

Theoretical Model that Explain the Knowledge of the CSE Program in Special Education Teachers: A Bayesian Approach

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ABSTRACT

This study introduces new evidence of the theoretical model that connects 21 theoretical hypotheses of personal experience with sexual education knowledge. Participants were 82 Special Education students with a comparison group of 55 female students from Psychology and Natural Sciences Education studying special education. This correlational and exploratory study proposes an analysis path analyzed with a frequentist approach. It presents new empirical evidence from a Bayesian approach's theoretical and methodological assumptions that offer estimates similar to the real values. The information in the model can be used to guide the education of Latinas who are Special Education teachers to identify other aspects that condition their teaching.

Keywords: Causal analysis, sexuality education, special education, teacher training.

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1. INTRODUCTION

Sexual Education (SE) is of vital relevance for people to fully enjoy their sexuality responsibly, both with themselves and in the community. From a constructionist perspective of human sexuality, each person builds their understanding of sexuality from what they learned interacting with their social-cultural surroundings. In other words, the knowledge of human sexuality is in a space with temporal validity.

The ways of understanding sexuality are specific to each person and are directly related to personal assessments and experiences. These explanations, in turn, are made up of a set of attitudes that allow the person to act within a spectrum that goes from what is traditionally known as conservative to liberal sexual behaviors.

Research on sexual behavior indicates that people move in a wide range and do not assume extremist attitudes towards a pole, even though their discourses show the contrary. This issue requires further study. However, methodologically, it bears the difficulty of accepting what the person wants to share because it is in the intimate and private sphere. This becomes particularly complex in societies that demand that women be discreet when sharing their sexual experiences, assuming a series of sexist positions, and even more so when they are teachers.

From an affective and comprehensive perspective, sexual education helps people build self-respect by analyzing the social pressures taught. That demands differentiated behaviors, which leads to making decisions to protect oneself and those surrounding them in the community, so it goes beyond the couple. The effective and comprehensive pedagogic model of sexuality is the foundation of the curriculum proposal in Costa Rica (Ministry of Public Education, 2017a, 2017b).

However, sex education is taught by people who also have their constructions, and the results of the research (Browes, 2015; Fallas, 2009; López, 2015; Plaza, 2015; Preinfalk, 2014) make evident that the difficulties teachers have when mediating the curricular notions that are established in the curricula because they must face their fears and they do not always have mastery of the theoretical postulates in SE from a comprehensive perspective, as well as the appropriate methodologies. Aside from this, the group of professionals in education must fight against the institutional, community, and social pressures around the topic and leave aside the epistemological realities of sexuality and, even more so, the resistance that comes when SE is introduced to people in a situation of intellectual disability (Chappell *et al.*, 2018; Cuskelly & Gilmore, 2007; Franco *et al.*, 2012). The teachers are socially recognized for their expertise on how to approach the topic, and, in

the case of people with intellectual disability, professionals in Special Education are expected to offer support to guarantee access to knowledge.

As a part of a doctoral thesis (Solórzano Salas, 2022), a causal theoretical model was created which would clarify the variables that could explain the attitudes and other elements that intervene in future Special Education teachers to promote the knowledge of the postulates of CSE in people in a situation of intellectual disability in Costa Rica. Women participated in this study because this major includes mostly women.

The intention was to use the theoretical and methodological assumptions of the structural equation models. However, a trajectory analysis was selected due to the small response obtained from the participating population. The results obtained from the maximum likelihood method allowed, in a preliminary way, to confirm causal relationships embodied in the theory and collective knowledge. There is little research done with Special Education teachers, women, and sex education, as confirmed by the review by O'Brien *et al.* (2021) who did a systematic review of 22 research studies on the topic of initial studies for sex education teachers and none of them included this topic. Thus, this article aims to present new robust evidence of the theoretical model developed by Solórzano Salas (2022).

2. THEORETICAL BACKGROUND

Teachers teach the curriculum from their own experiences and do the same when teaching sex education (Browes, 2015; Saville *et al.*, 2019; Solórzano, 2019). As a part of the theoretical model developed by Solórzano (2019) and Solórzano Salas (2022), the starting point is the identification of those variables that can favor the knowledge of the contents proposed in the CSE in Special Education teachers in training. Thus, a causal model was established, including the following constructs:

2.1. Attitudes

Attitudes are defined as the predispositions people have at a behavioral, emotional, and affectionate level toward the valued object. As part of the model developed by Solórzano Salas (2022), the experiences of the teachers were operationalized from sexual behaviors, which are conditioned by different elements, e.g., attitudes toward sexuality, situations of sexual abuse, and religion, among others.

The literature consulted indicates that dogmatic positions in the practice of religion make people feel fear and guilt toward sexuality and, in turn, are more likely to make derogatory judgments regarding the liberal behavior of other people (Browes, 2015; Foucault, 2001; Monroe & Plant, 2018; Plaza, 2015). Lefkowitz *et al.* (2004) explain that measuring the religious practices of people is a good predictor of sexual behavior.

Situations of sexual abuse that a person has experienced can generate rejection of sexuality or risky sexual behavior (de Jong *et al.*, 2015). Thus, this experience and its influence on sexual behavior was incorporated.

Attitude to sexuality is also related, which ranges from erotophobia as contempt for everything related to sex and

sexuality to full and pleasurable enjoyment, that is the erotophilic attitude (Fisher *et al.*, 1988; Saville *et al.*, 2019). It is easier for professionals in education who show greater erotophilia to talk with students about topics such as birth.

Another attitude incorporated in the theoretical model is sexist attitudes, since they impose differentiated valuations for the behavior of men and women, paying special attention to the dominance of women from a patriarchal position (Navarro *et al.*, 2018). Sexist attitudes are reproduced in the methodologies and teachings (Browes, 2015; Venegas, 2018).

The model also included another group of attitudes directly related to the teaching practices of Special Education teachers, and these are related to how they value sex education and the contribution this makes to the comprehensive development of the person (Manzano-Pauta and Jerves-Hermida (2018). The proposed model also incorporated the attitude toward the sexuality of people in a situation of intellectual disability since Special Education teachers must guarantee access to the national curriculum, which includes sex education. Therefore, the attitude toward sexuality of this group was also included because, socially, they are determined by the belief of the eternal infantilization, or because their sexual impulses are disproportionate and can even be violent, even more so if they receive sex education (Chappell *et al.*, 2018).

2.2. Sexual Behaviors

Sexual behaviors are the actions people practice, which are determined by attitudes, social-cultural constructions, and vicarious learning (Solórzano Salas, 2022). The behaviors experienced by people range from traditional to more liberal, and in the model, these were defined as more to less frequent sexual behavior. It is important to highlight that women have more social-cultural pressure to behave modestly, e.g., chastity until motherhood, or they are pressured to be the goddess Aphrodite, who aims to pleasure men.

2.3. Vicarious Learning

Bandura and Walters (1974) define vicarious learning as learning human sexuality socially (Saville *et al.*, 2019). In the sexual area, people receive behavioral and emotional models from their families and friends, and this model is expected to be coherent with CSE. Furthermore, the media significantly contributed to the creation of sexist ideas and the conformation of socially accepted sexual behaviors. In Latin America, families would instead not teach sexuality, and the peer group is not a reliable source (López, 2015; Saville *et al.*, 2019).

Education, training, and self-efficacy of teachers: Education and training provide teachers the tools they need to feel confident and more self-efficient when developing the contents of sexual education with pertinent methodologies, according to the educational model of the CSE (O'Brien *et al.*, 2021). Through training and continuous education, teachers can identify erroneous behaviors toward sexuality and modify them. As Plaza (2015) explains, through metacognition, teachers can learn about the content of their beliefs, which have been built and internalized throughout their personal history, and can move toward transformation.

2.4. Comprehensive Sexuality Education (CSE) in Costa Rica

Because we worked with teachers in SE training, the criterion variable was the knowledge of the theoretical and methodological postulates in the CSE curricular proposal for all students in the country (Ministry of Public Education, 2017a, 2017b). The CSE program includes the pillars of human rights, culture, gender, and diversity. It promotes empowerment, respect for human integrity, communication, and informed decision-making.

In the country, the curricular proposal is just one, and Special Education teachers, along with the rest of the teachers, must develop the educational aids for students in a situation of intellectual disability to have access to and build the attitudes, knowledge, and skills of CSE. The population in a situation of intellectual disability has a right to have the information to prevent any form of violence and abuse for a dignified and autonomous life with sexual and reproductive rights, meaning the whole experience of the different manifestations of sexuality (Chappell *et al.*, 2018; Legislative Assembly of Costa Rica, 2008, 2016). Thus, the theoretical model provided in Fig. 1 was created (Solórzano Salas, 2022). The symbols “+” y “-” in Fig. 1 indicate a positive or negative causal relationship (straight arrows) or a correlation (curved arrows).

The following hypotheses arise from this theoretical model:

1. Erotophobic attitudes, sexism, sexual abuse, and dogmatic religious attitudes toward sexualities have a direct and statistically significant effect on frequent sexual behavior, with higher scores on the first variables higher the scores on frequent sexual behavior.
2. At the same time, the erotophilic attitude, models from the media, peers, and family, as well as a non-dogmatic attitude towards sexuality, have a direct and statistically significant effect on less frequent sexual behaviors, with higher scores on the first variables, higher scores on the less frequent sexual behavior.
3. Both sexual behaviors are directly related because people display different behaviors that range from frequent behaviors like caresses to others less frequent for women, like coital relationships with occasional partners.
4. Teacher self-efficacy, formal education and training, a positive attitude towards sexuality, and sexual education of the population in a situation of intellectual disability have a direct and statistically significant effect on the knowledge of the study program of education for affectivity and comprehensive sexuality. In other words, the higher the scores in the first variables, the higher the score in the knowledge of the curricular proposal. Furthermore, two inverse relationships were established related to negative attitudes towards sex education for the population in a situation of intellectual disability and toward sex education in general. Thus, with higher scores in both attitudes, one would expect lower scores in the knowledge of the program.
5. Frequent sexual behaviors would have an inverse and statistical effect on self-efficacy and knowledge of

CSE due to the way they are built from negative experiences and attitudes. Meanwhile, less frequent sexual behaviors have a direct and statistically significant effect on the understanding of CSE and self-efficacy since these are built from a respectful model of diversity and positive attitudes.

2.5. Bayesian Approach

A Path Analysis was used to determine the causal relationships between variables. This statistical technique is an extension of the multiple regression models, and in turn, it is immersed in structural equation modeling (Pérez *et al.*, 2013; Salas *et al.*, 2017). Path analysis aims to estimate the magnitude and importance of hypothetical causal connections between groups of variables. The estimate of the path coefficients was done with a Bayesian approach.

Bayesian models are used for groups of data where there is previous information available on the parameters to estimate or when the data does not comply with any assumption of the SEM under the frequentist approach (Murat & Ali, 2020). This is the case of the data in this study; the multivariate normality is not guaranteed, and this can affect the estimates done through an approach of maximum likelihood thus the importance of using a Bayesian model to empirically back up the results found under the maximum likelihood method.

The sample size collected for this study includes only women because of the characteristics of the university majors (special education, science, and psychology education). Furthermore, this is a sensitive topic, so there was little participation and, thus, a small sample.

The estimate of the path coefficients is based on the Bayes rule:

$$\pi(\theta|y) = \frac{\pi(y|\theta)\pi(\theta)}{\pi(y)} \quad (1)$$

where $\pi(y|\theta)$ represents the posterior distribution of the parameter θ given the observed data. The parameters to estimate (path coefficients) are treated as randomized variables, which have a distribution of probability that reflects the uncertainty of the real value θ . Furthermore, the term $\pi(y)$ corresponds to $\int_{\theta} \pi(y|\theta)\pi(\theta) d\theta$.

The distribution after the event is used to perform the inference, but this distribution is complex and pretty complicated to estimate, so there are algorithms like the Markov chain Monte Carlo method used to obtain an approximation of the posterior distribution. In this algorithm, each simulated value depends on the previous one. When the chain finally reaches convergence and stationarity, it is reported as an output of the algorithm and is used to perform all the respective inferences (Gilks *et al.*, 1996).

The initial values for the chains are taken from the previous distributions provided by the same statistical package (Merkle & Rosseel, 2018), this is since there is no prior information on the route coefficients. These prior distributions are not informative and correspond to normal distributions $N(0, 10)$ for the case of the regression coefficients, gamma (1, 0.5) for the variances, and beta (1, 1) for the covariances.

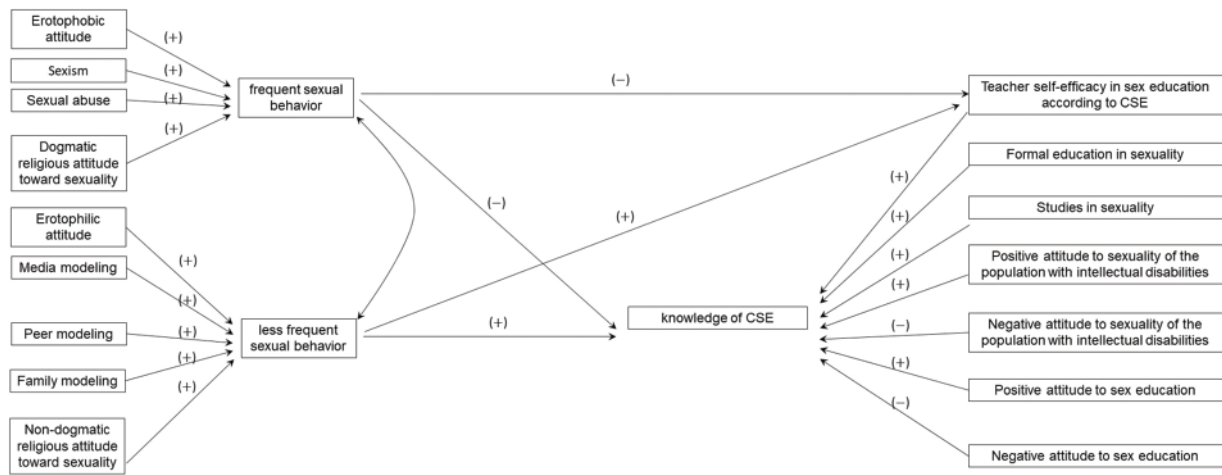


Fig. 1. Theoretical model of the relationships between variables and knowledge of CSE.

2.6. Convergence Diagnosis of the Bayesian Model

Three chains were used to estimate each prior distribution, with 10,000 iterations, from which 5,000 were burn samples and 5,000 were adaptive samples for the simulation. The convergence was validated by observing the graphs on the chain trace and the self-correlations, as well as the Gelman-Rubin and Geweke diagnoses (Merkle & Rosseel, 2018).

2.7. Bayesian Model Adjustment

Post-hoc predictive tests of the model's log-likelihood (minimum discrepancy between the observed matrix and the reproduced matrix) were used to assess the adjustment of the model. The adjustment index most used is the posterior predictive p-value (ppp), interpreted as a p-value in frequentist statistics (Merkle & Rosseel, 2018).

3. METHODOLOGY

The research is correlational and exploratory, using controlled measurements, and it used the multivariate statistic model of path analysis as a tool to assess the adjustment of theoretical models with relationships between variables (Pérez *et al.*, 2013).

3.1. Sample

According to Clark (2005), Bolker (2008), and Gelman *et al.* (2013), some of the advantages of using the Bayesian approach, as compared to the frequentist approach, include the ability to handle more complex models that the frequentist approach cannot tackle, the ability to obtain more accurate parameter estimates when the sample size is small, and the interpretation of results based on the probability that a parameter takes a certain value.

Although the Bayesian approach requires the specification of prior distributions that reflect knowledge or uncertainty about the parameters, it is possible to conduct Bayesian analysis even when no prior information is available. In such cases, non-informative prior distributions that do not incorporate any prior belief about the parameters can be used, as suggested by Merkle and Wang (2018). However, it is important to note that choosing

a non-informative prior distribution still requires some subjectivity.

This study included only women because this major is predominantly female. The research included two groups, one with 82 women training teachers in Special Education and one comparison group with 55 students of Science and Psychology Education in public universities of the great metropolitan area in Costa Rica. The whole available population was used for the study, and no probabilistic selections were made; the information was collected in the first four months of 2021.

The following characteristics predominated in both groups: university students, coursing the last year of the bachelor's degree and first year of the Licentiate degree, between 20 and 30 years old, single, first coital relationship happened between 16 and 20 years old, have had 1 to 3 couples or 4 to 6 couples. There also had been 1 to 3 couples in the last six months, mostly Catholics and evangelical Christians. Both groups received a university course in sex education, either on an optional course or through a regular study plan. In the Special Education group, 63% are working, while 73% of the students in the comparison group were not working when completing this survey.

3.2. Instrument

An online questionnaire on Google Forms was administered asynchronously in the first trimester of 2021. In 2020, the pilot instrument was applied, which helped select the items that showed evidence of validity and reliability according to the assumptions of the classical theory of the tests. The parameters used were variance explained by the first factor, Cronbach's alpha per scale, and each item.

The questionnaire included a section on informed consent for participation, characterization variables of the participating population, and 20 scales for a total of 170 items. The details of the composition of each instrument can be consulted in Solórzano Salas (2022).

The students were contacted via the professors of the courses, who shared messages and videos with messages from the researcher. Three awards of \$25 were given to students to motivate participation.

3.3. Variables

Each variable was measured with a personal scale retrieved from the bibliographical references, or the researcher prepared them for the questionnaire. The details are provided in Table I.

The sexual abuse variable was explored in two items designed by Figueredo *et al.* (2009) with a correlation of 0.755 significant on level 0.01 (2 queues; Solórzano Salas, 2022).

3.4. Data Analysis

Once the database was cleared, the average answers per scale were estimated as an indicator for the level of the construct of each person (Nunnally & Bernstein, 1995). With this information, the compliance of the theoretical assumptions was verified from a frequentist perspective of the trajectory analysis.

The sample size was small, so a frequentist approach to the adjustment indexes might be inconsistent and bias the substantial interpretations (Kline, 2016). In turn, this motivated the group of researchers to apply the assumptions of the Bayesian theory to this study. This way of estimating the parameters is more convenient when a small sample is presented, as well as the non-compliance of

assumptions, such as normality and the measurement scale of the variables (He *et al.*, 2021; Murat & Ali, 2020).

Procedures were carried out to guarantee the multivariate normality in those scales where the scores of some variables did not comply with the hypothesis of normality according to the p-value with 5% statistical significance. The two-step methodology Templeton (2011) developed was applied, and the missing values were eliminated.

At the same time, the inflation factor of the VIF variance (Dorán, 2015) was used, and none of the variables showed values similar or higher to 10, which evidences that there is no multicollinearity between the variables (Dario, 2014; Gonzales, 2020).

Only the less frequent sexual behavior scale showed two items with low reliability, but they were kept due to their theoretical contribution. The theoretical model was estimated with a robust maximum likelihood to minimize the differences between the variance matrix and covariates of the sample with the estimate (Kline, 2016).

Due to the sample size, this stage of the study used Excel, IBM SPSS v21, and Lisrel 8.71 (Jöreskog & Sörbom, 2007), the R statistical software, specifically the *Blavaan* package (Merkle *et al.*, 2021), to make estimates with the contribution of Bayes' Theory as an additional procedure

TABLE I: PSYCHOMETRIC CHARACTERIZATION OF THE SCALES USED

Construct	Source	Number of items on the scale	Variance explained by the 1 st factor	Cronbach's alpha of the scale
Sexism scale	Created by the researcher with the support of Venegas (2017)	11	43.8%	0.870
Erotophilic attitude to sexuality	Reviewed from sexual opinion EROS (Del Rio <i>et al.</i> , 2013)	5	56.8%	0.803
Erotophobic attitude to sexuality	Reviewed from sexual opinion EROS (Del Rio <i>et al.</i> , 2013)	3	71.2%	0.795
Dogmatic religious attitude to sexuality	Created by the researcher	3	72.4%	0.805
Non-dogmatic religious attitude to sexuality	Created by the researcher and Hendrick <i>et al.</i> (2006)	12	52.5%	0.916
Modeling from the family	López (2015), Boone (2015)	5	66.1%	0.865
Modeling from the group of peers	López (2015), Boone (2015)	3	70.4%	0.787
Modeling from the media	López (2015)	3	91.1%	0.951
Frequent sexual behavior	Created by the researcher	9	58.10%	0.903
Less frequent sexual behavior	Created by the researcher	8	37.18%	0.740
Studies in sex education for primary, secondary, and university education	Created by the researcher with the support of Preinfalk (2014)	15	44.94%	0.906
Studies in sex education	Created by the researcher with the support of Preinfalk (2014)	5	90.9%	0.975
Self-efficacy	López (2015)	5	76.2%	0.920
Knowledge of the CSE program	Fallas (2009)	12	27.6%	0.743
Positive attitude to sex education	Fallas (2009) Preinfalk (2014)	12	39.3%	0.845
Negative attitude to sex education	Fallas (2009) Preinfalk (2014)	12	55.5%	0.926
Negative attitude to people's sexuality in situations of disability	ASQ-ID questionnaire Cuskelly and Gilmore (2007) Franco <i>et al.</i> (2012)	12	49.9%	0.90
Positive attitude to people's sexuality in situations of disability	ASQ-ID questionnaire Cuskelly and Gilmore (2007) Franco <i>et al.</i> (2012)	9	61.3%	0.90

for checking the estimates. Merkle and Rosseel (2018) explain that the Blavaan package has a vast development thanks to the financing of the Department of American Education of the Institute of Education Sciences.

4. RESULTS

This study used analyses based on the assumptions of Bayes' theory due to the small samples obtained. One of the possible reasons for this small sample is that people felt exhausted by virtuality resulting from the pandemic, the little response obtained for the online questionnaires (Díaz de Rada & Portilla, 2015; Font & Pasadas, 2016), and the topic, which itself generates resistance, and people avoided giving their opinion despite the confidentiality criteria used.

The Bayesian approach uses estimates considering the probability that the event happens and is recommended for samples with less than 120 cases, as was the case of this research (Kaplan & Depaoli, 2012). With the Bayesian method, estimates were made with 5,000 and 10,000 iterations of three chains, and non-informative priors were used. With this estimate, convergence was reached, (see *Supplementary Material* for details of the fitted models).

The adjustment indexes in the model of the Special Education group and the comparison group are presented in Table II.

The measure of general adjustment was done via a posterior predictive p-value (ppp) of the Bayesian model that is greater than 0.1. This means the general model predicts the variance and covariance matrix well. Thus, the relationships between the variables and the established hypotheses have statistical significance.

Next are the values of the standardized coefficients with both approaches for each analysis group. The standardized coefficients among the variables with absolute values greater than 0.1 have practical importance (Salas et al., 2017). The p-value was used to determine if the estimates were statistically significant since “as a standard rule, we can say that when the result of this contrast is \geq , the

estimator is statistically significant (different from zero) at least with p” (Martínez et al., 2006, p. 365). Observations of indiscriminate use that can alter scientific findings in social research due to their conceptual and methodological limitation referred to by Wasserstein and Lazar (2016) are considered. The values presented contrary to the theoretical hypotheses are defined as spurious relationships since they imply a relationship with another variable not found in the proposed model (Ruiz et al., 2010).

This allowed us to confirm that the substantive results were similar to those obtained in the frequentist analyses, and some relationships between the variables showed higher coefficients (see Table III).

It is important to highlight that the number of observations collected in the groups is not equal (82 in the special education group and 55 in the comparison group). This may justify the differences in the coefficients, and even though they are very similar to the ones estimated with maximum likelihood, these measurements are believed to be more adjusted to the real values because they do not require the assumptions the frequentist approach requires.

Thus, an improvement in the expected coefficients of 3 theoretical hypotheses is achieved only in the special education group, representing a 14.28% improvement in the proposed theoretical model. The ideal would be for this conclusion to be reached in both groups to have robust evidence of the relationship. Furthermore, the correlation between frequent and less frequent sexual behavior increased the relationship coefficient with the Bayesian contribution only in the special education group.

The coefficient of the relationship established between the Negative attitude towards sex education and the knowledge of the CSE study program decreases with the Bayes approach in both groups, but it maintains the expected relationship.

5. DISCUSSION

The teaching of human sexuality is conditioned by personal experiences and academic training, among others,

TABLE II: ADJUSTMENT INDEXES IN THE MODEL IN SPECIAL EDUCATION OF THE COMPARISON GROUP, ACCORDING TO THE FREQUENTIST APPROACH

Index	Frequentist approach	
	Special education	Comparison group
	Incremental	
NFI \geq 0.90	0.92*	0.88
NNFI \geq 0.95	0.87	0.65
CFI \geq 0.95	0.97*	0.91
	Absolute	
GFI \geq 0.9	0.92*	0.86
SRMR \leq 0.08	0.070**	0.073**
	Parsimony	
AGFI \geq 0.9	0.68	0.40
RMSEA \leq 0.06	0.079/0.076	0.15
	Joint criteria	
NNFI, CFI \geq 0.96 and SRMR \leq 0.09	Complies	Does not comply
SRMR \leq 0.09 and RMSEA \leq 0.06	Does not comply	Does not comply

Note. *Value above the recommended threshold. **Value below the expected threshold (Source: Solórzano Salas, 2022, p. 2012).

TABLE III: STANDARDIZED COEFFICIENTS IN THE RELATIONSHIP BETWEEN THE VARIABLES OF THE FREQUENTIST AND THE BAYES APPROACHES OF THE SPECIAL EDUCATION GROUP AND THE COMPARISON GROUP

Relationship between variables	Standardized coefficients			
	Frequentist approach		Bayes approach	
	Special education	Comparison group	Special education	Comparison group
1. Erotophobic attitude and frequent sexual behavior	0.04	-0.20	0.29	-0.22
2. Sexism and frequent sexual behavior	0.10	-0.23	0.92	-0.20
3. Sexual abuse and frequent sexual behavior	-0.16	0.09	-0.14	0.07
4. Dogmatic religious attitude toward sexuality and frequent sexual behavior	-0.30	-0.20	-0.27	-0.17
5. Erotophilic attitude and less frequent sexual behavior	0.28	0.43	.026	0.40
6. Media modeling and less frequent sexual behavior	0.18	0.10	0.17	0.09
7. Peer modeling and less frequent sexual behavior	0.09	0.15	0.08	0.14
8. Family modeling and less frequent sexual behavior	-0.20	-0.33	-0.19	-0.30
9. Non-dogmatic religious attitude toward sexuality and less frequent sexual behavior	0.34	0.26	0.32	0.24
10. Frequent sexual behavior and less frequent sexual behavior	0.45	-0.03	0.62	-0.05
11. Teacher self-efficacy in sex education according to knowledge of CSE	0.09	-0.06	0.08	-0.05
12. Formal education in sexuality, according to knowledge of CSE	0.14	0.14	0.12	0.09
13. Studies in sexuality, according to knowledge of CSE	-0.26	0.20	-0.23	0.16
14. Positive attitude to the sexuality of the population with intellectual disabilities, according to the knowledge of CSE	0.36	0.10	0.32	-0.27
15. Negative attitude to the sexuality of the population with intellectual disabilities, according to the knowledge of CSE	-0.27	0.33	0.24	0.26
16. Positive attitude to sex education, according to knowledge of CSE	0.07	0.02	0.06	0.01
17. Negative attitude to sex education, according to knowledge of CSE	-0.43	-0.33	-0.38	-0.27
18. Frequent sexual behavior with teacher's self-efficacy in sex education	0.14	0.11	0.13	0.11
19. Less frequent sexual behavior with teacher's self-efficacy in sex education	0.20	-0.04	0.19	-0.03
20. Frequent sexual behavior, with knowledge of CSE	-0.15	-0.01	-0.14	0.00
21. Less frequent sexual behavior, with knowledge of CSE	-0.21	0.05	-0.19	0.04

which Saville *et al.* (2019) define as a psychosocial perspective and point out the relevance of studying personal biographies to support the studies of Special Education teachers based on training standards for the adequate teaching of sexuality education (Collier-Harris & Goldman, 2017; O'Brien *et al.*, 2021; Saville *et al.*, 2019), especially with vulnerable populations such as people with intellectual disability (Chappell *et al.*, 2018). With Bayes' theory, there are no problems in the sample composition, so when the chains converge, the estimates of the coefficients are more adjusted to the true values. New evidence of the relationships already confirmed from the frequentist perspective is achieved, and it can be affirmed that a model with new adjustments is presented.

Latina women feel the social pressure to build demure identities without any pleasure (Saville *et al.*, 2019), which

limits their academic studies in sex education, and this is confirmed by the relationship between the variables of erotophobic attitude and frequent sexual behavior, sexism and frequent sexual behavior, and negative attitude to sexuality of people with intellectual disabilities, of the CSE program. This also increased the coefficient of the special education group in the expected direction in the relationship between the variables of frequent and less frequent sexual behavior.

The same relationships presented in the analysis with the frequentist theory are maintained in both groups of women, between the variables sexual abuse and frequent sexual conduct, dogmatic religious attitude towards sexuality and frequent sexual behavior, erotophilic attitude and less frequent sexual behavior, modeling of the media and less frequent sexual behavior, peer modeling and less

frequent sexual behavior, family modeling and less frequent sexual behavior, non-dogmatic religious attitude and less frequent sexual behavior, teacher self-efficacy in sexual education in the knowledge of the CSE program, as well as education in sexuality in the knowledge of the CSE syllabus.

Also, the positive attitude towards sex education in the knowledge of the CSE program, frequent sexual behavior with teacher's self-efficacy in sex education, less frequent sexual behavior with teacher's self-efficacy in sex education, frequent sexual behavior with knowledge of the CSE program, and less frequent sexual behavior with knowledge of the CSE program.

With this new analysis, the coefficient decreases in both groups in the expected direction in the relationship between the negative attitude and sex education and the knowledge of the CSE program.

Finally, just as with the findings in the frequentist analysis, the coefficient decreases in both groups and in the comparison group, it loses practical importance. The relationships established in formal education in sexuality with the knowledge of the CSE program and the positive attitude to the sexuality of the population in a situation of intellectual disability, with knowledge of the CSE program. The findings help build new educational and human frameworks for Latina women to be freed from the shame of their sexuality sexism and to help them understand that these attitudes, religious positions, and other influences that condition their perspective and the way they mediate CSE, especially in traditionally vulnerable populations, like the population in a situation of intellectual disability (Browes, 2015; Collier-Harris & Goldman, 2017; Saville et al., 2019).

6. CONCLUSION

The contributions of the Bayesian theory helped obtain new evidence of the validity of the theoretical model established, and it can even be affirmed that there is a modest improvement in terms of the increase in the magnitude of some of the relationships established in the four hypotheses.

The Bayesian approach is useful for this type of research that has reduced observations, also considering the topic is sensitive for Latin-American women. The empirical evidence found that the Bayesian approach supports the results of the frequentist approach and improves the magnitude of the established relationships. This is because when the chains converge, the coefficients are not exaggerated, and therefore, the bias is reduced.

The theoretical model exposed is not comprehensive and must be contextualized in the cultural differences, but it can be one more input in constructing educational standards in sex education.

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CONFLICT OF INTEREST

The authors reported no potential conflict of interest.

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