PUBLISHED BY
JR EDUCATION

Available online at http://ijite.jredu.id

International Journal of Information Technology and Education (IJITE) 5 (3), (June 2026) 176 - 192

International Journal of Information Technology and Education (IJITE)

http://ijite.jredu.id

Social Media Use, Digital Literacy, and Counseling Effectiveness as Predictors of Reproductive Health Knowledge among Medical Students: An Educational Management Perspective

Inggrid C Mahama[1*], Deitje A Katuuk[1], Ruth Umbase[1], Henny N Tambingon[1]

[1]Doctoral Program in Educational Management, Graduate School, Universitas Negeri Manado, Indonesia

*Corresponding author: inggridmahama@gmail.com

ARTICLE INFO
Article history:
Received: April 28, 2026; Received in revised form: May 19, 2026; Accepted: May 29, 2026;
Available online: June 01, 2026;

ABSTRACT

This article analyzes the influence of social media use, digital literacy, and the effectiveness of reproductive health counseling on medical students' reproductive health knowledge. The study is positioned within educational management because digital platforms, information literacy, and counseling programs are not merely instructional tools; they represent a managed learning ecosystem that requires planning, implementation, monitoring, and evaluation. A quantitative survey design was used with 276 medical students as respondents. Data were collected through structured questionnaires measuring four constructs: social media use, digital literacy, counseling effectiveness, and reproductive health knowledge. Instrument testing showed that all indicators were valid, while reliability coefficients were strong for social media use (Cronbach's alpha = 0.939), digital literacy (0.923), counseling effectiveness (0.933), and reproductive health knowledge (0.926). Multiple regression analysis indicated that the three predictors simultaneously explained 51.3% of the variance in reproductive health knowledge ($R = 0.716$; $R^2 = 0.513$; $F = 95.551$; $p < 0.001$). In the final model, social media use showed the strongest standardized effect ($\beta = 0.381$), followed by counseling effectiveness ($\beta = 0.346$) and digital literacy ($\beta = 0.261$). The findings imply that reproductive health education in medical education should be managed as an integrated digital education strategy, combining credible social media content, critical digital literacy development, and interactive counseling. The article contributes to educational management by proposing a practical pathway for strengthening evidence-based reproductive health knowledge through digital learning governance.

Keywords: counseling effectiveness, digital literacy, educational management, medical education, reproductive health knowledge, social media.

INTRODUCTION

Digital transformation has changed the way students access, interpret, and use health information. Social media, online search engines, short-video platforms, and mobile applications have become daily learning environments for university students. In health education, this transformation creates both opportunities and risks. On the one hand, digital platforms can increase access to reproductive health information, support peer learning, and disseminate public health messages rapidly. On the other hand, the same platforms may spread unverified claims, misinformation, and simplified health messages that do not meet scientific standards. For medical students, this tension is especially important because they are not only recipients of health information but also future health educators and clinical decision-makers.

Reproductive health knowledge is a strategic competence in medical education. It includes understanding of reproductive anatomy and physiology, reproductive rights, contraception, prevention of sexually transmitted infections, adolescent pregnancy risks, and responsible health decision-making. Weak reproductive health knowledge among future physicians can affect the quality of counseling they provide to patients and communities. In contexts where early-age pregnancy, digital misinformation, and unequal access to trusted health education remain visible, universities must design educational management strategies that strengthen knowledge acquisition through credible and well-managed digital learning environments.

The use of social media among students has created a new pattern of health information seeking. Platforms such as Instagram, TikTok, YouTube, and other interactive media are used not only for entertainment but also for learning, peer discussion, and exposure to health campaigns. Uses and Gratifications Theory explains that individuals actively select media to satisfy cognitive, social, and emotional needs (Katz, Blumler, & Gurevitch, 1974). In the health context, students may use social media to obtain quick explanations, visual content, expert opinions, and experiential narratives. However, high exposure alone does not guarantee correct understanding. Students need digital literacy to evaluate whether a claim is evidence-based, whether a source is credible, and whether a message can be applied appropriately.

Digital literacy is therefore a central component of reproductive health education. Gilster (1997) defines digital literacy as the ability to understand and use information from digital sources, while Bawden (2001) emphasizes critical evaluation and information filtering. In medical education, digital literacy is connected to evidence-based learning: students must be able to distinguish scientific health information from popular content that lacks verification. The educational management challenge is to ensure that digital learning is not only accessible but also guided by pedagogical design, institutional support, and valid evaluation mechanisms.

Counseling effectiveness is another key predictor of reproductive health knowledge. Health counseling is effective when it provides clear messages, uses appropriate media, encourages active participation, and produces measurable learning outcomes. Notoatmodjo (2012) explains that health education aims to increase knowledge and shape attitudes that support healthier behavior. Glanz et al. (2015) emphasize that effective health communication depends on message clarity, audience involvement, and suitable communication channels. In digital contexts, counseling can be strengthened through videos, infographics, online discussions, quizzes, and social-media-supported learning communities.

This article is grounded in the need to understand the combined role of social media use, digital literacy, and counseling effectiveness in predicting reproductive health knowledge among medical students. The research problem is not limited to whether digital media are used; it concerns how educational management can integrate social media, digital literacy, and counseling into a coherent strategy for improving student knowledge. The article therefore asks: to what extent do these three variables, separately and simultaneously, influence reproductive health knowledge, and what educational management implications can be drawn from the findings?

THEORETICAL FRAMEWORK

Reproductive Health Knowledge in Medical Education

Reproductive health refers to physical, mental, and social well-being related to the reproductive system and its functions. It includes the ability to make informed decisions about sexuality, reproduction, prevention, and care. From a public health perspective, reproductive health knowledge is shaped by education, family norms, peer interactions, access to health services, and quality of health communication. Green and Kreuter (2005) argue that health behavior is influenced by predisposing, enabling, and reinforcing factors, meaning that knowledge cannot be separated from social environment and educational support.

In medical education, reproductive health knowledge is not merely a personal learning outcome. It forms part of future professional competence. Medical students must understand scientific concepts and translate them into counseling, prevention, and patient communication. Nutbeam (2000) links health literacy to the ability to access, understand, and use health information for decision-making. This is relevant because medical students must both interpret reproductive health information for themselves and later communicate it to patients in ways that are clear, ethical, and culturally sensitive.

Social Media as a Health Education Platform

Social media are internet-based platforms that enable users to create, share, and interact with content (Kaplan & Haenlein, 2010). In health education, social media can expand reach, increase interactivity, and present complex topics in visual and accessible formats. Chou et al. (2009) noted that social media have become significant sources of health information for younger populations. This potential is reinforced by the fact that students often prefer short, visual, and interactive content when learning about health topics.

However, social media also creates risks. The speed of distribution often exceeds the speed of verification. Health-related myths, incomplete explanations, and non-expert claims may influence students who lack critical evaluation skills. Therefore, social media should be managed as an educational channel, not left as an uncontrolled source of information. The study included in this article treats social media use as the degree to which students use digital platforms to access and use reproductive health information as a learning resource.

Digital Literacy and Critical Health Information Evaluation

Digital literacy is a multidimensional competence. It includes technical ability to use digital devices, cognitive ability to evaluate information, and social-ethical ability to communicate responsibly in digital environments. UNESCO (2018) frames digital literacy as the ability to access, manage, understand, integrate, communicate, evaluate, and create information safely and appropriately through digital technologies. Ng (2021) also describes technical, cognitive, and socio-emotional dimensions of digital literacy. These dimensions are important in medical education

because students must learn to evaluate health content according to scientific credibility, not popularity.

In reproductive health education, digital literacy helps students determine whether online information is accurate, relevant, and applicable. Without digital literacy, social media exposure can increase confusion rather than knowledge. With digital literacy, social media can become a powerful learning environment. The findings of Wuryaningrat, Katuuk, Kumajas, and Tuerah (2021) support this interpretation by showing that millennials use digital media in shaping social perceptions and behaviors; when supported by adequate literacy, digital media can strengthen knowledge formation in socially relevant domains.

Counseling Effectiveness in Digital Health Education

Counseling effectiveness refers to the degree to which counseling activities achieve educational objectives, such as increasing knowledge, improving attitudes, and promoting healthier behavior. Health counseling becomes effective when messages are clear, methods are interactive, content is relevant, and participants can apply the information received. Rogers' Diffusion of Innovations Theory (2003) explains that an innovation is adopted more easily when it is perceived as useful, compatible with needs, and easy to understand. Digital counseling can meet these criteria when reproductive health messages are delivered through attractive and evidence-based media.

In a digital learning environment, counseling effectiveness is closely linked to media richness, interactivity, and feedback. Video-based explanations, discussion forums, and guided quizzes may support comprehension better than one-way lectures. Umbase (2015) emphasizes that youth behavior is shaped by internal and external factors, including social environment, popular culture, and access to modern information. This supports a comprehensive counseling strategy that recognizes students' social context rather than treating reproductive health knowledge as a purely cognitive matter.

Educational Management Perspective

Educational management provides the structural foundation for integrating social media, digital literacy, and counseling into a coherent learning system. Robbins and Coulter (2022) define management through planning, organizing, leading, and controlling functions. In education, these functions translate into curriculum planning, resource organization, learning implementation, monitoring, and evaluation. A reproductive health education program that uses digital platforms must therefore be planned, supervised, and evaluated in the same systematic way as other academic programs.

In technology-mediated health education, this managerial role is also strengthened by the technological, pedagogical, and content knowledge perspective. Umbase (2023a) explains that technology-based learning management requires the integration of technological competence, pedagogical design, and content mastery; limited managerial knowledge and skills in organizing technology-supported learning can hinder the improvement of learning quality. This view is relevant to reproductive health education because digital media must be supported by instructional planning, content validation, and guided evaluation rather than being used merely as communication tools.

Tambingon, Sumual, and Naharia (2024) show that innovative education policies and adaptive learning systems can influence learning achievement in medical education. Their perspective strengthens the argument that digital media integration, digital literacy, and innovative counseling are part of strategic educational policy. In this article, educational management is used as a lens for interpreting the regression findings: the goal is not only to identify statistical influence but also to

formulate a practical management strategy for improving reproductive health knowledge in medical education.

METHOD

This article uses a quantitative survey design. The research examined the influence of three independent variables - social media use (X1), digital literacy (X2), and counseling effectiveness (X3) - on reproductive health knowledge (Y). The survey design was appropriate because the study aimed to measure relationships among variables and test both partial and simultaneous effects through regression analysis.

The respondents consisted of 276 medical students who completed the structured questionnaire. The questionnaire used Likert-scale items covering social media intensity and educational use, digital literacy skills, counseling clarity and interactivity, and reproductive health knowledge. The data were analyzed using simple linear regression to test the partial influence of each predictor, multiple regression with two predictors to examine paired effects, and multiple regression with three predictors to test the final simultaneous model.

The converted conceptual framework positions digital media, digital literacy, and counseling effectiveness as integrated educational management components that jointly shape reproductive health knowledge. See figure 1.

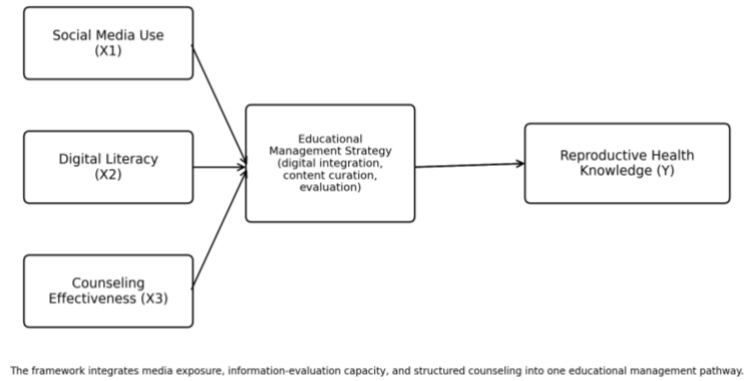

Figure 1. conceptual framework

Before hypothesis testing, the instruments were tested for validity and reliability, and the regression model was checked through prerequisite tests. The validity test showed that all questionnaire items met the validity criterion. Reliability was examined using Cronbach's alpha, with values above the minimum acceptable threshold. Normality and multicollinearity tests were also conducted. The tolerance values for X1, X2, and X3 were above 0.10 and VIF values were below 10, indicating that the final regression model did not contain problematic multicollinearity. See table 1.

Table 1. Operationalization of Research Variables.

Variable	Operational meaning	Key indicators	Scale
Social Media Use (X1)	Students' use of social media to access and use reproductive health information as digital education resources.	Intensity, platform type, access to health information, educational use	Likert 1-4

Digital Literacy (X2)	Students' ability to search, understand, evaluate, and use reproductive health information from digital media critically and responsibly.	Information access, source credibility evaluation, understanding, proper use	Likert 1-4
Counseling Effectiveness (X3)	The success of reproductive health counseling in improving understanding through clear, relevant, and interactive educational methods.	Clarity, delivery method, educational interaction, relevance, perceived impact	Likert 1-4
Reproductive Health Knowledge (Y)	Students' understanding of basic concepts, risks, prevention, and validity of reproductive health information.	Basic concepts, valid information, risk understanding, preventive actions	Likert 1-4

RESULTS AND DISCUSSION

Respondent Profile and Data Quality

The study involved 276 medical students who completed the questionnaire and met the analysis criteria. The respondent description indicated a predominantly young student population, with ages ranging from 17 to 21 years and an average age of approximately 19.5 years. The composition included around 60% female and 40% male students. Approximately 55% were in semesters 1-4 and 45% in semesters 5-8. Most respondents reported long daily online activity, and dominant information sources included Instagram, TikTok, YouTube, and official health websites.

The converted hypothesis model visualizes the seven tested relationships, including partial, paired, and simultaneous effects. See figure 2.

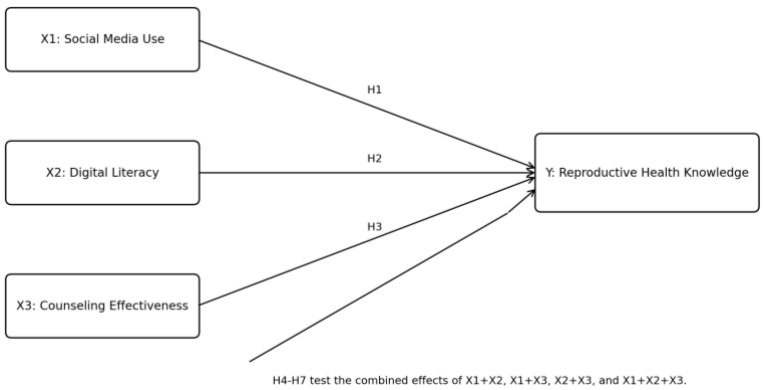

Figure 2. Hypothesis model

The reliability analysis indicated strong internal consistency across all constructs. Cronbach's alpha was 0.939 for social media use, 0.923 for digital literacy, 0.933 for counseling effectiveness, and 0.926 for reproductive health knowledge. These results indicate that the instruments were reliable for measuring the intended constructs. The normality test using the Kolmogorov-Smirnov procedure showed an asymptotic significance value above 0.05 for the residuals, supporting the use of regression analysis. The multicollinearity test showed tolerance values of 0.815, 0.829, and 0.927 for X1, X2, and X3 respectively, while VIF values were 1.227, 1.207, and 1.079. These values indicate that the predictors were sufficiently independent for multiple regression analysis. See table 2.

Table 2. Reliability and Regression Prerequisite Summary

Test component	Result	Interpretation
Reliability: Social Media Use (X1)	Cronbach alpha = 0.939	Highly reliable
Reliability: Digital Literacy (X2)	Cronbach alpha = 0.923	Highly reliable
Reliability: Counseling Effectiveness (X3)	Cronbach alpha = 0.933	Highly reliable
Reliability: Reproductive Health Knowledge (Y)	Cronbach alpha = 0.926	Highly reliable
Normality	Kolmogorov-Smirnov residual significance > 0.05	Normality assumption met
Multicollinearity	Tolerance = 0.815-0.927; VIF = 1.079-1.227	No serious multicollinearity

Simple Regression Results

Simple regression was used to test the partial influence of each predictor. Social media use significantly predicted reproductive health knowledge with the equation Y = 9.367 + 0.496X1, standardized beta = 0.568, t = 11.438, and p < 0.001. Digital literacy also significantly predicted reproductive health knowledge with the equation Y = 10.614 + 0.486X2, standardized beta = 0.484, t = 9.162, and p < 0.001. Counseling effectiveness significantly predicted reproductive health knowledge with the equation Y = 10.424 + 0.393X3, standardized beta = 0.492, t = 9.351, and p < 0.001. These results demonstrate that each variable has a positive and significant relationship with reproductive health knowledge. See table 3.

Table 3. Simple Regression Coefficients

Predictor	Regression equation	B	Beta	t	Sig.
X1 Social Media Use	Y = 9.367 + 0.496X1	0.496	0.568	11.438	<0.001
X2 Digital Literacy	Y = 10.614 + 0.486X2	0.486	0.484	9.162	<0.001
X3 Counseling Effectiveness	Y = 10.424 + 0.393X3	0.393	0.492	9.351	<0.001

Multiple Regression with Two Predictors

The paired regression models showed that the combination of predictors improved explanatory power. The model combining social media use and digital literacy produced R = 0.634 and R^2 = 0.402, with F = 91.870 and p < 0.001. The model combining social media use and counseling effectiveness produced the strongest two-predictor result, with R = 0.676 and R^2 = 0.457, F = 114.712, and p < 0.001. The model combining digital literacy and counseling effectiveness produced R = 0.628 and R^2 = 0.395, F = 89.028, and p < 0.001. These results show that social media use paired with counseling effectiveness was particularly powerful in predicting reproductive health knowledge. See table 4.

Table 4. Multiple Regression Model Summary with Two Predictors

Predictor combination	R	R^2	Adjusted R^2	F	Sig.	Interpretation
X1 + X2	0.634	0.402	0.398	91.870	<0.001	Significant combined effect
X1 + X3	0.676	0.457	0.453	114.712	<0.001	Strongest two-predictor model

X2 + X3	0.628	0.395	0.390	89.028	<0.001	Significant effect	combined

Final Multiple Regression Model

The final model included social media use, digital literacy, and counseling effectiveness simultaneously. The model produced R = 0.716, R^2 = 0.513, adjusted R^2 = 0.508, standard error of estimate = 5.07307, F = 95.551, and $p < 0.001$. This means that the three variables together explained 51.3% of the variance in reproductive health knowledge. The Durbin-Watson value of 2.020 indicated no serious autocorrelation problem. In the coefficient table, all three predictors remained significant: social media use (B = 0.333; β = 0.381; t = 8.132; $p < 0.001$), digital literacy (B = 0.262; β = 0.261; t = 5.617; $p < 0.001$), and counseling effectiveness (B = 0.276; β = 0.346; t = 7.869; $p < 0.001$). see table 5, and 6.

Table 5. Final Multiple Regression Model

Statistic	Value
R	0.716
R Square	0.513
Adjusted R Square	0.508
Std. Error of Estimate	5.07307
F	95.551
Sig.	<0.001
Durbin-Watson	2.020

Table 6. Final Model Coefficients

Predictor	B	Std. Error	Standardized Beta	t	Sig.	Tolerance	VIF
Constant	0.951	1.186		0.802	0.423		
X1 Social Media Use	0.333	0.041	0.381	8.132	<0.001	0.815	1.227
X2 Digital Literacy	0.262	0.047	0.261	5.617	<0.001	0.829	1.207
X3 Counseling Effectiveness	0.276	0.035	0.346	7.869	<0.001	0.927	1.079

Effective and Relative Contributions

The effective contribution calculation showed that social media use contributed 27.28%, digital literacy contributed 18.69%, and counseling effectiveness contributed 24.77% to the prediction of reproductive health knowledge. The relative contribution results were 53.18% for social media use, 36.44% for digital literacy, and 48.29% for counseling effectiveness. Although the relative contribution calculation exceeds 100% when interpreted cumulatively because of shared variance among predictors, the pattern confirms the dominant role of social media use, followed by counseling effectiveness and digital literacy. This finding should be interpreted in educational terms: students' exposure to digital content is influential, but its effect is strongest when supported by counseling and literacy. See table 7.

Table 7. Effective and Relative Contribution Summary

Predictor	Standardized Beta	Effective Contribution	Relative Contribution	Rank
X1 Social Media Use	0.381	27.28%	53.18%	1
X3 Counseling Effectiveness	0.346	24.77%	48.29%	2

X2 Digital Literacy	0.261	18.69%	36.44%	3

The final regression visualization summarizes the standardized effects and effective contribution values for the three predictors. See figure 3.

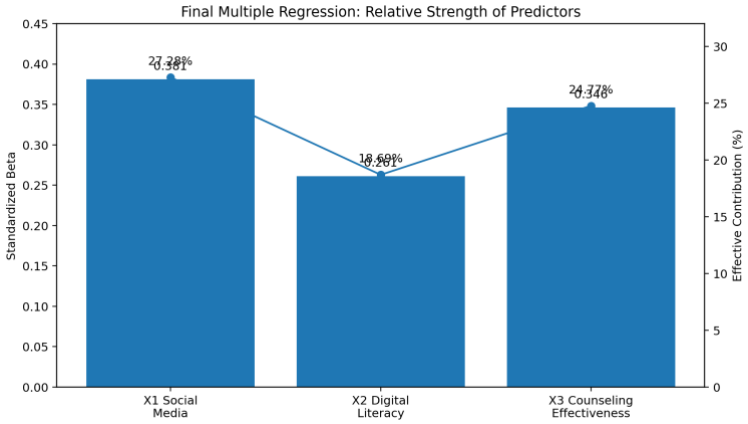

Figure 3. Final regression strength

Social Media Use and Reproductive Health Knowledge

The finding that social media use significantly predicts reproductive health knowledge confirms the importance of digital media as a learning environment for medical students. The standardized beta in the simple model was strong, and in the final model social media use remained the dominant predictor. This indicates that students who use social media more intensively and educationally tend to have higher reproductive health knowledge. In practical terms, social media gives students access to short videos, infographics, expert explanations, health campaigns, and peer discussions that can complement formal learning.

This result can be explained through Uses and Gratifications Theory. Students actively use media to satisfy information needs, and reproductive health is an area where privacy, convenience, and rapid access matter. Social media provides immediate access to content that may be difficult to discuss openly in conventional settings. The finding also aligns with Social Cognitive Theory, which explains learning through observation and interaction with the environment (Bandura, 2018). Health content on social media allows students to observe examples, narratives, and preventive messages, which can strengthen awareness and knowledge.

However, the finding should not be interpreted as an endorsement of unfiltered social media use. Social media is effective when it delivers credible, accurate, and pedagogically appropriate content. Educational management must therefore play a gatekeeping and curation role. Faculty-level strategies may include verified health education accounts, student assignments that evaluate digital health content, collaboration with health professionals in creating content, and ethical guidelines for sharing reproductive health information.

Digital Literacy as a Critical Competence

Digital literacy also had a positive and significant effect on reproductive health knowledge, although its standardized contribution was smaller than social media use and counseling effectiveness in the final model. This pattern suggests that digital literacy functions as a quality filter. Students may access health information through social media, but digital literacy determines whether they can assess the credibility, relevance, and applicability of that information. In

reproductive health, where misinformation can easily shape misconceptions, digital literacy is a protective educational competence.

Theoretical support comes from Gilster (1997), Bawden (2001), UNESCO (2018), and Ng (2021), who emphasize that digital literacy combines technical access, critical evaluation, and responsible use. In medical education, these skills are linked to evidence-based thinking. Students must be able to distinguish between scientific guidance, popular opinion, commercial messages, and culturally biased narratives. This is especially relevant for reproductive health because the topic is often shaped by social norms, stigma, and personal belief systems.

The findings also resonate with the citation statement by Wuryaningrat, Katuuk, Kumajas, and Tuerah (2021), which highlights that millennials use digital media in forming social perceptions and behaviors. In this article's context, the influence of digital media becomes educationally useful when students also possess the capacity to evaluate and interpret information critically. Educational managers should therefore integrate digital literacy into reproductive health learning outcomes, rather than assuming that students automatically have these skills because they are digital natives.

Counseling Effectiveness as a Structured Learning Intervention

Counseling effectiveness showed a strong and significant influence on reproductive health knowledge. This finding indicates that structured educational intervention remains essential even in an environment where social media is highly accessible. Counseling provides focus, sequence, clarification, feedback, and opportunities for questions. These features are important because reproductive health information requires conceptual accuracy and ethical sensitivity. Social media may stimulate interest, but counseling organizes and validates the knowledge students receive.

The result is consistent with health education theory. Notoatmodjo (2012) views health education as a process that improves knowledge and shapes attitudes. Glanz et al. (2015) emphasize the role of message clarity, audience involvement, and appropriate channels. The digital era does not eliminate the need for counseling; rather, it changes its format. Counseling can become more interactive through digital modules, video explanations, online discussion boards, and hybrid learning sessions.

Umbase (2015) emphasizes that youth behavior is shaped by internal and external factors, including social environment, popular culture, and access to modern information. This supports the importance of counseling that is context-sensitive and not merely information-based. Effective counseling should recognize students' media habits, sociocultural context, and learning preferences. It should combine evidence-based content with dialogue that allows students to clarify misconceptions and develop responsible health perspectives.

Simultaneous Influence and Educational Management Implications

The simultaneous regression result is the central contribution of the study. The three predictors together explained 51.3% of the variance in reproductive health knowledge. This indicates that reproductive health knowledge is not produced by a single factor. Instead, it emerges from the interaction of access to digital media, competence in evaluating information, and structured counseling. The remaining variance may be explained by other factors such as prior knowledge, family communication, peer norms, curriculum exposure, clinical experience, and personal motivation.

From an educational management perspective, the model suggests that universities should not treat social media, digital literacy, and counseling as separate activities. They should be organized as a digital reproductive health education system. Planning should identify learning outcomes and student needs. Organizing should involve lecturers, health educators, digital media teams, and

student peer educators. Implementation should combine social media-based content, digital literacy training, and counseling sessions. Evaluation should measure knowledge gains, student engagement, content credibility, and behavioral intentions.

The quality assurance perspective further strengthens this interpretation. Umbase (2023b) emphasizes that policy and management are two key drivers of successful higher education organizations, particularly when quality culture is developed through systematic planning, monitoring, evaluation, and continuous improvement. In the context of this article, reproductive health knowledge should therefore be managed through a quality-oriented digital education cycle that links credible content, student engagement, counseling feedback, and evidence-based revision.

Tambingon, Sumual, and Naharia (2024) show that adaptive educational innovation can influence student achievement in medical education. This supports the argument that reproductive health knowledge can be improved through innovative educational management. The findings of this article show that innovation is not simply the use of technology; it is the managed integration of technology with literacy and pedagogy. Educational managers must ensure that digital health education is evidence-based, interactive, culturally appropriate, and continuously evaluated.

The results also imply that medical education institutions should strengthen partnerships with credible health information providers. Faculty-managed digital channels can present reproductive health information in forms that students already use: short videos, myth-versus-fact posts, quizzes, expert Q&A sessions, and infographics. At the same time, students should be trained to evaluate sources, identify misinformation, and communicate reproductive health information ethically. This integrated approach can transform students from passive recipients of online health content into responsible digital health communicators.

Proposed Educational Management Strategy

Based on the findings, an integrated strategy is proposed. First, social media should be used as a planned educational channel rather than an informal supplement. Second, digital literacy should be embedded into the curriculum through tasks that require source evaluation and evidence-based interpretation. Third, reproductive health counseling should be delivered through interactive hybrid formats that combine face-to-face discussion with digital modules and social media reinforcement. Fourth, evaluation should include knowledge tests, analytics of student engagement, and reflective assignments on digital health information. Finally, institutional policy should establish standards for credible content production and ethical communication. See table 8.

Table 8. Proposed Management Strategy for Digital Reproductive Health Education

Management function	Strategic action	Expected output
Planning	Map student needs, identify reproductive health learning outcomes, and design a digital content calendar.	Clear curriculum-linked digital health education plan
Organizing	Assign roles to lecturers, health educators, student peer educators, and digital media support teams.	Coordinated implementation structure
Implementation	Use verified social media content, digital literacy workshops, and interactive counseling sessions.	Improved access, critical understanding, and engagement
Monitoring	Track participation, platform engagement, misconception patterns, and counseling feedback.	Real-time evidence for program improvement

Evaluation	Measure knowledge outcomes and revise content based on data and student feedback.	Sustainable improvement of reproductive health education

Extended Implications for Educational Management

The empirical pattern reported in this article has important implications for how medical education institutions govern reproductive health learning in digital environments. The three predictors do not operate as isolated variables. They function as a learning chain: social media provides exposure, digital literacy provides critical judgment, and counseling effectiveness provides pedagogical structure. If one link is weak, the educational outcome may be weakened. For example, abundant social media exposure without digital literacy may increase the risk of misinformation. Conversely, strong digital literacy without planned access to relevant reproductive health content may not automatically increase knowledge. Effective counseling can bridge these gaps by connecting content, interpretation, and application.

An educational management perspective therefore requires more than the adoption of digital media. It requires institutional governance of learning resources. Faculties that expect students to learn from digital platforms should establish standards for content credibility, guidance for platform selection, and procedures for evaluating learning outcomes. Such standards may include content review by lecturers or health experts, alignment with national health guidelines, and regular updating of digital materials. This is consistent with the principle that educational management should connect planning, implementation, and evaluation in a continuous cycle rather than treating learning interventions as one-time activities (Robbins & Coulter, 2022).

The dominance of social media use in the final model should be interpreted with nuance. The high beta value indicates that students' social media use is strongly associated with reproductive health knowledge. However, the educational value of social media depends on what students consume and how they interpret it. If students access credible sources, social media becomes a channel for continuous micro-learning. If they access unverified sources, it can become a channel for misunderstanding. The role of educational management is to maximize the positive function of social media by directing students toward credible content and building reflective habits in digital information use.

Digital literacy, although statistically significant, had the smallest standardized coefficient in the final model. This should not lead to the conclusion that digital literacy is less important. Rather, it suggests that digital literacy may function as a moderating competence that improves the quality of learning from both social media and counseling. A student may not score higher in knowledge simply because he or she has general digital skills; the skills must be applied to specific reproductive health information. Therefore, digital literacy training should be contextualized, using examples of reproductive health content, misinformation cases, source-comparison exercises, and evidence-appraisal tasks.

Counseling effectiveness showed a strong role because counseling provides organized learning. In digital settings, students often encounter fragmented information. Counseling can transform fragmented content into coherent understanding by sequencing topics, clarifying concepts, and facilitating dialogue. This is especially relevant for reproductive health, where misinformation may be emotionally persuasive and culturally sensitive. Counseling enables educators to address misconceptions about contraception, sexually transmitted infections, reproductive rights, adolescent pregnancy risks, and preventive health behaviors in a structured manner.

The findings also point to the importance of hybrid educational design. Fully digital learning can expand access, but reproductive health education benefits from interaction, trust, and guidance. A hybrid model can combine online modules, social media reinforcement, classroom discussion, and counseling feedback. For example, students may first access verified short videos on reproductive health topics, then complete digital literacy tasks evaluating online claims, and finally attend counseling sessions where they discuss questions and receive clarification from lecturers or health educators. This sequencing turns media exposure into managed learning.

In medical education, digital reproductive health learning should also develop students' future professional communication competence. Students are not only learning for examinations; they are preparing to counsel patients and communities. Therefore, social media literacy should include ethical communication. Students should learn how to explain reproductive health topics without stigma, protect confidentiality, avoid sensationalism, and refer audiences to appropriate services. These skills align with the broader goal of producing physicians who can function responsibly in both clinical and digital public spaces.

The results have implications for curriculum development. Reproductive health content should be integrated with digital literacy outcomes. Instead of teaching digital literacy as a general skill, educators can design reproductive health cases that require students to compare a social media post, a public health guideline, and a scientific source. Students can be asked to identify bias, missing information, source credibility, and clinical relevance. This approach develops both content knowledge and critical digital competence.

Assessment strategies should also be expanded. Traditional knowledge tests are useful, but they may not capture the ability to evaluate digital information. A more comprehensive assessment system could include source appraisal assignments, reflective journals on health information seeking, creation of evidence-based health education posts, and peer review of digital counseling materials. Such assessment would align with the study's implication that knowledge improvement is linked to digital access, literacy, and counseling quality.

For institutional policy, the findings suggest that medical faculties should establish digital health education guidelines. These guidelines may regulate official social media use, content approval, student participation, privacy protection, and evaluation metrics. They can also encourage collaboration between medical lecturers, communication experts, information technology teams, and student organizations. This collaborative governance is important because reproductive health education crosses disciplinary boundaries: it involves medicine, education, communication, ethics, sociology, and digital technology.

The study also has implications for community engagement. Medical students who have strong reproductive health knowledge and digital literacy can become peer educators or digital ambassadors. They can help produce culturally relevant content for younger audiences while being supervised by faculty experts. Such programs would strengthen the social responsibility of medical education and create a bridge between university learning and public health needs. In regions where early pregnancy and reproductive health misinformation remain concerns, this form of student involvement can have practical significance.

The citation statement incorporated in this article strengthens the contextual interpretation of the findings. Umbase (2023a) underscores the importance of TPACK-based learning management in technology-supported education, while Umbase (2023b) emphasizes quality assurance and quality culture as management foundations for higher education improvement. Wuryaningrat, Katuuk, Kumajas, and Tuerah (2021) emphasize the role of digital media in shaping millennial social perception. Umbase (2015) highlights the interaction of internal and external factors in youth behavior, including modern information access. Tambingon, Sumual, and Naharia (2024) show that

adaptive educational innovation influences student achievement in medical education. Together, these sources support the view that reproductive health knowledge should be developed through a comprehensive educational management approach that acknowledges digital culture, youth context, quality assurance, TPACK competence, and innovative learning systems.

From a theoretical standpoint, the findings connect several frameworks. Uses and Gratifications Theory explains why students actively seek reproductive health information through media. Social Cognitive Theory explains how students learn through observation and interaction with digital environments. Digital literacy theory explains why critical evaluation is necessary for knowledge quality. Health education theory explains why counseling remains essential for structured learning. Educational management theory integrates these components into a systematic process of planning, organization, implementation, monitoring, and evaluation.

The proposed strategy also aligns with the need for sustainable improvement. Digital reproductive health education should not be a temporary campaign. It should become a permanent component of medical education quality assurance. Regular evaluation can track whether students' knowledge improves, whether misconceptions decrease, which platforms are most useful, and which counseling methods generate the strongest engagement. Feedback from students should be used to revise content and delivery methods. This continuous improvement approach can strengthen both academic outcomes and public health relevance.

The study has some limitations that should be acknowledged. The survey design measures relationships among variables but does not establish causality in the same way as experimental research. The data rely on self-reported responses, which may be influenced by social desirability or individual interpretation of questionnaire items. The setting is limited to medical students in a specific institutional context, so generalization should be made carefully. Future research could use experimental designs, longitudinal tracking, or mixed methods to explore how digital counseling interventions change knowledge over time.

Future studies can also examine moderating and mediating relationships. Digital literacy may mediate or moderate the effect of social media use on reproductive health knowledge. Counseling effectiveness may strengthen the relationship between digital literacy and knowledge by providing guided interpretation. Other variables such as motivation, peer influence, family communication, prior health education, and trust in health authorities may also be included. Such models would provide a more detailed understanding of how reproductive health knowledge develops in digital learning ecosystems.

In practical terms, the findings encourage educators to move from reactive to proactive digital education management. Rather than waiting for students to encounter misinformation, institutions can provide curated content and teach students how to verify claims. Rather than offering counseling only in conventional formats, institutions can design interactive digital counseling that meets students in the platforms they already use. Rather than treating social media as a distraction, educational managers can transform it into a structured learning resource.

The broader contribution of this article lies in reframing reproductive health education as a digitally mediated educational management issue. The problem is not simply whether students know reproductive health facts. The problem is how institutions manage the information environment through which students acquire, evaluate, and apply those facts. In the digital era, knowledge formation is distributed across classrooms, social media platforms, counseling sessions, peer networks, and online health resources. Effective educational management must coordinate these spaces so that they support, rather than contradict, one another.

Finally, the findings support the development of a reproductive health education model that is credible, interactive, and context-sensitive. Credibility is achieved through expert-reviewed

content and evidence-based references. Interactivity is achieved through counseling, discussion, and feedback. Context sensitivity is achieved by recognizing students' digital habits, youth culture, and local public health challenges. When these elements are integrated, medical education can produce students who are not only knowledgeable but also capable of guiding communities in responsible reproductive health decision-making.

Practical Design for Implementation in Medical Education

A practical implementation design can begin with a needs analysis at the program level. The needs analysis should identify students' preferred platforms, dominant misconceptions, frequency of reproductive health information seeking, and barriers to asking questions in formal learning environments. The analysis should also review existing curriculum content to determine whether reproductive health topics are delivered as isolated lectures or as integrated digital learning experiences. This stage is important because an educational management strategy must be grounded in actual student behavior and institutional capacity rather than assumptions about technology use.

The second step is instructional design. Reproductive health content can be organized into small thematic modules such as adolescent reproductive development, contraception and family planning, prevention of sexually transmitted infections, reproductive rights, early pregnancy risks, and responsible health communication. Each module should include three components: a verified social media micro-content package, a digital literacy task, and a counseling or discussion activity. The micro-content introduces the topic, the literacy task trains students to evaluate online claims, and the counseling activity deepens understanding through guided dialogue.

The third step is content governance. Institutions should establish a review team consisting of medical lecturers, public health educators, and digital learning staff. The team is responsible for reviewing accuracy, language, cultural sensitivity, and visual clarity before content is distributed. This governance mechanism is essential because reproductive health topics can be sensitive and easily misunderstood. Content should avoid fear-based messaging and instead promote evidence-based, ethical, and respectful communication. Student-generated content can be encouraged, but it should pass through supervisory review before being shared publicly.

The fourth step is capacity building for lecturers and counselors. Educators need training not only in reproductive health content but also in digital pedagogy. They should be able to use learning management systems, moderate online discussions, interpret engagement analytics, and provide feedback in digital environments. This is closely related to the TPACK perspective, which emphasizes the integration of technological, pedagogical, and content knowledge. When educators have strong digital pedagogical competence, counseling becomes more interactive and more responsive to students' learning needs.

The fifth step is student digital literacy development. Students can be trained using realistic tasks such as evaluating a viral reproductive health claim, comparing a social media post with a WHO guideline, identifying unsupported claims in a video, and rewriting misinformation into an evidence-based educational message. This form of task-based literacy training is more meaningful than generic instruction on internet use. It enables students to practice critical appraisal in the exact contexts where they usually encounter health information.

The sixth step is evaluation and feedback. The program should use both quantitative and qualitative indicators. Quantitative indicators may include knowledge scores, quiz completion, platform engagement, and attendance in counseling sessions. Qualitative indicators may include student reflections, questions raised during counseling, peer feedback, and educator observations. Evaluation results should not only be reported but also used to revise content and counseling methods. This converts evaluation into a management tool for continuous improvement.

The seventh step is sustainability planning. Digital reproductive health education should be institutionalized through policy, not depend solely on individual lecturers. Policies can specify content approval procedures, roles of student peer educators, schedules for updating materials, and ethical standards for digital communication. Sustainability also requires technological support, including accessible platforms, reliable internet access, and archiving of learning materials. With institutionalization, reproductive health education can continue across cohorts and evolve according to new health issues.

This implementation design shows how the statistical findings can be transformed into educational action. The dominance of social media use justifies investment in credible digital content. The significance of digital literacy justifies critical information appraisal training. The significance of counseling effectiveness justifies interactive educational intervention. When these three components are managed together, reproductive health education becomes more than information delivery; it becomes a structured process of knowledge formation, critical reasoning, and professional preparation.

The implementation strategy should also include risk management. Digital health education can fail when information is inaccurate, when students experience information overload, or when sensitive topics are delivered without ethical safeguards. Risk management can include periodic review of content accuracy, moderation of online discussions, referral pathways for students who need private consultation, and clear rules on confidentiality. These measures protect students while maintaining the educational value of digital communication.

Finally, institutional leaders should view the program as part of broader public health responsibility. Medical students who develop strong reproductive health knowledge and digital literacy can contribute to community education during clinical rotations, public health campaigns, and peer education activities. Thus, the benefits of the program extend beyond student learning outcomes. They can support healthier community decision-making and strengthen the role of medical education institutions as credible sources of public health knowledge in the digital era.

CONCLUSION

This article demonstrates that social media use, digital literacy, and counseling effectiveness have positive and significant influences on reproductive health knowledge among medical students. Each variable is significant when tested separately, and the three variables together explain 51.3% of the variance in knowledge. In the final model, social media use is the strongest predictor, followed by counseling effectiveness and digital literacy. These findings confirm that reproductive health knowledge in the digital era is shaped by both exposure to information and the educational capacity to interpret and validate that information. The study contributes to educational management by showing that digital reproductive health education should be planned and governed as an integrated system. Social media should be curated as a credible learning channel, digital literacy should be taught as a critical competence, and counseling should be strengthened as an interactive intervention. The practical implication is that medical education institutions need to develop sustainable digital education policies that combine content credibility, student engagement, and systematic evaluation. Such integration can improve student knowledge and prepare future physicians to become more responsible reproductive health educators in society.

REFERENCES

Ajzen, I. (2020). The theory of planned behavior: Frequently asked questions. Human Behavior and

Emerging Technologies, 2(4), 314-324.
Bandura, A. (2018). Toward a psychology of human agency: Pathways and reflections. Perspectives on Psychological Science, 13(2), 130-136.
Bawden, D. (2001). Information and digital literacies: A review of concepts. Journal of Documentation, 57(2), 218-259.
Chou, W. Y. S., Hunt, Y. M., Beckjord, E. B., Moser, R. P., & Hesse, B. W. (2009). Social media use in the United States: Implications for health communication. Journal of Medical Internet Research, 11(4), e48.
Creswell, J. W. (2018). Research design: Qualitative, quantitative, and mixed methods approaches. Sage.
Gilster, P. (1997). Digital literacy. Wiley.
Glanz, K., Rimer, B. K., & Viswanath, K. (2015). Health behavior: Theory, research, and practice. Jossey-Bass.
Green, L. W., & Kreuter, M. W. (2005). Health program planning: An educational and ecological approach. McGraw-Hill.
Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of social media. Business Horizons, 53(1), 59-68.
Katz, E., Blumler, J. G., & Gurevitch, M. (1974). Utilization of mass communication by the individual. In J. G. Blumler & E. Katz (Eds.), The uses of mass communications. Sage.
Lambert, S. D., & Loiselle, C. G. (2007). Health information-seeking behavior. Qualitative Health Research, 17(8), 1006-1019.
Notoatmodjo, S. (2012). Promosi kesehatan dan perilaku kesehatan. Rineka Cipta.
Nutbeam, D. (2000). Health literacy as a public health goal. Health Promotion International, 15(3), 259-267.
Robbins, S. P., & Coulter, M. (2022). Management. Pearson.
Rogers, E. M. (2003). Diffusion of innovations. Free Press.
Tambingon, H., Sumual, S., & Naharia, O. (2024). The influence of the independent learning system on student achievement in the medical education program. Eduvest: Journal of Universal Studies, 4(11), 10250-10256.
Umbase, R. S. (2015). Gaya hidup remaja di Kota Manado: Suatu kajian fenomenologis. Jurnal Harkat: Media Komunikasi Gender, 11(2), 116-127.
Umbase, R. S. (2023a). Implementing technological pedagogical and content knowledge from the social studies learning management perspective. International Journal of Learning, Teaching and Educational Research, 22(11), 401-418. https://doi.org/10.26803/ijlter.22.11.21
Umbase, R. S. (2023b). Management of quality assurance and development of the quality culture of higher education in Indonesia. Multidisciplinary Reviews, 6, e2023032. https://doi.org/10.31893/multirev.2023032
UNESCO. (2018). A global framework of reference on digital literacy skills for indicator 4.4.2. UNESCO Institute for Statistics.
Wuryaningrat, N. F., Katuuk, D. A., Kumajas, L. I., & Tuerah, I. J. C. (2021). Millennials' social perceptions when implementing new habit adaptations in North Sulawesi. Society, 9(2), 421-430.
World Health Organization. (2020). Digital education for building health workforce capacity. WHO.
World Health Organization. (2023). Sexual and reproductive health and research. WHO.