

# Development of an android-based e-module on hypnoprenatal material for diploma III midwifery students

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## ABSTRACT

Mobile technology has become increasingly important in health professions education, yet midwifery learning in Indonesia still relies largely on printed modules and conventional lectures. Hypnoprenatal is a relaxation technique that has been reported in the literature as a complementary approach to reduce antenatal anxiety and fear of childbirth; however, digital instructional resources covering this topic for midwifery students remain limited. This study aimed to develop an Android-based hypnoprenatal e-module for Diploma III Midwifery students and to assess its feasibility as a learning medium, using the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) as the research and development (R&D) framework. Methods: Feasibility was evaluated by two material experts, one media expert, one lecturer, and 20 fourth-semester students through validated five-point Likert-scale questionnaires. Responses were analyzed descriptively by calculating the percentage of agreement for each respondent group, which was then interpreted against a predetermined feasibility category scale (e.g., 81-100% = "Highly Feasible," 61-80% = "Feasible," and lower ranges indicating reduced feasibility). Results: After two rounds of expert validation and revision, the e-module obtained mean feasibility scores of 90.0% from the media expert and 96.3% from the material experts, both falling within the "Highly Feasible" category. Student feedback yielded 84.1% in the small-group trial and 90.1% in the large-group trial, while the lecturer's assessment reached 95.3%, all within the "Feasible" to "Highly Feasible" range. Conclusion: Based on these descriptive feasibility scores, the Android-based hypnoprenatal e-module is feasible for use as a self-directed learning medium for midwifery students. This study did not evaluate the e-module's effect on student learning outcomes or anxiety-related measures; further research employing experimental designs is needed to examine its effectiveness. The findings nonetheless support the potential of this e-module as a starting point for integrating complementary-care content into competency-based midwifery education.

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## INTRODUCTION

Advances in digital technology have transformed the landscape of health professions education, creating new opportunities for flexible and learner-centred instructional approaches. Mobile devices and digital learning platforms now play a central role in facilitating access to educational materials, allowing students to engage with learning content anytime and anywhere (Card et al., 2024). Building on this trend, recent evidence indicates that digitally delivered education can be tailored to individual learning paces while remaining accessible across varied clinical and academic settings (Martinengo et al., 2024). As a result, the integration of mobile learning resources has become increasingly important in supporting competency-based education and fostering self-directed learning among health professions students. In Indonesia, where smartphone penetration among university-aged learners exceeds 95%, this technological readiness creates an unprecedented opportunity to redesign curriculum delivery in vocational health education, including in Diploma III Midwifery programs.

Mobile learning (m-learning) is increasingly positioned as an effective modality for health professions education. A Cochrane systematic review and meta-analysis of 29 randomised trials concluded that m-learning is at least as effective as traditional learning and often superior for delivering knowledge and skills to medical, nursing, and allied-health learners (Kyaw et al., 2019). Building on this evidence base, a more recent meta-analysis found that spaced and mobile digital education improves knowledge retention and clinical confidence among pre- and post-registration health professionals (Martinengo et al., 2024). Complementing these findings, other reviews report that mobile-based instruction is also associated with measurable behavioural change in clinical practice following training (Tudor Car et al., 2022). In the specific context of midwifery education, a scoping review found that technology-mediated instruction enhances clinical reasoning and procedural skill when designed with sound pedagogical grounding (Ladjar et al., 2024). A separate review further highlighted that such instruction also improves student engagement and motivation in midwifery training programs (Szara & Klukow, 2024).

Within this broader m-learning landscape, the electronic module (e-module) has emerged as a distinct instructional artefact. An e-module is a structured, self-contained digital learning resource that integrates text, images, audio, video, and interactive evaluation, typically deployed via web or native mobile applications (Daryanto, 2016). This format allows learning content to be organised into sequential, competency-aligned units that students can navigate independently (Rahmatsyah & Dwiningsih, 2021). Compared with print modules, e-modules are more economical, durable, and easily updated qualities particularly valued in resource-constrained Indonesian higher-education contexts (Sriyanti et al., 2021). They also support differentiated, self-paced learning, which allows students with varying levels of prior knowledge to progress according to their own needs (Tarigan et al., 2021). Developmental research has documented favourable feasibility outcomes of Android-based e-modules in physics and mathematics education (Mahardika et al., 2024), in language learning (Subastian & Astuti, 2021), and in the basic sciences (Yanindah & Ratu, 2021), suggesting that this format is adaptable across diverse subject areas.

Hypnoprenatal education often used interchangeably with hypnobirthing in international literature is a complementary, non-pharmacological practice that combines self-hypnosis, guided relaxation, breathing techniques, and cognitive reframing to prepare pregnant women for childbirth. A growing body of high-quality systematic reviews now supports its clinical relevance. Catsaros and Wendland (2023) demonstrated that hypnosis-based interventions reduce childbirth anxiety and increase perceived control. Fernandez-Gamero et al. (2024) reported reductions in

labour pain, fear, and second-stage duration. Most recently, Betriana et al. (2025) provided meta-analytic evidence for hypnobirthing's effect on antenatal depression. These findings position hypnoprenatal as a competency that midwives should master both for direct application in antenatal care and for educating pregnant women about evidence-based relaxation strategies (Yaqoob et al., 2024).

Despite this clinical importance, hypnoprenatal content is poorly supported in Indonesian midwifery curricula. A preliminary needs assessment conducted by the authors at a Diploma III Midwifery Study Program in Palembang revealed that 73.3% of lecturers in the Holistic Care course relied on printed modules, 91.1% used handouts, and 94.5% used PowerPoint as primary instructional media. None used an e-module or formal e-learning system, although 95.9% of students owned an Android smartphone and 97.3% used it routinely for academic browsing. This contradiction high digital readiness paired with low digital pedagogy mirrors the implementation gap repeatedly documented in mobile-learning studies of Indonesian health education (Mutia et al., 2023). A related study similarly found that despite widespread device ownership, structured digital learning content remains scarce in vocational health programs, leaving students dependent on passive, lecturer-led delivery (Rahayu & Sukardi, 2021).

This gap carries direct consequences for students' mastery of complementary midwifery skills. Hypnoprenatal is an experiential, skill-based competency: it requires repeated practice of breathing patterns, relaxation sequences, and verbal induction scripts, none of which can be adequately conveyed through static printed modules or one-directional lecture formats. Without interactive media that allow students to revisit demonstrations, pace their own practice, and self assess their understanding, learners are largely confined to the limited contact hours available in classroom sessions. Under these conditions, students risk graduating with only theoretical familiarity rather than the practical confidence needed to apply hypnoprenatal techniques in clinical placements or to teach them to pregnant women during antenatal counselling. Over time, this can perpetuate the disconnect between national competency standards, which explicitly mandate holistic and complementary maternity care, and actual practice readiness among midwifery graduates. The absence of accessible, self-directed digital resources for hypnoprenatal therefore represents not merely a content gap, but a barrier to translating curricular intent into demonstrable clinical competence.

To date, published research on Android-based e-modules in Indonesia has concentrated on general subjects such as mathematics, physics, and biology, with relatively few studies addressing midwifery-specific content (Sari et al., 2023). A further study extended this line of work but similarly focused on general nursing rather than midwifery topics (Susanti & Mandiri, 2024). Within the small body of midwifery-focused work, attention has fallen on partography and intrapartum care (Giena et al., 2022), as well as on postpartum haemorrhage management (Pratiwi et al., 2021), while complementary-care topics particularly hypnoprenatal remain almost entirely unrepresented. This is a substantive curriculum gap given that Indonesian midwifery competency standards explicitly include holistic and complementary maternity care.

The present study addresses this gap. The novelty of the work is twofold: (i) it is, to the authors' knowledge, the first reported development of an Android-based e-module specifically targeting hypnoprenatal content for Indonesian Diploma III Midwifery students, and (ii) it operationalises a structured ADDIE-based design that integrates international clinical standards (International Board of Hypnotherapy, 2020) with national midwifery competency frameworks. The objective of this study is therefore to develop an Android-based hypnoprenatal e-module and to evaluate its feasibility through expert validation and user response.

## RESEARCH METHOD

### Research Design

This study used a research and development (R&D) design grounded in the ADDIE instructional-design model. The ADDIE model was selected because it provides a systematic, iterative framework that links empirical needs assessment to product validation through five sequential phases: Analysis, Design, Development, Implementation, and Evaluation, and is widely used in the development of valid, practical, and effective instructional products (Branch, 2009; Cahyadi, 2019; Rayanto & Sugianti, 2020).

### Setting and Participants

The study was conducted at the Diploma III Midwifery Study Program of STIKes Muhammadiyah Palembang, South Sumatra, Indonesia, between February and November 2020. Participants were selected purposively and comprised four groups.

The first group consisted of two material experts. Purposive selection prioritised domain complementarity: the first expert was a hypnobirthing-certified midwifery lecturer holding international hypnotherapy certification, selected to evaluate the clinical and hypnoprenatal content accuracy of the module; the second was a senior midwifery academic responsible for delivering the Holistic Care course, selected to assess curriculum alignment and pedagogical appropriateness. Two validators were considered sufficient at this stage because the module addresses a single, well-defined clinical topic (hypnoprenatal), and because both experts together covered the two primary dimensions of content validity – clinical accuracy and curriculum fit – as recommended for small-scale developmental feasibility studies in health professions education (Sugiyono, 2019).

The second group consisted of one media expert, a lecturer in Information Systems at STIMIK GI MDP Palembang with expertise in software engineering, database design, and information system analysis. A single media expert was deemed appropriate given that media validation in this study was confined to a specific, bounded technical domain (Android application interface, navigation logic, and visual design) rather than a broad multimedia production context. This approach is consistent with R&D feasibility studies at the early development stage, where the primary purpose of expert review is to identify critical design errors prior to user testing rather than to establish psychometric reliability of the validation instrument (Branch, 2009).

The third group consisted of one course lecturer who had taught the Holistic Care course, selected to provide a practitioner perspective on the module's usability and instructional fit within the existing course structure.

The fourth group consisted of 20 fourth-semester Diploma III Midwifery students enrolled in the Holistic Care course, divided across a small-group pilot ( $n = 9$ ) and a large-group field test ( $n = 20$ , inclusive of the pilot participants in the expanded trial). This sample size follows the user-testing guidelines recommended for formative evaluation in instructional design, which specify a minimum of 10–20 participants for small-group trials and 20–30 for large-group field tests (Dick et al., 2015; Tessmer, 1993). As this study was designed to evaluate feasibility rather than to test hypotheses or estimate effect sizes, a statistical power calculation was not applicable; the sample was instead sized to yield sufficient qualitative and descriptive feedback to identify usability problems and inform iterative revision (Branch, 2009). The authors acknowledge that this sample represents a single institution and a single cohort, which limits the generalisability of the user-response data; a larger, multi-site evaluation would be required to confirm findings at scale.

Inclusion criteria for student participants were: ownership of an Android smartphone with operating system version 7.0 or above, completion of the prerequisite antenatal-care module, and provision of written informed consent.

### ADDIE Procedure

The five ADDIE phases were operationalised as follows.

**Analysis.** A needs assessment was conducted through document review of the institutional curriculum and Course Learning Outcomes (CLO) for Holistic Care, in-depth interviews with two lecturers, and a structured needs questionnaire administered to 20 students. Three analytic dimensions were examined: (a) curriculum analysis, mapping CLOs against the National Indonesian Midwifery Competency Standards; (b) learner-characteristic analysis, profiling cognitive readiness, digital literacy, learning style, and device specifications using a pre-test of foundational hypnoprenatal knowledge; and (c) technology analysis, assessing device ownership and bandwidth conditions. This phase was anchored in (Dick et al., 2015) instructional-analysis principles.

The needs assessment revealed a critical pedagogical mismatch. Although 95.9% of students owned Android smartphones and 97.3% used them routinely for academic purposes, none of the lecturers in the Holistic Care course had implemented e-modules or formal digital learning systems. This low e-learning utilisation carries direct implications for students' mastery of complementary midwifery skills. Hypnoprenatal is an experiential, practice-oriented competency that requires repeated exposure to breathing techniques, relaxation induction scripts, and trimester-specific preparation protocols. Reliance on static printed modules and one-directional lecture delivery restricts students to a single, non-repeatable exposure during limited contact hours, with no mechanism for independent practice or self-assessment between sessions. Under these instructional conditions, students are likely to develop declarative knowledge of hypnoprenatal concepts while remaining underprepared to perform or teach these techniques in clinical placements. This gap between knowledge and practical readiness is particularly consequential given that Indonesian national midwifery competency standards explicitly require graduates to apply holistic and complementary care approaches in antenatal services. The needs assessment therefore confirmed not only the absence of appropriate digital resources, but also the functional risk of graduating students whose competence in complementary care remains at a theoretical rather than an applied level.

**Design.** The blueprint stage produced: (i) a content map covering hypnotic theory, suggestibility testing, and the prenatal hypnobirthing class, sourced from the International Board of Hypnotherapy curriculum; (ii) a wireframe of the application interface differentiated into student and lecturer modes, each with home, content, and activity sub-menus; and (iii) the validation instruments described in the Instrument section.

**Development.** The Android application was built in two iterative cycles. After the first prototype was constructed, it underwent Validation Round I by the material and media experts, who reviewed instructional quality, interface aesthetics, navigation logic, and clinical accuracy. Critical feedback included the addition of an admin module, expansion of brain-wave physiology content, alignment of preparation steps with trimester-specific protocols, and refinement of the title and visual style. A revised prototype incorporating all feedback then underwent Validation Round II. **Implementation.** The validated application was first piloted in a small-group user test with nine students and one lecturer, then deployed in a large-group field test with 20 students and one lecturer. Each session began with a 30-minute orientation, followed by independent use of the e-module for two weeks, after which respondents completed the user-response questionnaire and provided open-ended feedback.

**Evaluation.** A summative evaluation triangulated quantitative scores from validators and users with qualitative comments. Final revisions were applied before declaring the product feasible for deployment in the Holistic Care course.

### **Instruments**

Two validated instruments were used in this study: (i) an expert-validation questionnaire and (ii) a user-response questionnaire. The expert-validation questionnaire comprised 25 items distributed across four domains: instructional media principles (12 items), operational

management (6 items), application media (5 items), and content relevance (2 items). An additional 10-item content-relevance sub-scale was administered exclusively to material experts to assess clinical accuracy and curriculum alignment. The user-response questionnaire comprised 22 items mirroring the same four domains, adapted to reflect a student and lecturer perspective on usability and learning experience. Both instruments used a five-point Likert scale with the following anchors: 1 = Highly Unfeasible, 2 = Unfeasible, 3 = Moderately Feasible, 4 = Feasible, and 5 = Highly Feasible.

**Content Validity.** Content validity of both instruments was established prior to data collection using Aiken's Content Validity Index (Aiken's V), computed from ratings provided by two independent content reviewers who assessed each item for relevance, clarity, and representativeness relative to the construct being measured. Aiken's V was calculated using the formula:  $V = \sum s / [n c(c-1)]$ ; where  $s$  = the difference between each rater's score and the minimum possible score,  $n$  = number of raters, and  $c$  = number of scale categories. Aiken's V ranges from 0 to 1.00, with higher values indicating stronger content validity. A retention threshold of  $V \geq 0.80$  was applied, consistent with recommendations for small expert panels in educational instrument development (Aiken, 1985; Polit & Beck, 2006). Items falling below this threshold were revised or removed following discussion with the reviewers. All retained items met or exceeded the  $V \geq 0.80$  criterion, confirming adequate content validity for both instruments.

**Reliability.** Internal consistency reliability of the user-response questionnaire was assessed using Cronbach's alpha, computed from raw subscale scores obtained during the small-group pilot phase ( $n = 9$  students). The questionnaire comprised three subscales: instructional media principles (9 items, maximum score 45), operational management and application media (9 items, maximum score 45), and content relevance (10 items, maximum score 50). The overall Cronbach's alpha coefficient across the three subscales was  $\alpha = 0.809$ , which exceeds the minimum acceptable threshold of  $\alpha \geq 0.70$  recommended for research instruments in educational contexts (Nunnally & Bernstein, 1994) and is classified as good internal consistency according to the criteria proposed by George & Mallery (2003). Corrected item-total correlations ranged from 0.455 (content relevance subscale) to 0.858 (instructional media principles subscale), indicating adequate convergence between each subscale and the overall composite score. These results confirm that the user-response questionnaire demonstrated satisfactory reliability prior to large-group field testing. The authors acknowledge that the small pilot sample ( $n = 9$ ) represents a limitation of this reliability estimate, as alpha coefficients computed from small samples carry wider confidence intervals; a larger independent sample would be needed to confirm the stability of this estimate.

## Data Analysis

### Quantitative Analysis

Quantitative data from both the expert-validation and user-response questionnaires were analysed descriptively. For each respondent group, a percentage feasibility score was computed using the formula:  $P = (\sum x / \sum xi) \times 100\%$ ; where  $\sum x$  represents the sum of observed scores across all items and  $\sum xi$  represents the sum of maximum possible scores. This formula yields a single aggregate feasibility percentage for each respondent or respondent group, which was then averaged across respondents within each group to produce a group level mean feasibility score (Sudaryono, 2013). Group-level mean scores were interpreted against the five-category feasibility classification proposed by (Sudaryono, 2013), as presented in Table 1.

**Table 1.** Feasibility classification criteria

| Percentage Score (%) | Category            |
|----------------------|---------------------|
| 81-100               | Highly Feasible     |
| 61-80                | Feasible            |
| 41-60                | Moderately Feasible |
| 21-40                | Unfeasible          |
| 0-20                 | Highly Unfeasible   |

A minimum threshold of >60% was applied as the criterion for acceptability: a product was deemed ready for implementation only when mean feasibility scores from both expert validators and user respondents independently exceeded this threshold (Sudaryono, 2013). This two-source criterion was adopted to ensure that judgements of feasibility were not dependent on a single respondent group alone.

To examine the consistency of responses within each respondent group, inter-item agreement was further inspected at the subscale level by computing mean scores and standard deviations for each domain (instructional media principles, operational management, application media, and content relevance). Subscale-level inspection allowed identification of specific areas of relative strength or concern in the e-module's design, beyond what aggregate scoring alone could reveal. For the user-response data, individual-level percentage scores were also computed to examine the range of student responses and identify outliers whose ratings diverged substantially from the group mean, as individual variation in user experience can mask important usability issues when only aggregate scores are reported (Branch, 2009).

Changes in feasibility scores between Validation Round I and Validation Round II were compared descriptively to document the direction and magnitude of improvement following each revision cycle. No inferential statistical tests were applied, as the study was designed to evaluate feasibility rather than to test hypotheses or estimate population parameters, and the small number of validators precluded meaningful significance testing (Tessmer, 1993).

### **Qualitative Analysis**

Qualitative data comprising open-ended comments from expert validators and users were analysed using a directed content analysis approach (Hsieh & Shannon, 2005). Comments were first transcribed verbatim, then coded inductively into descriptive categories aligned with the four instrument domains. Codes were subsequently reviewed and consolidated into thematic clusters representing (i) content accuracy and clinical appropriateness, (ii) interface usability and navigational logic, (iii) instructional sequencing and learning support, and (iv) technical performance. Themes were then used to prioritise and guide iterative revision of the e-module between validation rounds and following user testing.

Quantitative and qualitative findings were integrated in the summative evaluation phase using a convergent triangulation approach: expert percentage scores were examined alongside thematic comments to determine whether quantitatively lower-scoring domains corresponded to areas of concentrated qualitative critique, thereby providing a more complete basis for revision decisions than either data type could offer independently (Creswell & Creswell, 2018).

### **Ethical Considerations**

Ethical clearance was granted by the Health Research Ethics Committee of Poltekkes Kemenkes Palembang (No. 087/KEPK/Adu.2/II/2020). All participants provided written informed consent. Data were anonymised and stored on a password-protected server accessible only to the research team.

## **RESULTS AND DISCUSSIONS**

### **Results**

#### **Analysis Phase**

Curriculum analysis confirmed that hypnoprenatal is positioned as a hallmark competency within the Holistic Care course at the institution but lacks dedicated instructional media. Learner-characteristic analysis showed that students were predominantly visual-auditory learners with moderate prior knowledge of hypnotherapy (mean pre-test 51.2%) and high digital literacy.

Technology analysis confirmed universal Android device ownership but no existing institutional Android-based learning resource for the course.

### Design Phase

The blueprint generated three deliverables: a content architecture organised into Introduction, Prenatal Hypnobirthing Class, and Hypnosis in Labour; an interface wireframe with welcome, login, profile, materials (text, video, references), and activity (evaluation, assignments, group discussion, identity) sub-menus; and the validation instruments. Source content was anchored to the International Board of Hypnotherapy curriculum to ensure international standardisation.

### Development Phase

Validation Round I yielded mean scores of 76.5% (Feasible) from media experts and 58.1% (Moderately Feasible) from material experts. Critical recommendations included incorporating an admin function, redesigning visuals, adding brain-wave content, and aligning preparation steps with trimester-specific protocols. Following comprehensive revision, Validation Round II produced markedly improved results, summarised in Tables 2 and 3.

**Table 2.** The round-II validation by media expert (n = 1)

| Domain                         | Score Obtained | Maximum Score | Percentage (Category)   |
|--------------------------------|----------------|---------------|-------------------------|
| Instructional media principles | 54             | 60            | 90.0% (Highly Feasible) |
| Operational management         | 27             | 30            | 90.0% (Highly Feasible) |
| Application media              | 23             | 25            | 92.0% (Highly Feasible) |
| Overall mean                   | 104            | 115           | 90.4% (Highly Feasible) |

**Table 3.** Round-II validation by material experts (n = 2)

| Domain                         | Validator 1 (%) | Validator 2 (%) | Mean (Category)         |
|--------------------------------|-----------------|-----------------|-------------------------|
| Instructional media principles | 100.0           | 90.0            | 95.0% (Highly Feasible) |
| Operational management         | 100.0           | 96.7            | 98.3% (Highly Feasible) |
| Content relevance              | 98.0            | 94.0            | 96.0% (Highly Feasible) |
| Overall mean                   | 99.3            | 93.6            | 96.3% (Highly Feasible) |

As shown in Tables 2 and 3, the e-module attained mean scores of 90.4% from the media expert and 96.3% from material experts—both within the "Highly Feasible" range. The aggregated expert validity index was 93.4%, exceeding the institutional cut-off of 80% for product readiness.

### Implementation Phase

Small-group user testing (n = 9 students, 1 lecturer) yielded student response scores of 85.4% on instructional media principles, 83.9% on application media, and 82.9% on content relevance, with an overall mean of 84.1% (Highly Feasible). Lecturer-response scores at this stage were Feasible (66.2% overall; Table 4). Qualitative feedback indicated installation difficulties, requests for personal-chat features alongside the existing group discussion, calls for more visually engaging design, and requests for cross-platform (iOS, web) availability.

**Table 4.** Lecturer response (small-group test, n = 1)

| Domain                         | Score | Maximum | Percentage (Category) |
|--------------------------------|-------|---------|-----------------------|
| Instructional media principles | 40    | 60      | 66.7% (Feasible)      |
| Operational management         | 21    | 30      | 70.0% (Feasible)      |
| Application media              | 17    | 25      | 68.0% (Feasible)      |
| Content relevance              | 33    | 55      | 60.0% (Mod. Feasible) |
| Overall mean                   | 111   | 170     | 66.2% (Feasible)      |

Comments from the lecturer recommended a more attractive interface, expanded coverage of general hypnosis theory, and tighter alignment of imagery with content. After targeted revision,

the large-group test (n = 20 students, 1 lecturer) returned substantially improved scores: student response 90.1% and lecturer response 95.3%, both within the "Highly Feasible" range.

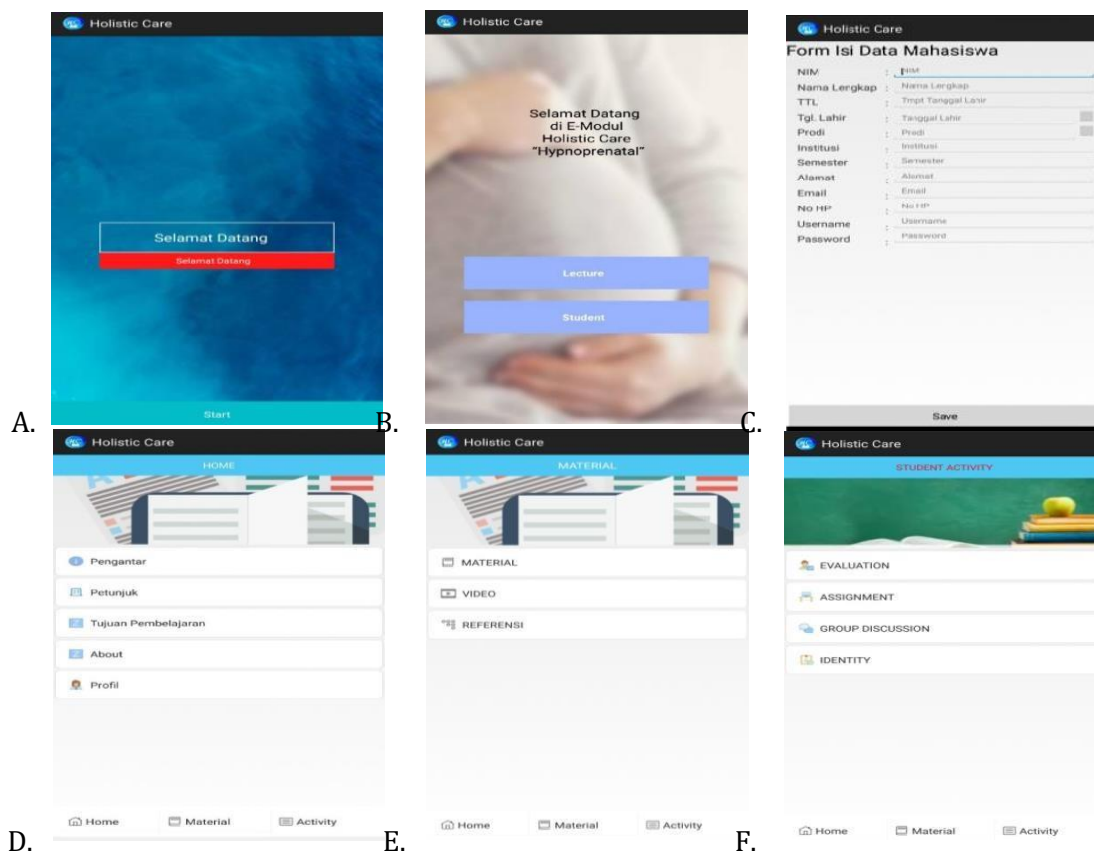
### Evaluation Phase

Triangulated evaluation confirmed that the final product met all four feasibility domains. Aggregated mean scores across expert and user evaluations are presented in Table 5.

**Table 5.** Summary of feasibility across evaluation sources

| Evaluation Source          | n  | Mean Score (%) | Category        |
|----------------------------|----|----------------|-----------------|
| Media expert (Round II)    | 1  | 90.4           | Highly Feasible |
| Material expert (Round II) | 2  | 96.3           | Highly Feasible |
| Student small-group test   | 9  | 84.1           | Highly Feasible |
| Student large-group test   | 20 | 90.1           | Highly Feasible |
| Lecturer large-group test  | 1  | 95.3           | Highly Feasible |
| Aggregated mean            | 33 | 91.2           | Highly Feasible |

The results of the interface and content revisions are presented in Figure 1 and Figure 2.



**Figure 1.** The initial menu view of the e-module consists of a welcome menu (A), login as a lecturer or student (B), student data (C), home menu: introduction, instructions, learning objectives, about and author profile (D), material menu: materials, videos, and references (E), and activity menu: evaluation, assignments, group discussion, and identity (F)



Figure 2. Display of the content in the home, material, and activity menu consists of learning objectives (A), instructor profile (B), user instructions (C), learning materials (D), evaluation (E), and group discussion (F)

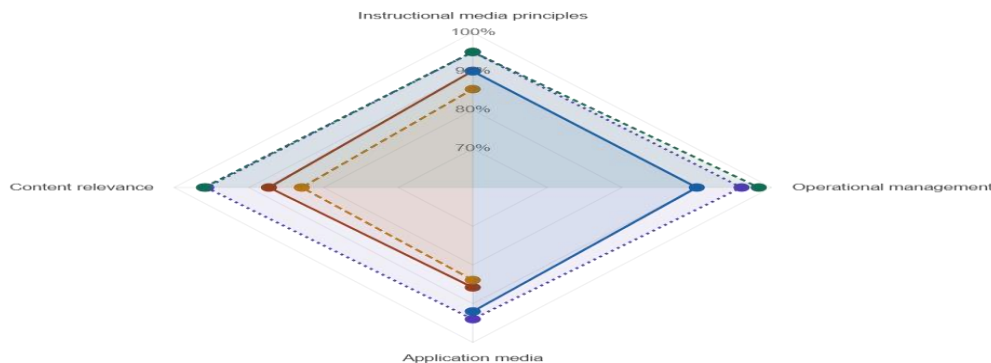


Figure 3. Radar chart of mean feasibility percentages across four instructional domains by evaluator type

Scores are derived from Round II expert validation (media expert, n = 1; material experts, n = 2) and user-response testing (students small-group, n = 9; students large-group, n = 20; lecturer, n = 1). All domain scores exceed the 81% threshold for the "Highly Feasible" category (Sudaryono, 2013). Axes range from 60% to 100%.

**Discussions**

This study developed and assessed an Android-based e-module on hypnoprenatal material for Diploma III Midwifery students using the ADDIE design framework. The aggregated feasibility score of 91.2% places the product firmly in the "Highly Feasible" range and supports its readiness for routine deployment in the Holistic Care course. Three substantive points warrant deeper discussion: the methodological strength of the ADDIE design, the convergence of findings

with the international m-learning evidence base, and the curricular implications of integrating evidence-based hypnopenatal content into Indonesian midwifery education.

The improvement of material-expert validation scores from 58.1% in Round I to 96.3% in Round II illustrates the formative power of the ADDIE iterative cycle. This pattern is consistent with a substantial body of R&D research showing that two-cycle expert validation systematically refines content accuracy, interface usability, and pedagogical alignment (Branch, 2009; Cahyadi, 2019; Mahardika et al., 2024). The structured separation of analysis from design proved particularly valuable: pre-development needs assessment surfaced the digital-readiness paradox near universal smartphone ownership coupled with negligible academic use that would not have been visible in a less systematic design (Pratiwi et al., 2021; Susanti & Mandiri, 2024). The findings therefore reaffirm ADDIE as a robust framework for developing competency-aligned mobile learning resources in Indonesian health-professions education.

The high feasibility scores observed in this study converge with international meta-analytic evidence on mobile learning in health professions education. (Kyaw et al., 2019) reported that m-learning yields equivalent or superior outcomes compared with traditional teaching for knowledge and skills acquisition; (Martinengo et al., 2024) extended this with meta-analytic evidence for spaced digital education improving knowledge, confidence, and behaviour; and (Ladjar et al., 2024) documented positive effects of technology mediated midwifery education on clinical reasoning. The student response score of 90.1% in our large-group test sits comfortably within the 80–95% range typically reported for Android-based e-modules in Indonesian higher education (Mahardika et al., 2024; Subastian & Astuti, 2021; Yanindah & Ratu, 2021), suggesting that our product meets, rather than exceeds, an established benchmark of feasibility.

Comparative analysis with prior e-module studies. To contextualise the present findings, Table 6 presents a comparison of feasibility scores between this study and comparable Android-based e-module development studies in health and higher education contexts.

**Table 6.** Comparison of feasibility scores with prior android-based e-module studies

| Study / Context                             | Domain Penilaian                              | Feasibility / Validity Score | Category / Interpretation             | Citation                    |
|---|---|------------------------------|---------------------------------------|-----------------------------|
| Alternating Current e-module (physics, SMA) | Expert validation (material, media, language) | 84%                          | Very feasible                         | (Oktavia, 2022)             |
|   | Student perceptions                           | 82%                          | Very feasible                         |                             |
| Math multimedia e-module (JHS)              | Material validation (2 validators)            | 86% and 92%                  | Very feasible                         | (Arjoni et al., 2025)       |
|   | Media validation (2 validators)               | 57.33% and 86.33%            | Fairly-very feasible                  |                             |
|   | Student practicality                          | 82.57%                       | Very feasible / very practical        |                             |
| SUGAR e-module (math, SMP)                  | Expert validation (material + media)          | 98%                          | Very good / valid                     | (Yanindah & Ratu, 2021)     |
| Android e-module - fractions (grade 5)      | Validation round 1 (experts)                  | 71.43%                       | Fairly valid (feasible with revision) | (Syahputra & Mustika, 2022) |
|   | Validation round 2 (experts)                  | 95.94%                       | Very valid / feasible                 |                             |
| Network OS e-module (SMK)                   | Media expert validation                       | 86.6%                        | Very feasible                         | (Imamah & Hasanah, 2022)    |
|   | Material expert validation                    | 85%                          | Very feasible                         |                             |
|   | Small-scale student trial                     | 83.26%                       | Feasible                              |                             |

As shown in Table 6, expert validation scores across five comparable Android-based e-module studies ranged from 71.43% to 98.00%, while student response scores ranged from 82.00% to 83.26% – all within the "Feasible" to "Highly Feasible" range. The feasibility scores obtained in the present study (material experts 96.3%, media expert 90.4%, student large-group response 90.1%) are consistent with and in several domains exceed these benchmarks. Notably, the pattern

of marked score improvement between validation rounds – most evident in Syahputra & Mustika (2022), who reported a rise from 71.43% to 95.94% across two rounds – closely mirrors the trajectory observed here (58.1% to 96.3%), confirming the formative value of iterative ADDIE-based revision cycles. Collectively, the comparative data indicate that the present e-module meets established feasibility standards while extending Android-based e-module development into a previously unrepresented domain: complementary and holistic care in Indonesian Diploma III Midwifery education.

Several mechanisms plausibly underlie this consistency. First, mobile devices afford ubiquitous access, supporting Knowles's andragogical premise that adult learners benefit from autonomous, just-in-time learning (Knowles et al., 2020). Second, the multimodal nature of e-modules – combining text, image, audio, and video – engages a wider cognitive bandwidth than print modules, reducing extraneous cognitive load in line with Mayer's cognitive theory of multimedia learning (Mayer, 2021). Third, embedded interactive evaluations support retrieval practice, an evidence-based learning strategy with strong empirical support (Karpicke & Roediger, 2020). The present e-module purposefully integrated all three mechanisms, which may explain its rapid acceptance among users.

Beyond its design merit, the most distinctive contribution of this study is the formalisation of hypnoprenatal content as a structured, digitally accessible competency for Indonesian midwifery students. Recent high-quality reviews provide convincing evidence that hypnobirthing reduces childbirth fear, anxiety, labour pain, and antenatal depression (Betriana et al., 2025; Catsaros & Wendland, 2023; Fernandez-Gamero et al., 2024; Yaqoob et al., 2024). Equipping midwives the first line maternity care providers in Indonesia with formal training in this complementary modality has the potential to translate international evidence into routine antenatal practice, thereby contributing to the World Health Organization's vision of respectful, woman-centred maternity care (World Health Organization, 2023)

That hypnoprenatal content was almost entirely absent from existing Indonesian midwifery e-modules prior to this work suggests a broader pattern: digital pedagogy in Indonesian midwifery has clustered around procedural skills (e.g., partography, intrapartum care) while neglecting holistic and complementary domains (Giena et al., 2022; Pratiwi et al., 2021; Susanti & Mandiri, 2024). Our e-module thus partially redresses this imbalance and opens a replicable pathway for integrating other complementary topics: prenatal yoga, perineal massage, mindfulness-based stress reduction into mobile-learning curriculum.

Three limitations warrant acknowledgement. First, the study assessed feasibility and user response but did not measure learning effectiveness; without a pretest–posttest design, we cannot claim impact on knowledge or clinical performance. Second, validation involved a small expert panel (one media expert, two material experts), which may limit the breadth of perspectives captured; future work should employ larger panels and consider Aiken's V-based content validation across multiple raters. Third, the application is currently Android-only, excluding iOS users and potentially limiting scalability. Practically, the validated e-module is ready for institutional adoption in the Holistic Care course and may serve as a template for similar developments in other Indonesian midwifery programmes. Theoretically, the study reinforces ADDIE as a transferable framework for competency-based digital instructional design. Methodologically, future studies should (i) employ randomised pretest–posttest controlled trials to quantify effects on hypnoprenatal knowledge and clinical skills, (ii) develop cross-platform versions, (iii) integrate analytics to monitor longitudinal engagement, and (iv) test the e-module's downstream effect on women's childbirth experiences when delivered by graduating midwives.

## CONCLUSION

An Android-based e-module on hypnoprenatal material was successfully developed for Diploma III Midwifery students using the ADDIE framework. After two iterative validation cycles, the

product attained an aggregated feasibility score of 91.2% (Highly Feasible), with consistently strong evaluations from media experts (90.4%), material experts (96.3%), students (90.1% in large-group testing), and lecturers (95.3%). The e-module contributes to complementary care integration by formalising hypnoprenatal, an evidence based approach to reducing childbirth anxiety and labour pain into a curriculum-aligned, competency-referenced learning medium anchored to International Board of Hypnotherapy standards. Its modular architecture is replicable across other complementary topics such as prenatal yoga and mindfulness-based stress reduction, providing a scalable template for holistic curriculum expansion in Indonesian midwifery education.

For digital transformation, the study demonstrates that the gap between students' high digital readiness (95.9% Android ownership) and low digital pedagogy is bridgeable through structured R&D. Beyond delivery convenience, the e-module establishes mobile learning as a pedagogical necessity for practice-oriented competencies requiring repeated, self-paced engagement, signalling a broader shift from passive lecturer-centred instruction toward active, competency-based learning that may catalyse wider digital curriculum reform across Diploma III Midwifery programs. Future work should establish learning effectiveness through experimental designs, expand to cross-platform delivery, and evaluate downstream clinical impact on childbirth experiences of women cared for by trained graduates.

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