

Effectiveness of E-content Integrated Comprehensive Sexuality Education on Menstruation Awareness among Secondary School Students

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Abstract: Menstruation is a natural physiological process that begins during adolescence; however, inadequate knowledge, persistent cultural taboos, and limited structured instruction often result in low levels of Menstruation Awareness among Secondary School Students. The integration of digital learning resources within Comprehensive Sexuality Education (CSE) provides a promising pedagogical approach to address these gaps through accurate, interactive, and learner-centred instruction. The present study examined the effectiveness of E-content Integrated Comprehensive Sexuality Education on Menstruation Awareness among Secondary School Students. An experimental research design with a Pre-test Post-test single group design, was employed to assess the impact of the intervention. The sample comprised 102 Secondary School Students, selected using simple random sampling technique.

The investigator developed and validated an E-content Integrated CSE module on menstruation, aligned with international CSE guidelines. The instructional package covered key components, including the menstrual cycle, menstrual hygiene management, myths and misconceptions, premenstrual syndrome, and emotional changes during adolescence. A standardised Menstruation Awareness Test, constructed and standardised, was administered before and after the intervention to measure changes in awareness levels.

The collected data were analysed using descriptive and inferential statistical techniques. The Pre-test findings revealed comparatively low levels of Menstruation Awareness among Secondary School Students. Following the intervention, a statistically significant increase in Post-test mean scores was observed, indicating improvement in students' understanding and conceptual clarity regarding menstruation.

The findings demonstrate that E-content Integrated Comprehensive Sexuality Education is an effective instructional strategy for enhancing Menstruation

Awareness among Secondary School Students. The study recommends the systematic integration of digitally supported CSE modules into school-based health and sexuality education programmes to promote informed, confident, and healthy adolescent development.

Keywords: E-content, Menstruation Awareness, Secondary School Students, Adolescence, Comprehensive Sexuality Education

Introduction

Adolescence is a developmental stage characterised by rapid physical, psychological, emotional, and social changes. Among the significant biological transitions experienced by girls during this period is the onset of menstruation, which signifies reproductive maturity. Although menstruation is a natural physiological process, it continues to be surrounded by cultural taboos, silence, and misconceptions in many societies. Consequently, many adolescent girls experience menarche with limited knowledge and inadequate preparation, which may adversely affect their health, emotional well-being, and school participation (UNESCO, 2018).

Empirical evidence indicates that poor menstrual hygiene awareness is associated with unhealthy hygiene practices, anxiety, stigma, absenteeism, and reduced self-esteem among school-going adolescents (Hennegan et al., 2019; Sommer et al., 2016). In many contexts, parents and teachers hesitate to discuss menstruation openly, and traditional classroom methods often fail to address the topic effectively due to limited time, inadequate training, and discomfort in handling sensitive reproductive health issues (Vanwesenbeeck, 2020).

Comprehensive Sexuality Education (CSE) provides a structured framework for delivering scientifically accurate, age-appropriate, and culturally sensitive information on menstruation and related health topics (UNESCO, 2018). However, its implementation in school settings remains

inconsistent, particularly where pedagogical resources and instructional strategies are limited. The integration of digital technologies into education offers a promising alternative. E-content comprising multimedia resources such as animations, visuals, and interactive modules facilitates learner-centred, engaging, and flexible instruction. Research suggests that digital learning enhances conceptual understanding and retention, especially among technology-oriented adolescents (Mayer, 2020).

In this context, the present study adopts an experimental approach to examine the effectiveness of E-content Integrated Comprehensive Sexuality Education in enhancing Menstruation Awareness among Secondary School Students. By generating empirical evidence on digital pedagogy within CSE, the study aims to strengthen school-based menstruation education and promote informed, confident, and health-conscious adolescent development

Need and Significance of the Study

Menstruation is a fundamental aspect of adolescent reproductive health; however, inadequate awareness, persistent myths, and sociocultural taboos continue to hinder open discussion and informed understanding among Secondary School Students. Studies indicate that insufficient menstrual hygiene knowledge is linked to poor menstrual hygiene practices, emotional distress, absenteeism, and reduced academic participation (Hennegan et al., 2019; Sommer et al., 2016). In many educational contexts, menstruation is either inadequately addressed or treated superficially within the curriculum, leaving adolescents dependent on informal and often unreliable sources of information (UNESCO, 2018). This highlights a critical need for structured, scientifically accurate, and pedagogically sound instructional interventions.

Comprehensive Sexuality Education (CSE) provides an internationally recognised framework for addressing menstruation within a rights-based and developmentally appropriate approach (UNESCO, 2018). However, effective classroom implementation remains inconsistent due to limited teacher preparedness, discomfort in discussing sensitive topics, and inadequate instructional resources (Vanwesenbeeck, 2020). The integration of digital learning resources, particularly E-content incorporating multimedia and interactive components, offers a promising strategy to enhance

engagement, conceptual clarity, and retention of knowledge among adolescents (Mayer, 2020).

Therefore, the present study is significant as it experimentally examines the effectiveness of E-content Integrated Comprehensive Sexuality Education in improving Menstruation Awareness among Secondary School Students. By generating empirical evidence within a school-based context, the study contributes to strengthening digital pedagogy in health education, promoting informed menstrual practices, and supporting adolescents' physical, emotional, and educational well-being.

Objectives of the Study

1. To assess the level of Menstruation Awareness among Secondary School Students before and after the intervention of E-content integrated Comprehensive Sexuality Education.
2. To determine the effectiveness of E-content Integrated Comprehensive Sexuality Education in enhancing Menstruation Awareness among Secondary School Students.
3. To compare the effectiveness of the E-content Integrated Comprehensive Sexuality Education with respect to selected subsamples of Secondary School Students.

Hypotheses of the Study

1. There is a significant difference in the level of Menstruation Awareness among Secondary School Students before and after the intervention of E-content Integrated Comprehensive Sexuality Education.
2. E-content Integrated Comprehensive Sexuality Education is effective in enhancing Menstruation Awareness among Secondary School Students.
3. There is a significant difference in the effectiveness of E-content Integrated Comprehensive Sexuality Education on Menstruation Awareness among Secondary School Students with respect to selected subsamples.

Methodology

The experimental method was adopted for this study. A Pre-test and Post-test single group experimental design was used to examine the

effectiveness of E-content Integrated Comprehensive Sexuality education in enhancing the Menstruation Awareness among Secondary School Students. The study population consisted of Secondary School Students in Kerala. The sample comprised eighth-grade students from Thrissur district, Kerala State. A representative sample of 102 students was selected using simple random sampling technique. Initially, a Pre-test was administered to assess the initial level of Menstruation Awareness among the students. The second phase was E-content Integrated Comprehensive Sexuality education on menstruation was implemented. After the completion of the intervention, a Post-test was conducted using the same Menstruation Awareness test to assess the effect of the E-content integrated Comprehensive Sexuality Education on menstrual awareness among Secondary School Students.

Tools and Materials Used

The Following tools and materials were used for this study.

Menstruation Awareness Test

The Menstruation Awareness Test, developed and standardized by the investigator, was used to assess students’ level of Menstruation Awareness. The test included objective-type multiple-choice items covering key areas such as the menstrual cycle, menstrual products, menstrual hygiene management, myths and misconceptions, and premenstrual syndrome. The items were prepared in accordance with Comprehensive Sexuality Education guidelines to ensure scientific accuracy and age appropriateness. The tool was validated by subject experts and refined through item analysis to ensure reliability and validity. It was

administered as both Pre-test and Post-test to measure the effectiveness of the intervention.

E-content on Comprehensive Sexuality Education

The E-content Integrated Comprehensive Sexuality Education package was developed and validated by the investigator and used as the instructional intervention in this study. The E-content incorporated multimedia elements such as animations, visuals, and interactive presentations to explain menstruation-related concepts in a clear, engaging, and culturally sensitive manner. It addressed biological and psychosocial aspects of menstruation and was implemented systematically in classroom settings to enhance students’ awareness and understanding.

Analysis of Data

The collected data were analysed using both descriptive and inferential statistical techniques. Descriptive statistics, including mean and standard deviation, were computed to summarise and interpret the level of Menstruation Awareness among Secondary School Students. To determine the significance of the difference between Pre-test and Post-test scores, the paired samples *t*-test was employed.

Results and Discussion

The results of the data analysis are presented below.

Level of Menstruation Awareness among Secondary School Students

The level of Menstruation Awareness of Secondary School Students before and after intervention is presented in Table 1.

Table 1

Level of Menstruation Awareness among Secondary School Students

Level of Awareness	Pre-test		Post-test	
	N (102)	%	N (102)	%
Very high (24-28)	0	0	0	0
High (18-24)	7	6.8	61	59.8
Average (12-18)	21	20.6	39	38.2
Low (6-12)	40	39.2	2	1.96
Very Low (0-6)	34	33.3	0	0

Table 1 presents the distribution of students according to their level of Menstruation Awareness in the Pre-test and Post-test. The Pre-test results reveal that the majority of students possessed low or very low awareness. Specifically, 39.2% of students fell under the low category and 33.3% under the very low category. Only 6.8% of students demonstrated a high level of awareness, and none achieved a very high level. These findings indicate that before the intervention, most Secondary School Students had inadequate knowledge and limited understanding of menstruation-related concepts.

In contrast, the Post-test results show a marked improvement in awareness levels following the E-content integrated Comprehensive Sexuality Education intervention. A substantial proportion of students (59.8%) moved to the high level of awareness, and 38.2% reached the average level. The proportion of students in the low category drastically reduced to 1.96%, and no students remained in the very low category. However, no students attained the very high level in either phase.

The comparison between Pre-test and Post-test distributions clearly indicates a significant positive shift from lower to higher awareness categories. The reduction in the number of students

in the low and very low categories, along with the considerable increase in the high awareness category, demonstrates the effectiveness of the E-content integrated Comprehensive Sexuality Education programme in enhancing Menstruation Awareness.

These findings suggest that structured, multimedia-based instructional interventions can effectively address misconceptions and knowledge gaps related to menstruation. The improvement in awareness levels supports the pedagogical value of integrating E-content into Comprehensive Sexuality Education for Secondary School Students.

Effectiveness of E-content Integrated CSE on Menstruation Awareness

To examine the impact of the E-content Integrated Comprehensive Sexuality Education programme on students' Menstruation Awareness, a paired-samples t-test was conducted comparing Pre-test and Post-test scores. The analysis aimed to determine whether the instructional intervention produced a statistically significant improvement in Menstruation Awareness among Secondary School Students. The results are presented in Table 2.

Table 2
Effectiveness of E-content Integrated CSE on Menstrual Awareness

Test	N	Mean	SD	t-value	P	Cohens d
Pre-test	29	9.1	5.3	26.4	<.001	2.7
Post-test	29	21.96	3.4			

The results in Table 2 revealed a significant increase in the mean score from 9.10 (SD = 5.30) in the Pre-test to 21.96 (SD = 3.40) in the Post-test. The obtained t-value (t = 26.40) was statistically significant at the 0.001 level (p < .001), indicating a meaningful difference between pre- and post-intervention scores. The effect size (Cohen's d = 2.70) was large, demonstrating an impact of the intervention.

These findings indicate that the E-content Integrated Comprehensive Sexuality Education programme was highly effective in enhancing Menstruation Awareness among Secondary School

Students. The increase in mean scores and reduced variability in Post-test results suggest improved and more consistent understanding of menstruation-related concepts after the intervention.

Comparison of the Effectiveness of E-content Integrated CSE with respect to Subsamples

The study further analysed its effectiveness across selected subsamples, namely Gender, Type of Family, Birth Order, and Locality of Residence. The purpose of this comparison was to determine whether variations existed among different student groups.

Pre-test and Post-test scores were separately analysed for each subsample category. Descriptive statistics were used to identify patterns of improvement within each group, and inferential statistical techniques were applied to examine

whether the observed differences were statistically significant. The results presented in Table 2 illustrate the comparative Pre-test and Post-test performance of students across gender, family type, birth order, and locality of residence.

Table 3

Comparison of the Effectiveness of E-content Integrated CSE on Menstrual Awareness with respect to Subsamples

Subsample	Test	Group	N	Mean	SD	t-value	P	Cohens d
Gender	Pre-test	Boys	52	6.69	3.32	5.26	<.001	1.04
		Girls	50	11.6	5.74			
	Post-test	Boys	52	16.06	2.0	9.46	<.001	1.87
		Girls	50	19.5	1.67			
Type of family	Pre-test	Joint	57	8.79	5.63	0.624	<.001	0.124
		Nuclear	45	9.44	4.76			
	Post-test	Joint	57	17.96	2.48	0.943	<.001	0.188
		Nuclear	45	17.49	2.60			
Birth order	Pre-test	First child	48	9.08	5.21	0.008	<.001	0.001
		Other child	54	9.07	5.33			
	Post-test	First child	48	17.81	2.53	0.215	<.001	0.042
		Other child	54	17.70	2.55			
Locality of residence	Pre-test	Urban	59	9.03	4.83	0.09	<.001	0.020
		Rural	43	9.14	5.84			
	Post-test	Urban	59	17.31	2.52	2.13	<.001	0.429
		Rural	43	18.37	2.44			

Table 3 presents the comparison of the effectiveness of E-content Integrated Comprehensive Sexuality Education with respect to selected subsamples such as gender, type of family, birth order, and locality of residence. Independent samples t-tests were conducted to determine whether significant differences existed between groups in both Pre-test and Post-test scores.

With respect to gender, a statistically significant difference was observed in the Pre-test scores ($t = 5.26, p < .001$), indicating that girls ($M = 11.60, SD = 5.74$) had significantly higher initial Menstruation Awareness compared to boys ($M = 6.69, SD = 3.32$). The effect size ($d = 1.04$) indicates a large difference at the baseline level. In the Post-

test also, a significant difference was found ($t = 9.46, p < .001$), with girls ($M = 19.50, SD = 1.67$) scoring higher than boys ($M = 16.06, SD = 2.00$). The very large effect size ($d = 1.87$) suggests that although both groups improved after the intervention, girls demonstrated relatively higher awareness levels. This may be attributed to their direct personal experience with menstruation, which could enhance engagement and comprehension during the intervention.

Regarding the type of family, no meaningful difference was observed between students from joint and nuclear families in either the Pre-test ($t = 0.624, d = 0.124$) or Post-test ($t = 0.943, d = 0.188$). The effect sizes were very small,

indicating negligible differences. This suggests that family structure did not significantly influence Menstruation Awareness, and the E-content intervention was equally effective across both family types.

In terms of birth order, the Pre-test ($t = 0.008$, $d = 0.001$) and Post-test ($t = 0.215$, $d = 0.042$) results revealed no significant differences between first-born and other children. The extremely small effect sizes indicate that birth order had no impact on awareness levels. The intervention benefited students uniformly regardless of their ordinal position in the family.

With respect to locality of residence, no significant difference was observed in the Pre-test scores between urban and rural students ($t = 0.09$, $d = 0.020$), indicating similar baseline awareness. However, in the Post-test, a statistically significant difference emerged ($t = 2.13$, $p < .001$) with rural students ($M = 18.37$, $SD = 2.44$) scoring slightly higher than urban students ($M = 17.31$, $SD = 2.52$). The effect size ($d = 0.429$) indicates a small to moderate difference. This finding suggests that the intervention may have had a relatively greater impact among rural students, possibly due to lower prior exposure and higher novelty of structured menstruation education.

The findings indicate that the E-content Integrated Comprehensive Sexuality Education programme was effective across all subsamples. While gender differences persisted, particularly favouring girls, other demographic variables such as family type and birth order did not significantly influence outcomes. The intervention demonstrated broad applicability and inclusiveness, benefiting students across diverse backgrounds.

Major Findings

1. The Pre-test results indicated that the majority of Secondary School Students possessed low to very low levels of Menstruation Awareness, reflecting inadequate initial knowledge.
2. Post-test results revealed a marked improvement in Menstruation Awareness, with most students attaining high and average levels after exposure to E-content integrated Comprehensive Sexuality Education.
3. A significant difference was observed between Pre-test and Post-test mean scores, confirming the effectiveness of the E-content Integrated Comprehensive Sexuality education

intervention in enhancing the Menstruation Awareness.

4. Gender-wise analysis showed that girls scored significantly higher than boys at both the Pre-test and Post-test stages; however, both groups demonstrated improvement following the intervention.
5. The effect sizes obtained in gender comparisons indicated a large to very large impact of the E-content Integrated Comprehensive Sexuality education intervention on Menstruation Awareness.
6. No significant differences were found in Menstruation Awareness based on the type of family at either the Pre-test or Post-test stage, suggesting that family structure did not influence the effectiveness of the intervention.
7. With respect to locality of residence, no significant difference was observed at the Pre-test stage, indicating comparable initial awareness among urban and rural students.
8. At the Post-test stage, a significant difference favouring rural students was observed, demonstrating slightly higher gains in Menstruation Awareness among rural participants.
9. The findings related to menstrual awareness showed a highly significant improvement from Pre-test to Post-test, with a large effect size, confirming the strong impact of E-content Integrated Comprehensive Sexuality education integrated comprehensive sexuality Education.
10. The results established that E-content Integrated Comprehensive Sexuality education integrated Comprehensive Sexuality Education is an effective instructional strategy for improving Menstruation Awareness among Secondary School Students.

Educational Implications

1. The proven effectiveness of E-content Integrated Comprehensive Sexuality education integrated Comprehensive Sexuality Education indicates the need to incorporate digital learning resources into school curricula for teaching sensitive topics such as menstruation and sexual health.
2. Interactive and well-structured E-content Integrated Comprehensive Sexuality education can provide accurate, age-appropriate, and engaging learning experiences, thereby improving students' understanding and retention of sexuality-related concepts.

3. The significant improvement observed among both boys and girls highlights the importance of inclusive sexuality education, ensuring that instructional programs address the learning needs of all students irrespective of gender.
4. Gender-sensitive E-content Integrated Comprehensive Sexuality education can help reduce myths, misconceptions, and stigma associated with menstruation and sexuality among adolescents.
5. The negligible influence of family type on learning outcomes suggests that school-based digital interventions can effectively supplement differences in home environments.
6. The comparable effectiveness of the intervention across urban and rural settings demonstrates that E-content Integrated Comprehensive Sexuality education can bridge geographical and socio-cultural disparities in access to reliable sexual health information.
7. Teacher education and professional development programs should emphasize the use of E-content Integrated Comprehensive Sexuality education and digital pedagogies in delivering Comprehensive Sexuality Education.
8. Curriculum developers and educational policymakers may consider integrating E-content Integrated Comprehensive Sexuality education modules on sexuality education into regular instructional practices to enhance adolescents' health literacy and well-being.

Conclusion

The study concludes that E-content Integrated Comprehensive Sexuality education is highly effective in enhancing menstruation and menstrual awareness among Secondary School Students. The significant gains in Post-test scores, accompanied by large effect sizes, provide strong empirical evidence supporting the use of digital instructional materials in sexuality education. The intervention proved effective across gender, family background, and locality, underscoring its broad applicability and inclusiveness. Incorporating well-designed E-content Integrated Comprehensive Sexuality education into school curricula can play a vital role in empowering adolescents with accurate knowledge, fostering positive attitudes, and promoting informed decision-making related to sexual and reproductive health.

REFERENCES

- Hennegan, J., Shannon, A. K., Rubli, J., Schwab, K. J., & Melendez-Torres, G. J. (2019). Women's and girls' experiences of menstruation in low- and middle-income countries: A systematic review and qualitative metasynthesis. *PLoS Medicine*, *16*(5), e1002803.
- Journal of Adolescent Health*, *40*(3), 206–217. <https://doi.org/10.1016/j.jadohealth.2006.11.143>
- Kirby, D., Laris, B. A., & Roller, L. (2007). Sex and HIV education programs: Their impact on sexual behaviors of young people throughout the world.
- Mayer, R. E. (2020). *Multimedia learning* (3rd ed.). Cambridge University Press.
- Menon, S., & Sreelatha, M. (2019). Menstrual hygiene awareness among adolescent girls: A school-based study. *Indian Journal of Community Health*, *31*(1), 45–50.
- Mishra, S., & Panda, S. (2018). Effectiveness of e-learning in secondary education. *International Journal of Educational Research*, *7*(2), 45–52.
- Sommer, M., Hirsch, J. S., Nathanson, C., & Parker, R. G. (2016). Comfortably, safely, and without shame: Defining menstrual hygiene management as a public health issue. *American Journal of Public Health*, *105*(7), 1302–1311.
- UNESCO. (2018). *International technical guidance on sexuality education: An evidence-informed approach* (Rev. ed.). UNESCO. <https://www.unesco.org>
- Vanwesenbeeck, I. (2020). Comprehensive sexuality education: A global review of evidence and practice. *Sexual and Reproductive Health Matters*, *28*(1), 1–15.*
- World Health Organization. (2017). *Adolescent sexual and reproductive health*. WHO. <https://www.who.int>