

Generally speaking, respondents had a high level of confidence in their ability to provide sexuality education teaching (Figure 3), their self-efficacy was at a moderately high level, and respondents' perceptions and self-evaluations in this regard exhibited a high degree of consistency ( $M=3.54$ ,  $SD=0.68$ ). The finding suggested that pre-service teachers had a strong sense of subjective competence in teaching sexuality education and perceived themselves as capable of performing relevant teaching activities with a high degree of self-confidence.



**Figure 3.**  
Respondents' Self-Efficacy in Teaching Sexuality.



### 3.4. Relationships between Knowledge, Attitude, and Self-Efficacy

This study used SmartPLS 4.1.0 to analyse and illustrate the hypothesized path of the study. To begin with, the authors determined the goodness of model fit through observing the explanatory power of the endogenous variables, that is, the  $R^2$  [41]. The R-squared data of the 14 variables of the three second-order dimensions of knowledge, attitude, and self-efficacy ranged from 0.5 to 0.844, which indicated a good model data fit. Additionally,  $Q^2$  was employed to measure model predictive relevance [41]. The Q-square of each variable in this study is greater than 0, which means that all endogenous variables in the model have a strong predictive relevance and the model performs well in explaining and predicting these endogenous variables. The fit indicators were all within the standard range, resulting in a well-fitted model.

On the analysis of the relationship between the variables, the results are: 1) there is significant positive influence of knowledge on attitude, which means that the higher the sexuality knowledge level of pre-service teachers, the more positive the attitude they have; 2) there is significant positive influence of attitude on self-efficacy, which means that the more positive the attitude towards sexuality education pre-service teachers hold, the higher the self-efficacy in teaching sexuality education; 3) there is significant positive influence of knowledge on self-efficacy, which means that the higher the sexuality knowledge level of pre-service teachers, the higher the pre-service teacher's self-efficacy in teaching sexuality education. Details of the relationship between the different paths in the model are shown in the following table (Table 3).

**Table 3.**  
Pathway Results.

	Original sample (O)	2.50%	97.50%	T statistics	P values
Knowledge → Attitude	0.358	0.270	0.441	8.267	< 0.001
Attitude → Self-Efficacy	0.462	0.379	0.539	11.483	< 0.001
Knowledge → Self-Efficacy	0.217	0.140	0.298	5.401	< 0.001

## 4. Discussions

This finding suggested that there is a serious gap in the mastery of sex-related knowledge and facts among the participants, which may directly affect their capacity to educate and make decisions about sex-related issues in their future teaching practice. Previous research has shown that teachers' knowledge level of sexuality directly impacts the quality of the information delivered in the classroom [42]. If pre-service teachers, for example, failed to accurately recognize and respond to sensitive incidents such as child sexual abuse, their professionalism and effectiveness in school-based sexuality education would be seriously constrained, and might have even undesirable consequences. Collectively, the overall fairly weak mean scores revealed in this study, especially the uncertainty on some of the topics, reinforce the need for more and better training on sexuality education for pre-service teachers. More attention should be given in future teacher training to upgrading pre-service teachers' comprehension of core conceptual and practical issues in sexuality education to ensure their competence in making scientific and accurate decisions and guidance in practical teaching and learning environments.

Our findings reveal the paradoxical phenomenon of pre-service teachers' attitudes towards children's sexuality education. On the one hand, though overall relatively open-minded and willing to receive relevant training, on the other hand, many of them still had reservations about sexuality education in the school environment, especially for children. This conflict may be linked to the socio-cultural context and the status of sexuality education in the teacher training system. The taboo nature of socio-cultural debates on sexuality may result in teachers feeling uncomfortable when confronted with the topic of sexuality, and even avoiding related topics [15, 25, 38]. Traditional attitudes might influence teachers' perceptions of attribution of responsibility, with some respondents tending to believe that sexuality education should be the responsibility of families or professionals, which may stem from an absence of a relevant knowledge base that causes a sense of overwhelm when facing students' sexuality-related issues, thereby inclining them to avoid such topics [37, 39].

Although teachers' self-efficacy is one of the most influential factors affecting the quality of education, a failure to match their knowledge base or teaching competence could lead to a diminished effectiveness of teaching [43]. In conjunction with the results of assessing respondents' knowledge levels in this study, the authors argued that there is a need to further explore whether such confidence was built on solid subject matter knowledge and effective pedagogical approaches or perhaps there was some subjective overestimation. If the actual knowledge base and instructional competence of the pre-service teachers failed to match their level of self-efficacy, it might have an adverse effect on the quality of teaching in sexuality education. Besides, respondents' concerns about their incapability to reach insufficient pedagogical resources in this study indicated that the implementation of sexuality education programs still encounters practical challenges, so that schools should provide better educational support, such as training pre-service teachers how to get useful materials and prepare them with the ability to acquire equipment and resources, in order to enhance their teaching ability and the quality of the programs.

Pre-service teacher's knowledge on sexuality was found to be significantly and positively correlated with their attitudes towards sexuality education, suggesting that the better prepared them with sex-related information, the more likely they were to realize the significance and indispensability of school sexuality education in children's developmental process, leading them to adopt more positive attitudes towards it. It is consistent with the previous findings that increased knowledge tends to be accompanied by positive attitudinal changes [37]. Such correlation may stem from the fact that knowledge enrichment empowers individuals to comprehend the necessity of sexuality education in a scientific and objective perspective, thereby minimizing misconceptions or prejudices arising from a deficiency of understanding [1, 3, 16, 17]. When teachers are equipped with advanced knowledge of sexuality, a tendency exists for them to be better prepared with a more objective and scientific understanding of the connotations and importance of sexuality education, resulting in a shift towards more positive and open-minded attitudes. Yet, relying solely on the enhancement of knowledge may not be sufficient to fully ensure a



fundamental change in attitudes. The formation of attitudes is affected by a variety of factors, such as socio-cultural background, personal values and educational environment [44, 45]. Therefore, apart from providing comprehensive knowledge on sexuality education, the pre-service teacher preparation program should also integrate practical teaching, reflective thinking, and value clarification to facilitate further positive attitudinal development.

The significant positive effect of pre-service teachers' sexuality knowledge on their teaching self-efficacy indicates that when pre-service teachers place a higher value on sexuality-related knowledge and fully recognize the value of children's sexuality education, their self-efficacy in teaching sexuality education is correspondingly enhanced. The finding is consistent with Social Cognitive Theory, which states that an individual's knowledge base not only affects his/her cognitive appraisal, but also further acts on the behavioural beliefs and sense of competence [43]. Not only does a teacher's general knowledge of sexuality determine his/her depth of content understanding, but it also shapes his/her confidence in dealing with classroom complexity, in turn contributing to his/her sense of teaching efficacy. Besides, the result also brings to light the significance of knowledge enhancement on sexuality education for pre-service teachers. Past research has shown that systematic training in sexuality education is effective in improving teachers' sexuality knowledge base and promoting their confidence in teaching [46, 47]. An increase in their knowledge may assist pre-service teachers in building stronger self-confidence in their future teaching practices, preparing them to be more willing to take on the responsibility of sexuality education and enabling them to more effectively deliver relevant knowledge to their students. Thus, tertiary institutions are encouraged to strengthen the curriculum related to sexuality education at the pre-service teacher preparation stage and to provide practice-oriented pedagogical training so as to facilitate the simultaneous enhancement of knowledge internalization and teaching confidence.

A significant positive effect of pre-service teachers' attitude towards sexuality education on their teaching self-efficacy suggests that when pre-service teachers have more positive and open attitudes towards sexuality education, their confidence in undertaking the task of teaching sexuality education in schools in the future would increase accordingly, leading to a higher sense of self-efficacy. The finding is consistent with the core concept of Social Cognitive Theory (SCT), which states that an individual's beliefs, attitudes, and behaviours interact with each other to shape their perceived and practiced competence [43]. Findings are also congruent with existing research. For example, it is noted that teachers' self-efficacy has a major impact on their classroom practices, with higher levels of self-confidence typically associated with more positive teaching attitudes and behaviours [48, 49]. Such results underscore the critical role of one's attitudes in promoting his/her self-efficacy and offer practical insights for both teacher training and curriculum design. If pre-service teachers possess a high acceptance of sexuality education, they are likely to be much keener to take the initiative to gain relevant knowledge, engage in teaching practices, and adopt more proactive and effective teaching strategies in future educational scenarios. Therefore, during the pre-service teachers' studying process, in addition to enhancing their professional knowledge and teaching techniques, pre-service teachers should be guided to build up a positive concept of sexuality education during their training process.

## **5. Limitations**

This study presented new insights in revealing the relationship between pre-service teachers' knowledge of and attitudes toward sexuality education and their teaching self-efficacy. Yet, the study still suffers from several limitations necessitating improvements in future research.

Foremost, there was an imbalance in the gender ratio of the study sample, with female participants dominating and a smaller proportion of males. Such an imbalance in gender distribution may limit the generalizability of the study findings to diverse gender groups. In light of the potentially significant influence of gender on educational perceptions and teaching self-efficacy, future studies could enlarge the proportion of the male sample to more comprehensively reveal the underlying impact of gender on the research topic.

Secondly, a cross-sectional study limitation existed as this study was conducted in a cross-sectional setting, the observed associations may have been affected by unmeasured confounding variables, which would call for longitudinal or experimental studies to further validate the causal mechanisms.

Next, the study relied on self-reported data, which possibly introduced self-reporting data bias. Respondents might suffer from the social expectation effect, with a tendency to give more in line with the dominant social values or more idealized answers instead of their real thoughts. For instance, in the Sexuality Teaching Self-Efficacy Scale, pre-service teachers might have overestimated their own abilities due to societal expectations of professional competence in the teaching field. Future studies could integrate methodologies such as interviews or classroom observations to raise data objectivity.

The fourth is that there may be cultural and contextual limitations to the study. China is a vast and culturally diverse country where various social and cultural contexts in different regions are likely to affect pre-service teachers' perceptions and attitudes towards sexuality education. In minority regions with unique cultural backgrounds (e.g., Tibet, Xinjiang), for example, pre-service teachers might be influenced by local cultural and religious traditions, leading to differences in their beliefs about sexuality education from the results of this study. Thus, future research ought to conduct comparative studies for groups with different cultural backgrounds to improve the generalizability of the findings.

Lastly, selection bias may exist in the study that may affect the representativeness of the data. The samples of this study were all from moderately developed cities. In other cases, in large and well-developed cities like Beijing and Shanghai, or in remote areas, these findings may not be generalizable to groups. Therefore, prospective studies should expand the sample source to cover areas of varying development horizons to better generalize the findings.

## 6. Conclusion

For better promotion of effective implementation of sexuality education in the school setting, the education system has to fully recognize the crucial role of pre-service teachers in sexuality education and the possible risks of neglecting their professional development. Our findings demonstrate significant gaps in their knowledge of sexuality education, which affects their attitudes and self-efficacy in teaching it in schools. This underscores the pressing need and urgency of introducing sexuality education into the pre-service teachers' educational curricula framework at the tertiary level, ensuring they are equipped with the necessary expertise and confidence. Meanwhile, collaborative efforts among policymakers, educators, and the community are essential to raise teachers' motivation and professionalism and build a sustainable foundation for high-quality school-based sexuality education.

## References

- [1] U. N. C. s. F. U. N. E. f. G. E. a. t. E. o. W. UNESCO Joint United Nations Programme on HIV/AIDS, and WHO., *International technical guidance on sexuality education: An evidence-informed approach*, 2nd ed. Paris, France: UNESCO. <https://doi.org/10.54675/UQRM6395>, 2018.
- [2] WHO, "Comprehensive sexuality education," Retrieved: <https://www.who.int/news-room/questions-and-answers/item/comprehensive-sexuality-education>. [Accessed Mar. 06, 2025], 2025.
- [3] K. Michielsens and O. Ivanova, *Comprehensive sexuality education: Why is it important?* Brussels: European Union, 2022.
- [4] UNESCO, *The journey towards comprehensive sexuality education: Global status report*. Paris, France: UNESCO, 2021.
- [5] UNESCO, "Comprehensive sexuality education: A global review," Retrieved: <https://unesdoc.unesco.org/ark:/48223/pf00000235707>, 2015.
- [6] G. Fu *et al.*, "Ecological factors associated with child sexual abuse among 15-to 17-year-old adolescents in mainland China: Implications for intervention," *Frontiers in Public Health*, vol. 11, p. 1169669, 2023. <https://doi.org/10.3389/fpubh.2023.1169669>
- [7] China Girls' Protection Fund and Beijing Zhongyi Public Foundation, "China child sexual abuse prevention report (2013-2023)," Retrieved: <https://www.all-in-one.org.cn/newsinfo/6188914.html>. [Accessed Aug. 12, 2024], 2023.
- [8] T. Tian, I. Katz, and X. Shang, "Unveiling child sexual abuse disclosure in China: An ecological exploration of survivors' experiences," *Children*, vol. 11, no. 6, p. 688, 2024. <https://doi.org/10.3390/children11060688>
- [9] Z. R. K. Kandi, F. E. F. Azar, F. K. Farahani, N. Azadi, and M. Mansourian, "Significance of knowledge in children on self-protection of sexual abuse: A systematic review," *Iranian Journal of Public Health*, vol. 51, no. 8, p. 1755, 2022. <https://doi.org/10.18502/ijph.v51i8.10257>
- [10] H. Shi, "Gender socialization of Chinese children: Empirical evidence from school, family, and media," Doctoral Dissertation, University of Oregon, 2021.
- [11] UNICEF, *Tackling gender inequality from the early years*. Florence, Italy: UNICEF, 2022.
- [12] Ministry of Education of the People's Republic of China, "Teaching staff of schools at all levels and types (Number of Educational Personnel of Schools by Type and Level). Ministry of Education of the People's Republic of China," Retrieved: [http://www.moe.gov.cn/jyb\\_sjzl/moe\\_560/2021/quanguo/202301/t20230104\\_1038059.html](http://www.moe.gov.cn/jyb_sjzl/moe_560/2021/quanguo/202301/t20230104_1038059.html), 2022.
- [13] T. L. King, A. J. Scovelle, A. Meehl, A. J. Milner, and N. Priest, "Gender stereotypes and biases in early childhood: A systematic review," *Australasian Journal of Early Childhood*, vol. 46, no. 2, pp. 112-125, 2021. <https://doi.org/10.1177/1836939121999849>.
- [14] K. Sell, K. Oliver, and R. Meiksin, "Comprehensive sex education addressing gender and power: A systematic review to investigate implementation and mechanisms of impact," *Sexuality Research and Social Policy*, pp. 1-17, 2021. <https://doi.org/10.1007/s13178-021-00674-8>
- [15] H. Leung, D. T. Shek, E. Leung, and E. Y. Shek, "Development of contextually-relevant sexuality education: Lessons from a comprehensive review of adolescent sexuality education across cultures," *International Journal of Environmental Research and Public Health*, vol. 16, no. 4, p. 621, 2019. <https://doi.org/10.3390/ijerph16040621>
- [16] E. J. Kim *et al.*, "A meta-analysis of the effects of comprehensive sexuality education programs on children and adolescents," *Healthcare*, vol. 11, no. 18, p. 2511, 2023. <https://doi.org/10.3390/healthcare11182511>
- [17] BZgA and UNFPA, *Comprehensive sexuality education factsheet series*. Bonn, Germany: Federal Centre for Health Education (BZgA) and United Nations Population Fund (UNFPA), 2020.
- [18] UNFPA and UNESCO, *Comprehensive sexuality education technical guideline: Adaptation of global standards for potential use in China*, 1st ed. Beijing, China: UNFPA and UNESCO, 2022.
- [19] The Central People's Government of the People's Republic of China, "Law of the people's Republic of China on the protection of minors (2020 Amendment). The Central People's Government of the People's Republic of China," Retrieved: [https://www.gov.cn/xinwen/2020-10/18/content\\_5552113.htm](https://www.gov.cn/xinwen/2020-10/18/content_5552113.htm), 2020.
- [20] Z. Hu *et al.*, "Effects of sexuality education on sexual knowledge, sexual attitudes, and sexual behaviors of youths in China: A cluster-randomized controlled trial," *Journal of Adolescent Health*, vol. 72, no. 4, pp. 607-615, 2023. <https://doi.org/10.1016/j.jadohealth.2022.11.006>
- [21] Z. Xiong, I. Warwick, and S. Chalties, "Understanding novice teachers' perspectives on China's sexuality education: A study based on the national pre-service teacher education programme," *Sex Education*, vol. 20, no. 3, pp. 252-266, 2020. <https://doi.org/10.1080/14681811.2019.1640113>
- [22] UNESCO and UNFPA, *Implementation of sexuality education in middle schools in China*. Paris, France: UNESCO, 2018.
- [23] W. Liu, J. Li, H. Li, and H. Zheng, "Adaptation of global standards of comprehensive sexuality education in China: Characteristics, discussions, and expectations," *Children*, vol. 10, no. 2, p. 409, 2023. <https://doi.org/10.3390/children10020409>
- [24] J. K. S. Chan, *A study on comprehensive sexuality education in secondary schools of Hong Kong*. Hong Kong: Equal Opportunities Commission, 2022.
- [25] H. Wu, S. Luo, G. Espinosa-Hernández, A. Klettner, T. D. White, and H. Li, "Relating gender to sex: Gendered attitudes, sexual double standard, sexual intentions and behaviors in two Chinese adolescent samples," *The Journal of Sex Research*, vol. 58, no. 1, pp. 29-40, 2021. <https://doi.org/10.1080/00224499.2019.1695098>

- [26] Y. S. Park, L. Konge, and A. R. Artino Jr, "The positivism paradigm of research," *Academic Medicine*, vol. 95, no. 5, pp. 690-694, 2020. <https://doi.org/10.1097/ACM.0000000000003093>
- [27] H. H. Alharahsheh and A. Pius, "A review of key paradigms: Positivism VS interpretivism," *Global Academic Journal of Humanities and Social Sciences*, vol. 2, no. 3, pp. 39-43, 2020.
- [28] J. W. Creswell and J. D. Creswell, *Research design: Qualitative, quantitative, and mixed methods approaches*, 5th ed. USA: SAGE Publications, Inc, 2018.
- [29] W. G. Cochran, *Sampling techniques*, 3rd ed. New York: John Wiley & Sons, Inc, 1977.
- [30] P. B. Koch and P. Brick, *Questionnaire on young children's sexual learning*. In C. M. Davis, W. L. Yarber, R. Bauserman, G. Schreer, & S. L. Davis (Eds.), *Handbook of sexuality-related measures*, 3rd ed. United Kingdom: Routledge, 2011.
- [31] M. A. Perez, R. Luquis, and L. Allison, "Instrument development for measuring teachers' attitudes and comfort in teaching human sexuality," *American Journal of Health Education*, vol. 35, no. 1, pp. 24-29, 2004. <https://doi.org/10.1080/19325037.2004.10603601>
- [32] A. Bandura, "Guide for constructing self-efficacy scales," *Self-Efficacy Beliefs of Adolescents*, vol. 5, no. 1, pp. 307-337, 2006.
- [33] J. Hendriks, L. Mayberry, and S. Burns, "Preparation of the pre-service teacher to deliver comprehensive sexuality education: Teaching content and evaluation of provision," *BMC Public Health*, vol. 24, no. 1, p. 1528, 2024. <https://doi.org/10.1186/s12889-024-18982-0>
- [34] A. Bishop, P. Lunn, and K. Johnson, "I would just like to run away and hide, but I won't!" exploring attitudes and perceptions on child protection issues with early years teacher trainees on the threshold of their careers," *Westminster Studies in Education*, vol. 25, no. 2, pp. 187-199, 2002. <https://doi.org/10.1080/0140672020250208>
- [35] E. Al-Zboon and J. Ahmad, "Pre-service special education teachers' professionalism and preparation in terms of child sexual abuse," *European Journal of Special Needs Education*, vol. 31, no. 1, pp. 13-26, 2016. <https://doi.org/10.1080/08856257.2015.1087126>
- [36] J. C. Nunez, I. Derluyn, and M. Valcke, "Student teachers' cognitions to integrate comprehensive sexuality education into their future teaching practices in Ecuador," *Teaching and Teacher Education*, vol. 79, pp. 38-47, 2019. <https://doi.org/10.1016/j.tate.2018.12.007>
- [37] I. Ademuyiwa, S. Ayamolowo, T. Oshinyemi, and K. Oyeku, "Knowledge and attitude of sex education among secondary school students in south-western Nigeria: A cross-sectional study," *Dialogues in Health*, vol. 2, p. 100085, 2023. <https://doi.org/10.1016/j.dialog.2022.100085>
- [38] UNFPA, "Ensuring rights and choices for all: Practices of UNFPA China livestreaming comprehensive sexuality education project in Qinghai, Sichuan and Yunnan Provinces," Retrieved: [https://china.unfpa.org/sites/default/files/pub-pdf/livestreaming\\_comprehensive\\_sexuality\\_education\\_project-web.pdf](https://china.unfpa.org/sites/default/files/pub-pdf/livestreaming_comprehensive_sexuality_education_project-web.pdf), 2021.
- [39] P. Bibina, A. P. Mathew, and S. Jeyavel, "Sex education: School teachers' attitude and implementation in wayanad district," *Journal of Psychosexual Health*, vol. 5, no. 2, pp. 89-93, 2023. <https://doi.org/10.1177/26318318231181685>
- [40] K. H. Robinson, E. Smith, and C. Davies, "Responsibilities, tensions and ways forward: parents' perspectives on children's sexuality education," *Gender and Sexuality in Education and Health*, vol. 17, no. 3, pp. 333-347, 2019. <https://doi.org/10.1080/14681811.2017.1301904>
- [41] J. F. Hair, G. T. M. Hult, C. M. Ringle, and M. Sarstedt, *A primer on partial least squares structural equation modeling (PLS-SEM)*, 2nd ed. Thousand Oaks, CA: Sage Publications, 2019.
- [42] I. D. Rose *et al.*, "Key factors influencing comfort in delivering and receiving sexual health education: Middle school student and teacher perspectives," *American Journal of Sexuality Education*, vol. 14, no. 4, pp. 466-489, 2019. <https://doi.org/10.1080/15546128.2019.1626311>
- [43] A. Bandura, *Self-efficacy: The exercise of control*. United States: Worth Publishers, 1997.
- [44] M. P. Chavula, J. M. Zulu, and A.-K. Hurtig, "Factors influencing the integration of comprehensive sexuality education into educational systems in low-and middle-income countries: A systematic review," *Reproductive Health*, vol. 19, no. 1, p. 196, 2022. <https://doi.org/10.1186/s12978-022-01504-9>
- [45] H. Mahadik, M. Shaikh, and M. Muthe, "Sexual knowledge, attitude, behaviours and sources of influences in undergraduate medical students in a peripheral medical college: A cross-sectional study," *Journal of Psychosexual Health*, vol. 6, no. 1, pp. 66-73, 2024.
- [46] L. E. Szucs *et al.*, "School district-provided supports to enhance sexual health education among middle and high school health education teachers," *Teaching and Teacher Education*, vol. 92, p. 103045, 2020. <https://doi.org/10.1016/j.tate.2020.103045>
- [47] P. Y. Asare and S. K. Amo, "Developing preservice teachers' teaching engagement efficacy: A classroom managerial implication," *Cogent Education*, vol. 10, no. 1, p. 2170122, 2023. <https://doi.org/10.1080/2331186X.2023.2170122>
- [48] Y. Allsop and E. M. Anderman, "Developing sexual self-efficacy beliefs during adolescence: Do health teachers really matter?," *Journal of Youth and Adolescence*, vol. 51, no. 11, pp. 2061-2076, 2022. <https://doi.org/10.1007/s10964-022-01646-w>
- [49] A. M.-N. Laoungang and A. Wamba, "Relationship between teachers' attitudes, self-efficacy, and teaching practices in sexuality education in public primary schools of selected districts in N'djamena, Chad," *Africa Education Review*, vol. 19, no. 4-6, pp. 34-46, 2022. <https://doi.org/10.1080/18146627.2024.2311404>