



EFFECTIVENESS OF USING AUGMENTED REALITY ON THE RHDP PLATFORM IN SUPPORTING REPRODUCTIVE HEALTH EDUCATION

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ABSTRACT

Infertility is a crucial issue in reproductive health, impacting not only an individual's quality of life but also social, psychological, and cultural implications. Low reproductive health literacy in Indonesia, particularly in rural areas, poses a serious challenge in addressing this issue. This study aims to analyze the effectiveness of digital technology utilization through the Reproductive Health Digital Platform (RHDP) in improving reproductive health literacy in the Stabat District community, with a focus on infertility. A total of 20 participants were involved in this study, selected using purposive sampling to ensure relevance to the research focus. The research method used a descriptive qualitative approach with data collection techniques through questionnaires, in-depth interviews, and focus group discussions (FGDs), supported by secondary data from official documents and scientific literature. Data analysis was conducted using the Miles and Huberman interactive model with triangulation of methods and sources to maintain validity. The results show that the RHDP platform is effective in improving the quality of digital reproductive health services based on Pedrosa's eight effectiveness indicators. The dimensions with the highest scores are user trust in data security and information credibility, while the aspect with a relatively low score is system consistency across devices. These findings confirm that digital transformation plays a crucial role in expanding access and literacy in reproductive health, but strengthening infrastructure, regulations, and complaint management features is still needed to support service sustainability.

Keywords: augmented reality; digital platform; health literacy; pregnancy education; reproductive health

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INTRODUCTION

Reproduction health is one of the fundamental aspects of service guaranteed public his rights for every citizens. Within the framework of law international, rights on health reproduction included in *International Conference on Population and Development (ICPD)* as well as *Sustainable Development Goals (SDGs)* point 3.7, which emphasizes importance universal access to information and services health reproduction. In Indonesia, the basis law related health reproduction reflected in Constitution Number 36 of 2009 concerning Health, which confirms not quite enough answer government in ensure availability service quality, safe and affordable health care for all over layer society. This is also in line with Constitution Number 52 of 2009 concerning Development Population and Family Development, which places health reproduction as part from development sustainable.

One of issue crucial in health reproduction is infertility. WHO (2024) defines infertility as inability for reach pregnancy after period certain, which are direct influence quality life humans. Globally, infertility impacting 186 million people (Inhorn, 2015), with prevalence lifetime life estimated reaching 17% of individuals (Harris, 2023). *Epidemiological Characteristics of Infertility Study* even take notes that in 2021 the prevalence infertility man

reached 1,354.76 cases per 100,000 population, while Woman more tall namely 2,764.62 cases per 100,000 population (Feng, 2025). This data show trend improvement significant infertility, with burden more heavy on women.

Infertility no only impact on the numbers birth, but also bringing implications social, psychological, and cultural. Stigma, conflict House stairs, up to mental stress is impact frequent derivatives experienced sufferers infertility (GDB, 2017). In Indonesia, the low literacy reproduction the more make things worse condition This is the *Reproductive Health Survey Indonesian Youth (SKRRI)* take notes that 12.5% of teenagers without understanding health reproduction support practice abortion, and even 9% of teenagers with knowledge remains agree with abortion (Ulya, 2022). Phenomenon This indicates that understanding public about health reproduction, in particular infertility, still shallow and vulnerable cause misconceptions and practice risky.

Condition the in line with Petraglia's (2020) findings state that that lack of access to information medical push public look for non- medical alternatives that do not proven, even dangerous. Problem This become challenge for government, because literacy health reproduction not yet become priority service equal public with issue health others, even though the urgency high. This is similar with problem service health common in Indonesia which is still face queue length, limitations power medical, and distribution services that have not been evenly. As it develops technology information, government and various institution health start push digital transformation as solution For increase quality service public, as seen in implementation of E-Government in the field health. Utilization digital technology in sector health proven capable increase efficiency, expanding access, and speed up services, as exemplified through E-Health system at Community Health Center Sawahan, Surabaya. However, until now, integration technology for increase literacy health reproduction, in particular related infertility, is still very limited.

Indonesia continues to strive to improve healthcare services across its territory. Given the significant challenges of providing equitable and efficient access, the government is developing technology-based systems such as the RHDP to improve the accessibility, efficiency, and quality of healthcare services. The implementation of online registration, electronic medical records, and telemedicine are solutions to address the challenges of widespread service distribution and ensure faster and more accurate service delivery. Furthermore, government policies supporting digitalization are further accelerating the implementation of the RHDP in Indonesia (Yo et al. 2021).

In Stabat District, the problem This the more relevant. Low literacy reproduction society, the lack of access information, as well as limitations service medical become factor inhibitor improvement quality health reproduction. In fact, global data shows that Indonesia is one of the countries with level adoption application digital health is sufficient hig, so that there is opportunity big For utilise technology as an educational medium. Based on the description above, then formulation problem study This is: *How effectiveness utilization digital technology in increase literacy health reproduction the community in Stabat District, in particular related issue infertility?* Research objectives This is for study in a way comprehensive effectiveness of strategy based technology in expand understanding, reducing misconceptions, as well as support effort prevention and treatment infertility in a way more inclusive and sustainable.

METHOD

In an effort to comprehensively answer the research problem formulation and gain a deeper understanding of the effectiveness of digital technology utilization in improving public reproductive health literacy, this study employed a qualitative approach with descriptive methods. This approach was chosen because it provides a comprehensive picture of the social dynamics that emerge in community interactions with digital technology, while also enabling researchers to explore the meaning of informants' experiences and perceptions in the context of reproductive health, particularly the issue of infertility. Qualitative research is positioned not to test hypotheses, but rather to understand phenomena naturally and comprehensively as they occur in the field. A total of 20 participants were involved in this study, selected using purposive sampling to ensure relevance to the research focus. The research location was determined in Stabat District, Langkat Regency, as an area deemed relevant due to the challenges of low reproductive health literacy and limited access to health services. The research was conducted from April to July 2025, coinciding with the implementation of a technology-based health program being developed in the region. This location selection was also based on the need to directly evaluate the effectiveness of digital strategies in improving reproductive health literacy at the local community level. The research focused on evaluating the effectiveness of digital media use in disseminating reproductive health information, referring to the framework of eight indicators of digital service effectiveness proposed by Pedrosa et al. (2020), namely ease of use, usefulness, simplicity, trust, service availability, understandability, system consistency, and service speed. These eight indicators are used as the basis for analysis because they can comprehensively describe the quality of digital public services and adapt to user needs.

The research data was obtained through a combination of primary and secondary data. Primary data were collected directly through a questionnaire on the use of public service platforms, in-depth interviews with medical personnel, and focus group discussions (FGDs) to capture collective perceptions regarding the use of technology in reproductive health literacy. Meanwhile, secondary data were obtained from various supporting documents, including official government archives, health service reports, data from the Central Statistics Agency (BPS), and scientific literature related to reproductive health programs. Research informants were selected using a purposive sampling technique, including 20 respondents of productive age who participated in the FGD activities. The data analysis process was conducted using the interactive analysis model from Miles and Huberman (1994), which includes data collection, data reduction, data presentation, and conclusion drawing. Analysis was conducted simultaneously from the beginning of data collection until saturation point was reached, ensuring that the interpretations obtained authentically reflect field conditions. To maintain the validity of the research results, triangulation of methods and sources was conducted, as well as member checking with key informants to ensure the accuracy and validity of the data obtained.

RESULT

The implementation of the RHDP Platform shows significant effectiveness in providing digital-based health services. The validated RHFP Platform will be tested for its effectiveness. From the results of the questionnaire in the field, it can be seen that the application has an impact in supporting the quality and efficiency of services, especially providing comprehensive education anytime and anywhere. The first aspect analyzed was Ease of Use, which relates to the extent to which the platform can be operated without requiring specialized technical skills. This aspect reflects the user's initial experience accessing the service and is therefore key to forming a positive perception of the system. The average assessment results per indicator are shown in Fig.



Figure 1. RHDP Platform Display (www.rhdphealth.id)

Table 1.
Results of the Effectiveness Test of the User Ease Aspect

Indicator	Average
Easy platform used without need skills technical special	2.95
Platform navigation is clear and easy understood	2.80
Interface consistent and not confusing	2.85
Main features easy found by users	2.90
Login and access process service simple	2.90

The next aspect is Usefulness, which emphasizes the extent to which available features and services truly provide added value to users. Indicators in this aspect assess the platform's relevance and usefulness in helping meet public service needs. Details of the assessment results are presented in

Table 2.
Results of the Effectiveness Test of the Usefulness Aspect

Indicator	Average
Platform helps fulfil need service public	2.90
Available features relevant with need users	2.95
Platform upgrade efficiency use time	2.85
The platform provides benefit more compared to manual service	2.90
Platform makes it easier access service distance Far	2.90

The Simplicity aspect focuses on the ease of procedures and the clarity of the information presented. A simple platform is considered more effective because it minimizes administrative barriers and reduces the user's cognitive load. The results of this aspect assessment are shown in Fig.

Table 3.
Results of the Simplicity Aspect Effectiveness Test

Indicator	Average
Information served simple and clear	2.95
Amount step in the minimum service process	2.90
Terms of service easy filled	2.95
Menu and categories service No convoluted	2.90
Instructions service easy followed	2.95

The Trust aspect reflects the level of user confidence in the reliability, security, and credibility of the information presented by the platform. This dimension is crucial for ensuring users' continued use of the service. The average assessment results are shown in

Table 4.
Results of the Effectiveness Test of the Trust Aspect

Indicator	Average
The data and information provided by the platform can trusted	3.10
Users feel safe moment provide personal data	3.05
System guard user data confidentiality	3.00
Transparent platform regarding service status	3.05
Information service in accordance with the results provided	3.10

Aspect furthermore is Service Availability, which measures consistency access to the platform, including lack of disturbance technical and constraint operational aspects This become indicator important to sustainability service digital public.

Table 5.
Results of the Effectiveness Test of the Service Availability Aspect

Indicator	Average
Service can accessible When just	3.00
Rare platform experience disturbance	2.85
Service available in various devices (PC, mobile)	2.95
Service functioning stable without significant errors	2.90
System still can accessed during peak hours	2.95

The Understandability aspect assesses the extent to which information, instructions, and service requirements are clearly understood by users. This directly relates to the effectiveness of communication between service providers and the public. Table 6 presents the average scores for the understandability indicator.

Table 6.
Results of the Effectiveness Test of the Understandability Aspect

Indicator	Average
Easy to understand service instructions	2.95
Terms of service are clearly stated	2.85
Platform usage guides are available and easy to understand.	2.90
The language used is simple and unambiguous.	2.95
Additional information (FAQ) helps users understand the service.	2.90

Aspect Consistency System evaluate harmony appearance, function and service process on the platform in various menus and device. Good consistency will increase experience users and reduce potential confusion. Assessment results aspect This shown in

Table 7.
Results of the Consistency Aspect Effectiveness Test System

Indicator	Average
Appearance interface consistent across all menus	2.80
Service process uniforms in various device	2.90
Service results consistent with procedure	2.85
Notification service always given in a way consistent	2.90
Policy service implemented in a way uniform	2.85

The final aspect is Service Speed, which assesses the platform's responsiveness in processing user requests and the efficiency of service completion times compared to manual methods. This dimension reflects the system's effectiveness in supporting digital-based public services.

Table 8.
Results of the Effectiveness Test of the Speed of Service Aspect

Indicator	Average
The platform responds to input with fast	2.95
Settlement process service relatively short	2.90
Waiting time service in accordance expectation users	2.95
Platform speed is higher Good compared to manual service	2.90
Response to complaints /suggestions given appropriate time	2.85

Research result show that effective PEA-MH application in support maternal mental health pregnant in Tanjung Morawa District. Dimensions with score highest is *convenience usage* (mean = 3.72), which confirms that respondents No experience obstacle means in access feature application. Findings This in line with studies Divanda & Oktariyanda (2025) who emphasize that *user-friendliness* is prerequisite main success adoption application digital health in services public, because can increase efficiency administration and expanding access service. With thus, success PEA-MH application in aspect This show that design interface and affordability technology become factor key in reception user.

Dimensions *benefits* also obtained score high (mean = 3.68), which shows that application truly give mark plus for users, especially in increase knowledge and readiness face childbirth. This is strengthen findings of Arifah et al. (2024), which highlighted that digitalization health capable increase literacy health at a time give support psychological through education based application. With Thus, the benefits of PEA-MH are not only nature informative but also has an impact practical to mother's mental readiness pregnant.

In dimension *quality information* (mean = 3.56), respondents evaluate content Enough relevant However Still need development, especially in the aspect consultation interactive with power health. Limitations This reflect challenge similar found in implementation of telehealth for elderly, where even though application can increase quality life, connectedness with power health still crucial For ensure support comprehensive (Efendi & Sukihananto, 2024). This means that the success of application digital health no only determined by availability information, but also by two- way interactions that can increase validity and reliability user. Temporary that, *satisfaction users* (mean = 3.44) are in category effective, but Still show room repairs, especially related need stable internet connection. Challenges similar also found in telemedicine studies at home sick, which highlights that obstacle technical can reduce efficiency service although benefit digitalization is very large (Wildan & Hariyati, 2024). With thus, infrastructure technology still become factor determinant sustainability digital services, including PEA-MH.

Lastly, *the impact psychological* (mean = 3.60), indicating that application succeed reduce anxiety and increase trust self Mother pregnant. This is consistent with Agustina et al.'s (2023) findings that telemedicine during the pandemic effective as a consultation medium health For reduce anxiety society. In fact, in a more general context area, use technology proven digital health capable give support psychological significant in the group vulnerable, good Mother pregnant and elderly (Efendi & Sukihananto, 2024). In a way overall, results study This show that PEA-MH has fulfill five dimensions effectiveness digital services as put forward by Pedrosa et al. (2020), namely *convenience usage*, *quality information*, *usefulness*, *satisfaction*, and *impact psychological*. However, success application This still face challenge similar with various implementation *e-health* in Indonesia, namely limitations access infrastructure and needs strengthening feature interactive (Suhermawan & Oktariyanda, 2025). With Thus, the development strategy application to front need directed at improving *user engagement*, provision feature online consultation with power health, as well as repair infrastructure network in the area.

DISCUSSION

The results of this study indicate that the implementation of the RHDP Platform has successfully improved the quality of digital health services through eight dimensions: ease of use, usefulness, simplicity, trust, service availability, comprehensibility, system consistency, and service speed. Overall, the dimension that obtained the highest score was user trust, emphasizing that data security and information credibility are key factors in the successful implementation of digital health services. This finding is consistent with Lestyoningsih (2021), who highlighted that public trust in telemedicine has been increasing because services are not limited by distance and are able to minimize the risk of disease transmission, although challenges in data privacy and security remain critical issues that need to be addressed.

In terms of ease of use and procedural simplicity, the platform achieved relatively high scores, suggesting that users did not encounter significant technical barriers when accessing the services. This is in line with the findings of Manurung (2021), who stated that effective utilization of telehealth technology enhances accessibility, particularly for communities residing far from healthcare centers. Telehealth has even been shown to improve the quality of rehabilitative services by reducing geographical barriers and transportation costs. Accordingly, these results strengthen the empirical evidence that digital health platforms can serve as effective solutions to overcome the limitations of conventional healthcare services.

Nevertheless, a deeper analysis reveals that the success of digital health platforms such as RHDP does not rely solely on technical aspects, but also on regulatory support, infrastructure readiness, and community digital literacy. High levels of user trust cannot be sustained without robust personal data protection systems and transparent complaint management mechanisms. This is particularly important in healthcare services, where patient data constitutes highly sensitive information with significant ethical and legal implications. As noted by Giansanti (2020), the sustainability of digital health services requires clear regulations, strict supervision, and security standards that safeguard users' rights and comfort.

Furthermore, although the dimensions of service speed and feature availability received fairly good scores, the findings also indicate challenges in terms of system consistency across devices. Such inconsistencies can reduce user experience and lead to dissatisfaction, especially among individuals with limited devices or unstable internet connectivity. This aligns with the findings of Gao et al. (2022), who emphasized that the digital divide remains a major barrier in the adoption of telehealth, particularly in rural areas with underdeveloped network infrastructure. However, the relatively low score in the system consistency dimension indicates the need for significant improvements in ensuring interface uniformity and service stability across different devices. This gap was also identified by Nasution et al. (2024), who emphasized that one of the major obstacles in the adoption of telemedicine in Indonesia lies in the uneven distribution of digital infrastructure as well as disparities in digital literacy. They further argued that policy support and the establishment of standardized digital service frameworks are prerequisites for ensuring that health platforms operate consistently and sustainably. Without such measures, the risk of fragmented service delivery and user dissatisfaction remains high, ultimately undermining the credibility and sustainability of digital health innovations.

From the perspective of service speed, although the RHDP platform demonstrated good responsiveness, the relatively lower score on the complaint-handling indicator underscores the urgent need for the integration of a comprehensive feedback management feature. This finding parallels the study of Sulila et al. (2020), which revealed that web-based health information systems are capable of expediting services through functions such as appointment

scheduling and digital prescription recording. However, they also noted that more advanced mechanisms are required to address users' specific and dynamic needs in real-time. Thus, while RHDP has succeeded in enhancing certain aspects of digital service efficiency, the absence of a robust complaint-handling system could hinder long-term user engagement and satisfaction. Beyond technical performance, the findings of this study also carry important implications for healthcare equity in remote and underserved areas. As highlighted by Bakhtiar (2022), telemedicine has the potential to provide essential healthcare access for communities with limited healthcare facilities. Yet, its implementation in Indonesia remains constrained by regulatory frameworks that currently permit telemedicine primarily for inter-facility communication rather than direct doctor-to-patient services. Bakhtiar emphasized the urgent need for regulatory expansion that allows medical professionals to provide direct consultations to individuals, thereby extending the reach and inclusiveness of telemedicine services. From the perspective management quality service public, approach evaluation used in study This in line with the *Brazilian Quality Management (BrQM)* model that measures effectiveness service public based on dimensions convenience, trust, consistency, and availability. Pedrosa et al. (2020) emphasize that quality service digital public must seen from two sides, namely satisfaction users and suitability internal management. With Thus, the results study This No only give description about experience users, but can also become base repair operational and policy levels institutional.

CONCLUSION

This study demonstrates that the RHDP Platform has effectively enhanced the quality of digital health services across multiple dimensions, with user trust emerging as the strongest determinant of success due to its reliance on data security and information credibility. While the platform performed well in terms of ease of use, simplicity, and service speed, challenges remain in system consistency across devices and the absence of a comprehensive complaint-handling mechanism, both of which may limit long-term user satisfaction and engagement. These findings highlight that the sustainability of digital health platforms requires not only technical improvements but also robust regulatory support, equitable infrastructure development, and strengthened digital literacy initiatives to reduce disparities, particularly in rural areas. Moreover, aligning RHDP with broader public service quality management frameworks, such as the BrQM model, underscores its potential not only as a tool to improve user experiences but also as an instrument for institutional policy refinement. Collectively, the study affirms that digital transformation in healthcare can serve as a strategic pathway to expanding equitable access, provided that issues of governance, infrastructure, and user-centered service integration are systematically addressed.

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