

Development of A Digital Sexual Education Model For High Risk Children in Malaysia

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Abstract

This study aims to develop a Digital Sexual Education Model for high-risk children in Malaysia based on expert consensus using the Nominal Group Technique (NGT). A structured NGT approach was employed to systematically gather, discuss, and prioritise expert perspectives in developing the proposed model. Ten multidisciplinary experts from fields related to counselling, education, child development, and digital learning participated in the NGT sessions. Through a structured process involving idea generation, clarification, discussion, and ranking, experts evaluated and prioritised key elements required for the model. The findings indicated a strong level of expert agreement on the proposed model components. All identified elements exceeded the expert acceptance threshold of 70%, with the highest-ranked element achieving a full consensus score of 30 (100%). These results demonstrate that the proposed model components are considered highly relevant and appropriate by experts. The strong consensus achieved through the NGT process indicates high content validity and supports the suitability of the proposed model for guiding digital sexual education initiatives for high-risk children in Malaysia. The study contributes to the development of a contextually relevant digital sexual education framework while highlighting the effectiveness of the Nominal Group Technique in generating expert-driven educational models.

Keywords Child protection education, Digital sexual education, Educational model development, High-risk children, Norminal Group Technique (NGT)

INTRODUCTION

Sexual education plays a crucial role in promoting children's psychological well-being, personal safety, and protection from sexual abuse. Increasing exposure to digital media and online environments has created both opportunities and risks for children, particularly in relation to sexual knowledge and behaviour (Russell et al., 2024). As children gain greater access to digital technologies, there is an increasing need to ensure that reliable and age-appropriate sexuality education is accessible through safe learning environments (Aguilar-Quesada et al., 2024).

Globally, concerns regarding early exposure to sexual content, online sexual exploitation, and risky sexual behaviour among children and adolescents have intensified. Comprehensive sexuality education has been recognised as an effective approach to improving young people's understanding of sexual health and responsible behaviour (Gray et al., 2025). Digital platforms provide additional opportunities to deliver sexuality education

through interactive learning tools, including multimedia resources, mobile applications, and gamified learning environments (Ackah et al., 2024).

Recent studies have highlighted the effectiveness of digital educational tools in improving sexual health knowledge among adolescents. Digital platforms allow learning materials to be delivered in engaging and accessible formats while also addressing the challenges associated with discussing sensitive topics in traditional classroom settings (Alhassan et al., 2025; Guo et al., 2025). Furthermore, digital learning environments provide students with privacy and autonomy when exploring sensitive health-related information.

In Malaysia, sexuality education has been implemented through several school subjects such as health education and moral education. However, previous research indicates that the implementation of sexuality education remains inconsistent due to cultural sensitivity, limited teacher training, and social stigma (Goldfarb & Lieberman, 2021; Noh & Bakar, 2023). These challenges highlight the need for structured educational models that are culturally appropriate and supported by expert consensus. Therefore, this study aims to develop a Digital Sexual Education Model for High-Risk Children in Malaysia using the Nominal Group Technique (NGT) to ensure that the model elements are validated through multidisciplinary expert agreement.

2. Result

This section presents the findings derived from the NGT analysis conducted with a panel of multidisciplinary experts. The results focus on the level of expert consensus regarding the proposed elements of the digital sexual education model for high-risk children. The analysis includes the evaluation of model elements based on total scores, percentage agreement, and ranking priority, followed by descriptive statistical analysis and interpretation of the findings.

2.1 Expert Consensus Analysis

The NGT analysis was conducted to determine the level of expert agreement on the proposed elements of the digital sexual education model. Each element was evaluated using a structured three-point scale (1 = less important, 2 = important, 3 = most important). The analysis involved calculating the total score, percentage of agreement, and ranking priority for each element.

A minimum consensus threshold of 70% was established as the criterion for acceptance. This threshold is commonly used in NGT-based studies to indicate a strong level of agreement among experts. The use of this threshold ensures that only elements with substantial expert support are retained in the model development process.

The results indicate that all proposed elements met or exceeded the required threshold, demonstrating a high level of consistency and agreement among the expert panel.

2.2 Model Elements Evaluation

The evaluation of model elements revealed varying levels of importance based on expert consensus. Table 1 presents the total scores, percentage of agreement, and ranking of each element.

EASE OF USE

Digital Sexual Education Model

The rapid advancement of digital technologies has significantly transformed the way educational content is delivered, including in the field of sexuality education. A Digital Sexual Education Model refers to a structured educational framework that integrates digital technologies such as online learning platforms, mobile

applications, multimedia tools, and interactive digital environments to deliver sexual health knowledge in an engaging and accessible manner (Power et al., 2024; Soehnchen et al., 2024). These digital approaches have become increasingly relevant as children and adolescents are growing up in highly connected digital environments where information is easily accessible through various technological platforms (Silva et al., 2024). Recent research highlights that digital technologies can play a critical role in enhancing the accessibility and effectiveness of sexuality education programs (Kim et al., 2023). Digital learning environments allow educational content to be delivered through interactive tools such as videos, quizzes, simulations, and gamified learning systems, which can increase student engagement and improve knowledge retention (Bas-Sarmiento et al., 2025; Mancone et al., 2024). Technology-based sexual health education programs have been shown to significantly improve adolescents' understanding of sexual health topics, including reproductive health, consent, and personal safety (Barriuso-Ortega, S., et al., 2024; Yarger, J., et al., 2024).

Furthermore, digital platforms offer additional benefits by providing privacy and autonomy for young users when exploring sensitive topics related to sexuality and health (Borji-Navan et al., 2024). Adolescents may feel more comfortable accessing sexual health information through digital platforms compared to traditional classroom discussions, which may sometimes be limited by cultural norms, stigma, or embarrassment (Hasan et al., 2025). Digital interventions have also demonstrated potential in improving sexual health knowledge, attitudes, and behavioural outcomes among young people when implemented within structured educational frameworks (Guse et al., 2022).

In addition, digital sexual education models allow educators and researchers to integrate various components such as structured learning modules, interactive digital activities, self-paced learning features, and evaluation mechanisms to monitor learning outcomes (Chernick, L. S. et al., 2024). These components enable the development of comprehensive and adaptive learning environments that respond to the needs of digitally connected generations. As digital technologies continue to evolve, the development of structured digital sexual education models has become increasingly important in ensuring that accurate, age-appropriate, and culturally relevant sexual health information can be effectively delivered to children and adolescents (Sierra-Yagüe et al., 2025).

Nominal Group Technique (NGT)

The Nominal Group Technique (NGT) is a structured group decision-making method widely used in social science, health, and educational research to obtain expert consensus on specific issues (Liang, H. J. et al., 2025; Nyalela, M., et al., 2024). The technique was originally developed to facilitate idea generation and prioritisation within groups while ensuring that all participants have equal opportunities to contribute their perspectives (Smith, D., et al., 2024). NGT is particularly useful in studies that aim to develop models, frameworks, or guidelines that require input from multidisciplinary experts.

The NGT process typically involves several structured steps, including silent idea generation, round-robin sharing of ideas, group discussion for clarification, and individual ranking or voting to determine priorities (Humphrey-Murto, S., et al., 2023). This systematic procedure helps reduce the influence of dominant individuals and encourages balanced participation among all experts involved in the discussion. As a result, NGT enables researchers to obtain reliable consensus outcomes while maintaining transparency and methodological rigour in the decision-making process (Cetin-Sahin, D., et al., 2024).

In recent years, NGT has been increasingly used in health and educational research to develop intervention models, identify priority research areas, and design educational frameworks (Tucker, S., et al., 2025). The technique allows experts from different disciplines to collaboratively evaluate proposed ideas and determine the most relevant components through structured discussion and ranking procedures. This approach is particularly

valuable when developing educational models that require both theoretical and practical perspectives from professionals in various fields (Lee, S. H., et al., 2024; Kehinde, J., et al., 2025).

Moreover, the quantitative ranking process used in NGT provides measurable indicators of expert agreement, which can strengthen the content validity of the developed model. By systematically analysing the ranking scores given by participants, researchers can identify the most important elements to be included in the final model. Therefore, the use of NGT is considered a suitable method for developing a Digital Sexual Education Model for high-risk children, as it ensures that the proposed model components are validated through expert consensus.

MATERIALS AND METHODS

Method

This study employed the Nominal Group Technique (NGT) as the primary methodological approach to develop and validate the proposed digital sexual education model. NGT is a structured consensus-building method that enables researchers to collect and prioritise expert opinions through systematic discussion and ranking procedures (Lee et al., 2024). The method is widely used in healthcare and educational research to identify key elements in programme or model development. Unlike survey-based consensus techniques, NGT allows direct interaction among experts while maintaining structured participation to minimise dominance bias and group influence. This method is particularly suitable when the objective of the study is to generate and prioritise ideas based on expert knowledge.

3.1 Participants

A total of ten multidisciplinary experts participated in the NGT session. The experts were purposively selected based on several criteria, including having a minimum of five years of professional experience, possessing expertise related to child protection or education, and being actively involved in sexual health or counselling services.

The expert panel consisted of registered counsellors, clinical psychologists, child sexual crime investigation officers, religious affairs officers, information technology specialists, and experienced educators. The involvement of multidisciplinary experts is essential to ensure that the developed model incorporates diverse perspectives that are relevant to children's development and safety.

3.2 NGT Procedure

The NGT session was conducted following five structured stages to ensure a systematic and transparent consensus-building process. The session began with an introduction and explanation of the research objectives, where participants were briefed on the purpose of the study and the expected outcomes. This was followed by the silent generation of ideas, allowing each expert to independently reflect and propose relevant elements without external influence.

Subsequently, a round-robin process was carried out, during which each expert presented their ideas in turn to ensure equal participation and to avoid dominance by particular individuals. This stage was followed by a group discussion and clarification phase, where all proposed ideas were collectively reviewed, refined, and clarified to ensure mutual understanding among the participants. This interactive process enabled experts from diverse professional backgrounds to critically evaluate and enhance the proposed elements.

The final stage involved the ranking and voting of the model elements. Each expert evaluated and ranked the proposed elements using a three-point scale, where 1 indicated "Less Important," 2 indicated "Important," and 3 indicated "Most Important." This structured ranking process allowed for the prioritisation of elements based on collective expert judgement.

To determine the validity of the model components, a consensus threshold was established. Elements that achieved at least 70% agreement among the experts were accepted as valid components of the model. This threshold is commonly used in consensus-based research to ensure that only elements with substantial agreement are retained, thereby enhancing the credibility and robustness of the developed model.

FIGURES & TABLES

This section presents the findings derived from the NGT analysis conducted with a panel of multidisciplinary experts. The results focus on the level of expert consensus regarding the proposed elements of the digital sexual education model for high-risk children. The analysis includes the evaluation of model elements based on total scores, percentage agreement, and ranking priority, followed by descriptive statistical analysis and interpretation of the findings.

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4.2 Model Elements Evaluation

The evaluation of model elements revealed varying levels of importance based on expert consensus. Table 1 presents the total scores, percentage of agreement, and ranking of each element.

Table 1. NGT Results of Digital Sexual Education Model Elements

Model Elements	Score	Percentage	Rank	Status
Instructor's guide for digital sexual education	30	100%	1	Very High
Animation, video and AI learning support	22	73.33%	4	High
Digital model provides sexual education knowledge	22	73.33%	4	High
Storytelling in reproductive health education	21	70%	5	High
Simple language and visual learning	21	70%	5	High

The findings show that all elements achieved a minimum agreement of 70%, indicating that they are considered relevant and important components of the proposed digital sexual education model.

The element "Instructor's guide for digital sexual education" achieved the highest score of 30 (100%), indicating unanimous agreement among all experts. This reflects a strong consensus regarding the importance of guided facilitation in digital learning environments, particularly when addressing sensitive topics such as sexual and reproductive health. Other elements, including multimedia integration (animation, video, and AI) and knowledge delivery through digital platforms, also achieved high levels of agreement (73.33%). These findings highlight the importance of incorporating interactive and technology-enhanced learning strategies in digital education models. Elements such as storytelling approaches and the use of simple language and visuals obtained

the minimum acceptable consensus level (70%), suggesting that while they are important, they are considered supportive components rather than core elements.

4.3 Descriptive Statistical Analysis

To further examine the overall level of agreement among experts, a descriptive statistical analysis was conducted. The mean score for all elements was calculated as follows:

$$\text{Mean} = (30 + 22 + 22 + 21 + 21) / 5$$

$$\text{Mean} = 23.2$$

The mean score of 23.2 indicates a high level of expert consensus, as it falls within the upper range of the scoring scale. This suggests that the proposed model elements are generally perceived as important to highly important by the expert panel. In addition, the relatively small variation between scores (ranging from 21 to 30) indicates low dispersion in expert responses, reflecting consistency in expert judgment. This strengthens the reliability of the findings and suggests that the identified elements are stable and suitable for inclusion in the model.

4.4 Interpretation of Results

The findings provide important insights into the key components required for developing an effective digital sexual education model for high-risk children.

The element “Instructor’s Guide for Digital Sexual Education”, which achieved full consensus (100%), highlights the critical role of human facilitation in digital learning environments. Despite the use of technology, experts strongly emphasised that educators, counsellors, or facilitators are essential in guiding children through sensitive and complex topics. This suggests that digital platforms should function as support tools rather than standalone learning systems.

The strong support for multimedia learning components, including animation, video, and AI-based features, indicates that interactive and visually engaging content plays a crucial role in enhancing children’s understanding. These elements are particularly important in explaining abstract concepts such as body awareness, personal boundaries, and reproductive health in a manner that is both engaging and age-appropriate. The inclusion of storytelling in reproductive health education reflects the importance of contextual and culturally sensitive teaching approaches. Experts recognised that storytelling can help children relate to real-life situations, thereby improving comprehension and emotional engagement. This approach is especially relevant in addressing sensitive topics where direct instruction may be less effective.

Furthermore, the emphasis on simple language and clear visual presentation underscores the need for developmentally appropriate learning materials. Children, particularly those at high risk, may have varying levels of cognitive and emotional readiness. Therefore, educational content must be designed to ensure accessibility, clarity, and inclusivity.

Overall, the findings demonstrate that the proposed model integrates three key dimensions:

1. Guided facilitation,
2. Technology-enhanced learning, and
3. Child-centred content design.

The strong consensus among experts indicates that these elements are essential in developing a structured, effective, and culturally appropriate digital sexual education model for children.

CONCLUSIONS

This study developed a Digital Sexual Education Model for high-risk children in Malaysia based on multidisciplinary expert consensus using the Nominal Group Technique. All proposed elements achieved the minimum consensus level of 70%, with the instructor’s guide receiving the highest agreement (100%). The

findings highlight the importance of combining guided facilitation, digital and interactive learning, and child-centred content in addressing sensitive sexual education topics. The proposed model provides a practical foundation for developing culturally appropriate and accessible digital sexual education for high-risk children. Further research is needed to implement and evaluate the model with the intended users to establish its usability and effectiveness in practice.

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