Proceedings Academic Universitas Jambi
Volume 2, Issue 3, September, 2026

The Effectiveness of Electronic Portfolios and Digital Logbooks in Community-Based Interprofessional Education: A Systematic Review

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Abstract

Background: Community-based Interprofessional Education (IPE) is critical for preparing health profession students for collaborative primary healthcare delivery. However, evaluating collaborative competencies in decentralized community settings presents significant logistical and pedagogical challenges. Electronic portfolios (e-portfolios) and digital logbooks have emerged as pivotal tools to support real-time documentation and assessment. **Objective**: This systematic review aims to evaluate the effectiveness of e-portfolios and digital logbooks in enhancing collaborative competencies and learning outcomes among health profession students in community-based IPE. **Method**: A systematic search was conducted across Scopus, PubMed, and Taylor & Francis databases following PRISMA 2020 guidelines for studies published between 2016 and 2026. Studies assessing digital logbooks, e-portfolios, or mobile applications in community-based or primary health care IPE interventions were included. Educational outcomes were categorized using Kirkpatrick's model of educational evaluation. Methodological quality was critically appraised using the relevant Joanna Briggs Institute (JBI) Critical Appraisal Tools. **Result**: A total of 20 studies met the inclusion criteria. Synthesis of the evidence demonstrated that digital logbooks and e-portfolios significantly enhanced students' reflective practice, interprofessional communication, and role clarification (Kirkpatrick Level 2a/2b). Features such as real-time activity logging, embedded rubric assessments, and dynamic feedback loops facilitated timely mentorship from clinical preceptors in community settings. **Conclusion**: Electronic portfolios and digital logbooks are highly effective instruments for tracking and fostering collaborative competencies in community-based IPE. Integrating user-friendly mobile interfaces with structured reflective frameworks is essential for optimizing digitalization and quality assurance in health professions education.

Keywords: Electronic Portfolio; Digital Logbook; Interprofessional Education; Community-Based Education; Systematic Review.

Cite This Article

Fitri, A.D., Herlambang, H., Subandi, A., Puspasari, A., Kusdiyah, E., Aurora, W.I.D. (2026). The Effectiveness of Electronic Portfolios and Digital Logbooks in Community-Based Interprofessional Education: A Systematic Review. Proceedings Academic Universitas Jambi, 2(3): e59994. DOI: https://doi.org/10.22437/proca.v2i3.59994

Editor

Dian Arisandy Eka Putra Sembiring, S.Pd., M.Pd.

Article info

Received: August 4, 2026 . Revised: August 26, 2026 . Accepted: September 1, 2026

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INTRODUCTION

Primary healthcare systems globally face increasingly complex challenges, demanding a workforce equipped to deliver integrated, patient-centered, and collaborative care [1]. Interprofessional Education (IPE) is an educational approach where students from two or more health professions learn about, from, and with each other. It has been widely recognized by the World Health Organization (WHO) as an essential strategy to foster Interprofessional Collaborative Practice (IPCP) and optimize health outcomes [2,3]. Integrating IPE into primary healthcare and community-based settings is particularly vital, as it exposes health profession students to complex social determinants of health, population management, and interdisciplinary teamwork in real-world environments [4].

Despite the established educational value of community-based IPE, monitoring and assessing student performance during field placements present significant logistical and pedagogical hurdles [5]. Traditional assessment methods heavily rely on paper-based logbooks and retrospective self-reports. These paper-based approaches are increasingly criticized for several structural limitations:

- They are susceptible to recall bias and delayed completion [6].
- They lack real-time tracking capabilities for clinical preceptors and academic faculty [7].
- They offer limited capacity to deliver timely, formative, and constructive feedback [8].
- They hinder the systematic aggregation of data for institutional quality assurance and curriculum evaluation [9].

To mitigate these challenges, the digitalization of health professions education has accelerated the adoption of Electronic Portfolios (e-portfolios) and digital logbooks [10]. These web- and mobile-based tools enable real-time documentation of interprofessional learning activities, structured reflective entries, direct uploading of multimedia evidence, and immediate integration of rubrics for faculty assessment [11,12]. While the utility of e-portfolios has been extensively studied in hospital-based clinical rotations and single-discipline training, their specific application, operational effectiveness, and pedagogical impact within community-based IPE remain dispersed across literature [13].

Recent systematic reviews have evaluated e-portfolio adoption in medical and nursing education independently [10,14]. However, a critical literature gap exists regarding how digital tracking mechanisms function within the unique dynamics of decentralized, community-based interprofessional learning. Community settings often involve non-traditional supervisory models, diverse interprofessional student cohorts (e.g., medicine, nursing, pharmacy), and remote learning environments [15]. A comprehensive synthesis evaluating how digital logbooks capture collaborative competencies (such as communication, role clarification, and team functioning) and drive student learning outcomes in primary care contexts is urgently needed.

This systematic review aims to synthesize existing empirical evidence regarding the effectiveness of electronic portfolios and digital logbooks in community-based IPE. Specifically, this review addresses the following research questions:

1. What are the key features and operational characteristics of e-portfolios and digital logbooks utilized in community-based IPE?
2. How effective are e-portfolios and digital logbooks in enhancing health profession students' collaborative competencies and learning outcomes, as categorized by Kirkpatrick's model of educational evaluation?
3. What are the primary facilitators and barriers associated with the implementation and assessment of digital logbooks in community-based primary healthcare settings?

METHODS

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) statement guidelines [16]. The review protocol was established prior to data extraction to ensure methodological rigor and minimize reporting bias.

Eligibility Criteria

Eligibility criteria were structured based on the PICOS framework (Population, Intervention, Comparator, Outcome, and Study Design) as detailed in Table 1.

Table 1. PICOS Eligibility Criteria

Parameter	Inclusion Criteria	Exclusion Criteria
Population (P)	Health profession undergraduate/postgraduate students (Medicine, Nursing, Pharmacy, Public Health, Dentistry, Allied Health) participating in Interprofessional Education (IPE).	Non-health profession students; single-discipline studies without interprofessional interaction.
Intervention (I)	Implementation of electronic portfolios (e-portfolios), digital logbooks, mobile applications, or web-based logging tools for tracking learning activities.	Conventional paper-based logbooks only; interventions without digital tracking components.
Comparator (C)	Traditional paper logbooks, non-digital assessment methods, historical cohorts, or studies without a control group.	None (studies without comparators were eligible for inclusion).
Outcome (O)	Collaborative competencies (communication, role clarification, teamwork, values/ethics), learning engagement, reflective practice, or assessment utility categorized via Kirkpatrick's educational outcomes.	Studies focusing solely on technical software usability without evaluating educational or collaborative outcomes.
Setting (S)	Community-based settings, primary health care centers (e.g., Puskesmas), community health projects, or rural field placements.	Strictly hospital-based clinical rotations; laboratory-based simulations without community engagement.
Study Design	Empirical studies (Randomized Controlled Trials, quasi-experimental, cohort, mixed-	Review articles, editorials, conference abstracts lacking full text,

	methods, and qualitative studies) published between 2016 and 2026 in English.	opinion pieces, and book chapters.

Information Sources and Search Strategy

A comprehensive search strategy was executed across three electronic databases: PubMed, Scopus, and Taylor & Francis online. The search period covered publications from January 2016 to August 2026. Medical Subject Headings (MeSH) terms, Title/Abstract keywords, and Boolean operators (AND, OR, *) were combined.

The complete search strings for each database were operationalized as follows:

- **PubMed:**

  (("electronic portfolio"[Title/Abstract] OR "e-portfolio"[Title/Abstract] OR "digital logbook"[Title/Abstract] OR "electronic logbook"[Title/Abstract] OR "e-logbook"[Title/Abstract] OR "digital portfolio"[Title/Abstract]) AND ("interprofessional education"[Title/Abstract] OR "IPE"[Title/Abstract] OR "interprofessional learning"[Title/Abstract] OR "interprofessional collaborative practice"[Title/Abstract]) AND ("community-based"[Title/Abstract] OR "primary care"[Title/Abstract] OR "community health"[Title/Abstract] OR "fieldwork"[Title/Abstract]))

- **Scopus:**

  TITLE-ABS-KEY (("electronic portfolio" OR "e-portfolio" OR "digital logbook" OR "electronic logbook" OR "e-logbook" OR "digital portfolio") AND ("interprofessional education" OR "IPE" OR "interprofessional learning" OR "interprofessional collaborative practice") AND ("community-based" OR "primary care" OR "community health" OR "fieldwork"))

- **Taylor & Francis:**

  [[All: "electronic portfolio"] OR [All: "e-portfolio"] OR [All: "digital logbook"] OR [All: "e-logbook"]] AND [[All: "interprofessional education"] OR [All: "IPE"]] AND [[All: "community-based"] OR [All: "primary care"]]

In addition, reference lists of included articles were manually searched (backward search) to identify relevant studies that might have been missed by the database search.

Study Selection and Data Management

All identified records were exported into Rayyan AI software for deduplication and screening management [17]. Two reviewers independently screened the titles and abstracts against the predefined inclusion criteria. Full-text articles of potentially eligible studies were subsequently retrieved and evaluated for final inclusion. Discrepancies between reviewers at both screening stages were resolved through discussion or consultation with a third senior reviewer until consensus was reached.

The selection process was documented using the standard PRISMA 2020 flow diagram.

Data Extraction

Data were systematically extracted using a standardized data extraction form created in Microsoft Excel. Extracted information included:

1. Study haracteristics: Author(s), year of publication, and study design.
2. Participant Details: Target health disciplines, sample size, and community setting (e.g., primary care center, community health placement).
3. Evaluation methods : Intervention Features: Digital platform type (e-portfolio, e-logbook, mobile app), key operational features (real-time logging, embedded rubrics, feedback mechanisms).
4. Educational Outcomes: Collaborative competencies assessed, Kirkpatrick evaluation level (Level 1: Reaction, Level 2a: Modification of Attitudes/Perceptions, Level 2b: Acquisition of Knowledge/Skills, Level 3: Behavioral Change), and key findings/conclusions.
5. Justification for E-Logbook development

Critical Appraisal of Methodological Quality

The methodological quality of included studies was rigorously appraised using the Joanna Briggs Institute (JBI) Critical Appraisal Tools [18]. Depending on the specific design of each included study, appropriate JBI checklists were applied. Each item on the checklist was scored as *"Yes"*, *"No"*, *"Unclear"*, or *"Not Applicable"*. Overall quality scores were calculated to classify studies into low, moderate, or high quality. Studies were not excluded based solely on quality scores, but the appraisal findings were used to contextualize the strength of evidence in the synthesis and discussion.

RESULTS

Study Selection

The initial search across three electronic databases (Scopus, PubMed, and Taylor & Francis) yielded a total of 284 records (Scopus: n = 118, PubMed: n = 92, Taylor & Francis: n = 74). After importing all records into Rayyan AI, 62 duplicate records were identified and removed, leaving 222 records for title and abstract screening. During the title and abstract screening, 186 records were excluded for failing to meet the eligibility criteria (e.g., non-IPE contexts, hospital-only settings, paper-based only, or non-empirical publications). The full texts of the remaining 36 studies were retrieved and assessed in detail.

Following full-text evaluation, 16 studies were excluded for specific reasons:

- Incorrect setting (strictly hospital-based clinical rotations without primary care/community components, n = 6).
- Lack of collaborative or interprofessional educational outcomes (n = 7).
- Focus purely on technical software architecture without student/faculty evaluation (n = 3).

Ultimately, 20 studies met all inclusion criteria and were included in the systematic review and qualitative synthesis. Figure in illustrates the complete selection process (PRISMA 2020 Flow Diagram).

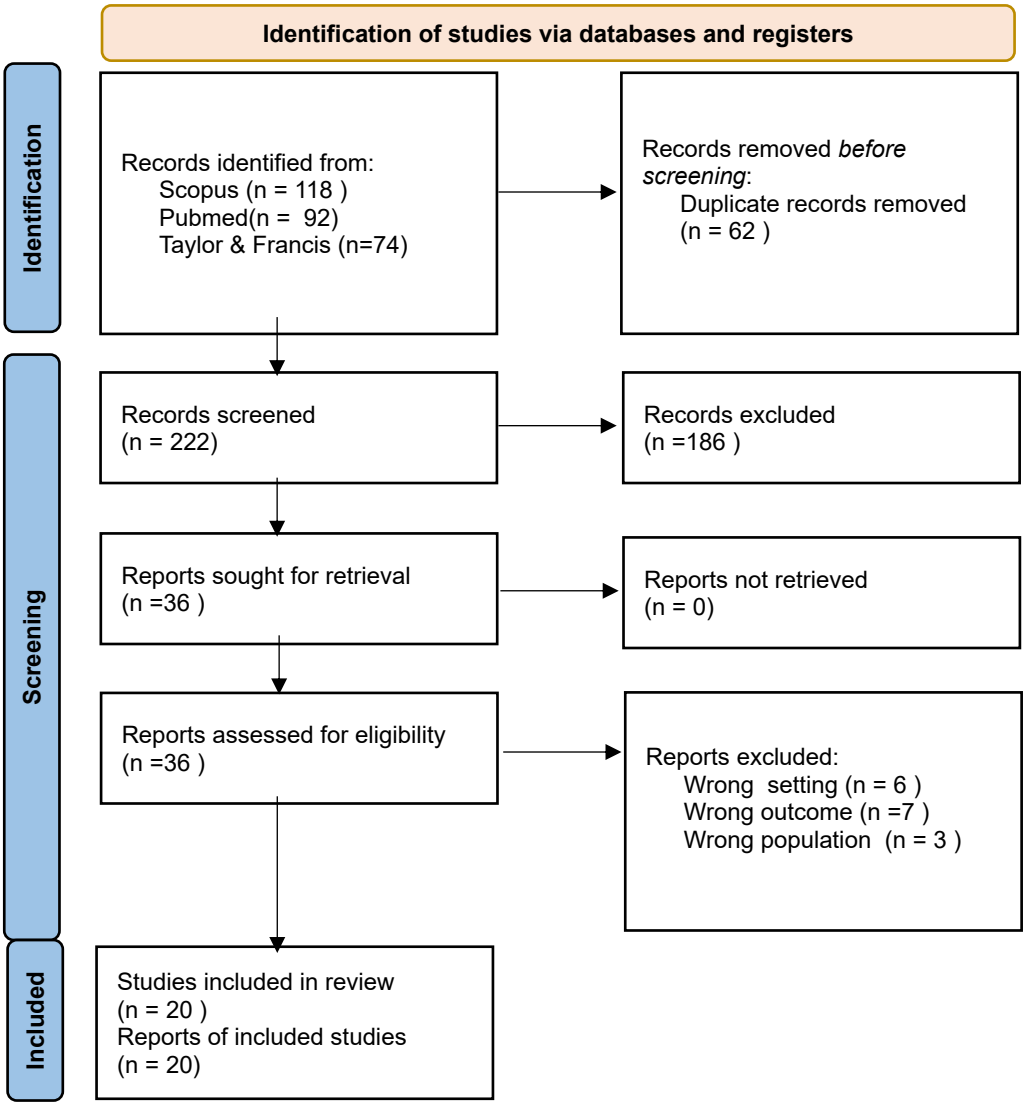

Figure 1. PRISMA 2020 Flow Diagram of Study Selection Process.

Methodological Quality Appraisal (JBI Risk of Bias)

The 20 included studies were critically appraised using the appropriate Joanna Briggs Institute (JBI) Critical Appraisal Tools. Overall methodological quality was high across the dataset:

- High Quality (80%-100% JBI criteria met): 14 studies demonstrated clear temporal relationships, valid outcome measurements, and robust qualitative data analysis.
- Moderate Quality 60%-79% JBI criteria met): 6 studies lacked control groups or had minor limitations in describing strategies to address confounding factors.

- Low Quality (<60%JBI criteria met): 0 studies. No studies were excluded based on quality criteria.

Characteristics of Included Studies

A comprehensive summary of the included studies, their operational features, assessed competencies, and Kirkpatrick educational levels is presented in **Table 2**.

Table 2. Extraction Matrix of Included Studies (n = 20)

No	Study Characteristics (Author, Year, Design)	Participant Details (Target Disciplines, Sample Size, Setting)	Evaluation Methods & Intervention Features (Digital Platform, Key Features)	Educational Outcomes (Competencies Assessed, Kirkpatrick Level, Key Findings)	Justification for E-Logbook / Portfolio Development
1	**Godwin et al. (2022)** **Design:** Process Evaluation & Modified Delphi Panel (2 rounds)	**Disciplines:** Medicine (n=25), Nursing (n=7), Pharmacy (n=1), Clinical Psychology (n=1), Healthcare Administration (n=1) **Sample Size:** 35 experts (Round 1), 34 experts (Round 2) **Setting:** Academic & Community Healthcare/VA Centers	**Platform Type:** Performance Portfolio / Health Care Improvement Portfolio **Key Features:** Documentation across 7 domains (Personal Statement, Training/Certification , Leadership/Admin, QI Projects, Teaching/Curriculum, Honors, Supporting Docs)	**Competencies:** QI Leadership, Interprofessional Teamwork, Clinical Expertise & Mentorship **Kirkpatrick Level:** Level 2a (Attitude/Perception Modification) & Level 3 (Behavioral Change) **Key Findings:** Strong expert consensus achieved (Mean Completeness: 8.4; Clarity: 8.3). Successfully facilitated academic promotion (Associate Professor) and tenure.	Traditional metrics (grants & peer-reviewed publications) fail to capture interprofessional contributions to sustained Quality Improvement (QI). The portfolio provides standardized documentation of individual impact for academic promotion and clinical career evaluation.
2	**Domac et al. (2013)** **Design:** Retrospective Qualitative Study (Portfolio Content Analysis & Thematic Interviews)	**Disciplines:** Medicine, Speech & Language Therapy (S&LT), Social Work (DMU & UoL) **Sample Size:** 85 randomized portfolios & 35 student interviews **Setting:** Community, Hospital, & Higher Education (South Trent)	**Platform Type:** Print Reflective Portfolio / Interprofessional E-Portfolio (Three IPE Strands) **Key Features:** Periodic prospective reflection (Knowledge, Skills, Attitudes, Behaviors), self-assessment, and field practice integration	**Competencies:** Interprofessional Knowledge, Collaboration/Communicat ion Skills, Professional Boundaries, De-stereotyping **Kirkpatrick Level:** Level 1 (Reaction), Level 2a (Perception/Attitude Shift), Level 2b (Knowledge/Skills) **Key Findings:** All students successfully reflected on progressive growth in knowledge and collaborative skills. Reflective quality improved over time, despite initial difficulties in articulating skill/attitude reflection.	Requires a valid, formative, and summative assessment tool to evaluate complex, abstract IPE competencies that traditional exams cannot capture. Portfolios foster self-analysis and reflective accountability.
3	**Thistlethwaite (2015)** **Design:** Narrative Review & Curriculum Framework	**Disciplines:** Medicine, Nursing, Midwifery, Pharmacy, Dentistry, Dietetics, Physical Therapy	**Platform Type:** IPE Assessment Portfolio / Blended & Online Learning **Key Features:** Centralized evidence	**Competencies:** Teamwork, Roles & Responsibilities, Interprofessional Communication, Ethics & Reflection	Directly observing interprofessional student teams on a continuous basis is challenging due to fragmented schedules. Portfolios offer

	Analysis (Lee et al. 4-Dimension Framework)	**Sample Size:** Literature & National Accreditation Standards (AHPRA & GMC) **Setting:** Higher Education & Primary/Secondary Healthcare Settings	collection for IPE learning outcomes, repeated observations, multi-source feedback (MSF/360-degree), T-OSCE	**Kirkpatrick Level:** Level 1 (Reaction), Level 2a (Attitudes), Level 2b (Knowledge/Skills), Level 3 (Clinical Behavior) **Key Findings:** Evaluating large student cohorts efficiently requires an IPE portfolio as a centralized hub to map evidence from real-world clinical exposure and simulated practice.	structured evidence of progressive competency development required by accreditation bodies.
4	**Kandasamy et al. (2024)** **Design:** Narrative Review & Curriculum Implementation Model (CIPP Framework & Kirkpatrick Model)	**Disciplines:** Undergraduate Medical, Nursing, Midwifery, and Allied Health Sciences Students **Sample Size:** N/A (Literature-based Implementation Model) **Setting:** Tertiary Care Teaching Hospitals & Community Settings	**Platform Type:** IPE Portfolio / E-Portfolio (CIPP Model) **Key Features:** Self-assessment, periodic facilitator feedback, case study assignments (PBL/CBD), observation checklists, and reflective narratives	**Competencies:** Roles & Responsibilities, Values/Practice Ethics, Interprofessional Communication, Teamwork **Kirkpatrick Level:** Level 1 (Reaction), Level 2a/2b (Knowledge/Attitude Shift), Level 3 (Behavioral Change) **Key Findings:** CIPP-based portfolios act as a continuous evaluation tool transitioning students from novice to mastery, significantly enhancing critical thinking and patient safety culture.	Uniprofessional, isolated health education produces graduates with weak communication and teamwork skills. Reflection-driven portfolios foster deep, lifelong learning and accountability toward achieving the *Triple Aim*.
5	**Anderson et al. (2015)** **Design:** Meta-Analysis & Longitudinal Curriculum Evaluation (Biggs 3P Model & Kirkpatrick Model)	**Disciplines:** >10 Health & Social Care Professions (Medicine, Nursing, Social Work, Pharmacy, ODP, S&LT, Paramedics, OT, Midwifery, etc.) **Sample Size:** Multi-Year Cohorts of Students & Facilitators (since 2005) **Setting:** 3-University Consortium (Leicester, De Montfort, Northampton) & Community/Clinical Settings	**Platform Type:** Interprofessional Personal Portfolio (Print / Digital) **Key Features:** Continuous documentation (Strands 1–3), learning triggers, reflective case study tasks, facilitator feedback, mapping to professional standards	**Competencies:** Teamwork, Role Understanding/Boundaries, Complex Case Communication, Patient Safety **Kirkpatrick Level:** Encompasses Level 1 (Reaction), Level 2a/2b (Attitude/Knowledge Shift), Level 3 (Behavior), to Level 4a/4b (Organizational Impact & Patient Outcomes) **Key Findings:** Practice-based learning integrated with reflective portfolios transformed student understanding, elevated patient engagement, and yielded a direct impact on service quality and patient safety.	Portfolios enable horizontal and vertical integration throughout the curriculum. They record incremental competency progression flexibly across diverse health disciplines without disrupting core uniprofessional curricula.
6	**Hermasari et al. (2019)** **Design:** Qualitative Study (Content Analysis & Open-Ended Questionnaires)	**Disciplines:** Medicine (n=5) and Midwifery (n=10) **Sample Size:** 60 portfolio documents (4 weekly sections) &	**Platform Type:** Reflective IPE Portfolio **Key Features:** 4-part portfolio (Weeks 1–3 and Final Reflection), attachment of learning evidence	**Competencies:** Values & Ethics, Roles & Responsibilities, Interprofessional Communication, Teams & Teamwork (IPEC Framework) **Kirkpatrick Level:** Level 1 (Reaction) & Level 2a/2b	Assesses abstract IPE learning objectives while simultaneously serving as a formative learning tool. It promotes structured reflection, provides evidence of learning, and

		15 student questionnaires **Setting:** Community Maternal & Child Health Care (FK UNS / Moewardi Hospital)	(e.g., ICAR sheets, tutor feedback), and concrete work/study plans	(Modification of Attitudes & Knowledge) **Key Findings:** Portfolios successfully illustrated all 4 IPE core competencies through student reflections. Over two-thirds of students developed concrete, appropriate future work plans.	encourages students to formulate concrete collaborative practice plans.
7	**Karsten et al. (2015)** **Design:** Pilot Case Study / Educational Innovation Evaluation	**Disciplines:** Registered Nursing, Physical Therapist Assistant (PTA), Occupational Therapy Assistant (OTA), Food & Nutrition (DTR), Human Services/Social Work **Sample Size:** 10 students (2 per discipline) **Setting:** Urban Community College (CUNY LaGuardia)	**Platform Type:** Interprofessional ePortfolio (Digication Platform + Google Docs) **Key Features:** Web-based platform functioning as a simulated Electronic Medical Record (EMR) with tabs for each discipline, real-time co-authoring of clinical notes, teaching plans, and discharge summaries for a stroke case ("Anna")	**Competencies:** Interprofessional Communication, Role Understanding, Collaborative Care & Discharge Planning, Mutual Respect **Kirkpatrick Level:** Level 1 (Reaction) & Level 2a/2b (Attitude & Skill Enhancement) **Key Findings:** Simulated a realistic "nurses' station" environment. Enhanced cross-disciplinary understanding (e.g., Human Services educating clinical teams on social barriers, and therapy/nursing clarifying clinical data).	Traditional siloed academic training limits interprofessional teamwork. Using an ePortfolio as a shared EMR bridges clinical and academic gaps, providing real-time data access and fostering collaborative patient care skills before graduation.
8	**Imafuku et al. (2018)** **Design:** Qualitative Exploratory Case Study (Inductive Phenomenographic Analysis)	**Disciplines:** Medicine, Dentistry, Pharmaceutical Sciences, Nursing, Physical Therapy, Occupational Therapy **Sample Size:** 104 written reflective reports from e-portfolios across 26 first-year students (3 well-balanced groups) **Setting:** Showa University (Fujiyoshida Boarding Campus & Hospital Wards)	**Platform Type:** Longitudinal IPE e-Portfolio **Key Features:** 4-stage reflective writing prompts (behavioral, cognitive/difficulty, affective, goal-setting) embedded in Interprofessional PBL and Early Exposure modules, coupled with written faculty feedback	**Competencies:** Interpersonal Communication, Teams & Teamwork, Roles/Responsibilities as Group Members, Roles/Responsibilities as Health Professionals **Kirkpatrick Level:** Level 1 (Reaction) & Level 2a/2b (Perception, Knowledge, & Professional Identity Shift) **Key Findings:** Students underwent a stepwise transformation: transitioning from struggling individual learners to active group members, prioritizing collective teamwork, and developing early interprofessional identities.	Long-term e-portfolios provide an emic, longitudinal window into how students' perceptions evolve over time. They support self-directed learning, reflective habituation, and early professional identity formation.
9	**Domac et al. (2016)** **Design:** Qualitative Study (Content Analysis & Semi-Structured Interviews)	**Disciplines:** Social Work (BA & MA programs) **Sample Size:** 30 student portfolios (15 BA, 15 MA) & 14 student interviews	**Platform Type:** Reflective IPE Portfolio (Three-Strand Model) **Key Features:** Prospective self-analysis across classroom theoretical events, community	**Competencies:** Interprofessional Knowledge, Communication & Active Listening, Challenging Stereotypes, Professional Identity, Non-judgmental Practice	Portfolios move beyond simplistic competency checklists to capture deep reflective learning, critical self-analysis, and cross-boundary integration. They prepare social

		Setting: Higher Education (De Montfort University & University of Leicester) & Practice Placements	practice, and specialized workshops; guided reflection frameworks (Moon/Schön); integration with Professional Capabilities Framework (PCF)	**Kirkpatrick Level:** Level 1 (Reaction), Level 2a (Attitude/Perception Shift), & Level 2b (Knowledge/Skills) **Key Findings:** Students effectively demonstrated progressive growth in collaborative competence. Reflective writing was initially challenging (especially for skills/attitudes) but improved over time, preparing students for lifelong professional reflection.	workers for mandatory continuing professional development (CPD) and ASYE requirements.
10	**Domac et al. (2014)** **Design:** Qualitative Multiple Case Study (Content Analysis & Semi-Structured Thematic Interviews)	**Disciplines:** Medicine, Speech & Language Therapy (S&LT), Social Work (BA & MA) **Sample Size:** 85 student portfolios (40 Medicine, 15 S&LT, 15 SW-BA, 15 SW-MA; 282 total reflections) & 35 student interviews **Setting:** University Consortium & Clinical/Community Health Settings (South Trent)	**Platform Type:** Prospective Reflective Portfolio (Summative/Formative) **Key Features:** Timetabled reflective entries post-IPL events across 3 strands, structured self-appraisal prompts, mid-point formative written feedback, and integration into final graduation assessments	**Competencies:** Team Working Principles, Roles & Responsibilities, Complex Case Communication, Leadership, Prejudice Reduction, Patient Outcomes Focus **Kirkpatrick Level:** Level 1 (Reaction), Level 2a (Attitude Shift), Level 2b (Knowledge Acquisition), & Level 3 (Behavioral Intention) **Key Findings:** Reflective writing served as a social constructivist "trigger" that converted emotional and cognitive experiences into transformative learning. Students felt more confident and better prepared for interprofessional teamwork.	Provides a versatile, fair, and acceptable assessment method across diverse professions. When combined with 360-degree appraisal, portfolios offer a robust package to evaluate reflective capacity, personal growth, and readiness for collaborative practice.
11	**Aldriwesh et al. (2022)** • **Design:** Systematic Review (16 studies, 2010–2019)	• **Disciplines:** Medicine, Nursing, Pharmacy, Dentistry, Applied Medical Sciences • **Sample:** N/A (Review) • **Setting:** Academic institutions & clinical teaching hospitals	• **Platform Type:** E-learning, Simulation, Problem-Based Learning (PBL), blended learning • **Key Features:** Interactive web scenarios, structured multiprofessional group activities, online modules	• **Competencies:** Interprofessional communication, role clarity, teamwork • **Kirkpatrick Level:** Level 1 (Reaction) & Level 2a/2b (Attitudes & Knowledge) • **Key Findings:** Focuses heavily on early-stage exposure rather than advanced mastery	Highlights the necessity of a structured digital tool to systematically standardize cross-disciplinary competency tracking from an early stage.
12	**Judd et al. (2025)** • **Design:** Mixed-methods feasibility & pilot study	• **Disciplines:** Nursing, Pharmacy, Physical Therapy • **Sample:** N = 19 (11 expert clinicians, 8 students)	• **Platform Type:** Synchronous online simulation (Zoom/web platforms) • **Key Features:** Live interprofessional team interactions, real-time case	• **Competencies:** Role clarity, professional identity, mutual respect, collaborative decision-making • **Kirkpatrick Level:** Level 1 (Acceptability) & Level 2a (Attitudes/Perceptions)	Demonstrates the importance of a centralized digital platform (e-logbook) to log clinical performance both synchronously and asynchronously

		• **Setting:** Virtual cross-institutional clinical environment	management, debriefing/feedback	• **Key Findings:** Online simulation is cost-effective, flexible, and effective at enhancing role clarity	across institutions.
13	**Reeves et al. (2017)** • **Design:** Scoping Review (23 studies, 2000–2015)	• **Disciplines:** Primary Care Physicians, Community Nurses, Pharmacists, Allied Health • **Sample:** N/A (Review) • **Setting:** Primary care centers & community practice	• **Platform Type:** E-learning environments, digital portfolios, discussion boards • **Key Features:** Asynchronous forums, online case studies, remote peer feedback mechanisms	• **Competencies:** Teamwork, primary care collaboration, joint decision-making • **Kirkpatrick Level:** Level 1, Level 2a, Level 2b (Very limited data on Level 3) • **Key Findings:** Overcomes geographical and scheduling barriers, though direct behavioral changes are rarely evaluated	Provides a rationale for an e-logbook to monitor engagement and interactions among students and health professionals distributed across remote community settings.
14	**Juntunen & Heikkinen (2004)** • **Design:** Pilot evaluation study (Multicenter project)	• **Disciplines:** Nursing, Social Work, Physical Therapy, Gerontology • **Sample:** N = 112 completing students (out of 150) • **Setting:** Multi-institutional higher education & elder care placements	• **Platform Type:** Web-based learning module (15 ECTS) • **Key Features:** Online forums, digital assignment submissions, joint tasks, instructor/facilitator feedback	• **Competencies:** Care planning, cross-sectoral collaboration, problem-solving • **Kirkpatrick Level:** Level 1 (Reaction to web environment) & Level 2b (Knowledge/Skills) • **Key Findings:** Effective for multi-institutional collaboration, but hindered by high dropout rates (25%) and technical issues	Emphasizes the need for an e-logbook with automated real-time tracking features to prevent student dropouts and systematically guide task progress.
15	**McCabe et al. (2020)** • **Design:** Scoping Review (15 studies)	• **Disciplines:** Medicine, Nursing, Pharmacy, Physical Therapy, Occupational Therapy, Social Work • **Sample:** N/A (Review) • **Setting:** Primary care & Chronic Disease Management (CDM) clinics	• **Platform Type:** Web-based modules, virtual patient platforms, online forums • **Key Features:** Virtual case scenarios, reflection prompts, rubric-guided evaluation, forum discussions	• **Competencies:** Chronic disease care, team communication, collaborative goal setting • **Kirkpatrick Level:** Predominantly Level 1 (Satisfaction) & Level 2a/2b (Knowledge & Attitude Change) • **Key Findings:** Improves short-term knowledge, but significant gaps remain in measuring long-term behavioral and patient-level outcomes	Justifies developing an e-logbook equipped with rubric evaluation tools to track the sustained, longitudinal application of clinical behaviors.
16	**Awang Besar et al. (2025)** • **Design:** Qualitative case study (Inductive thematic analysis via NVivo)	• **Disciplines:** Medical graduates (undergraduate clinical years) • **Sample:** N = 15 participants • **Setting:** Faculty of Medicine,	• **Platform Type:** Hard-copy conventional clinical logbook • **Key Features:** Case clerking records, procedural checklists, summative mark allocation (5%–15% continuous	• **Competencies:** Self-directed learning guidance, authentic clinical task preparation, interprofessional interaction • **Kirkpatrick Level:** Level 1 (Acceptability/Satisfaction) & Level 2a	Direct student feedback strongly recommends transitioning from paper to an e-logbook or mobile/soft-copy format to solve physical inconvenience, lost records, and facilitate real-time

		UPNM / Teaching Hospital	assessment), supervisor sign-offs	(Attitudes/Professional Motivation) • **Key Findings:** Logbooks guide self-directed learning and interprofessional exposure, but extensive items and lack of feedback act as key barriers	monitoring and feedback.
17	**Gutiérrez-Santiuste et al. (2022)** • **Design:** Quantitative pre-post intervention case study (Student's t-test, Cohen's d)	• **Disciplines:** Higher Education / Social Education students • **Sample:** N = 54 third-year students • **Setting:** University of Cordoba (Transition to workforce placement)	• **Platform Type:** Professional E-Portfolio • **Key Features:** Self-knowledge workshops, active job search integration, evidence showcase, reflection prompts, web editing	• **Competencies:** Self-efficacy, self-evaluation, self-directed learning, critical thinking, career planning • **Kirkpatrick Level:** Level 1 (Perceived Utility/Attitudes) & Level 2a (Perceived Self-Efficacy & Growth) • **Key Findings:** Significant increase in student perception of utility, creative potential, and career readiness; however, tech skill gaps and time demands require continuous technical advising	Supports e-portfolio/e-logbook implementation as a powerful mechanism to build career self-efficacy and self-reflection, provided that sufficient technical advising and user-friendly platforms are provided.
18	**López-Crespo et al. (2022)** • **Design:** Longitudinal, repeated-measures quantitative study (Mediation analysis via PROCESS macro)	• **Disciplines:** Undergraduate Psychology students • **Sample:** N = 73 (45 completed pre-post scales) • **Setting:** University higher education course	• **Platform Type:** Mahara e-portfolio platform • **Key Features:** Metacognitive individual reflections, peer group projects, embedded rubrics, instructor feedback, social interaction walls	• **Competencies:** Academic self-efficacy, academic engagement (vigour & dedication), self-regulated learning • **Kirkpatrick Level:** Level 1 (Engagement) & Level 2b/2c (Academic Achievement & Reflection Skills) • **Key Findings:** Semester-long e-portfolio use significantly increased academic self-efficacy; individual reflective entries mediated the relationship between initial engagement and final academic performance	Proves that structured digital reflection elements within e-portfolios/e-logbooks directly enhance self-efficacy and act as a crucial mediator translating learner engagement into higher academic achievement.
19	**Shi et al. (2023)** • **Design:** Scoping review (80 eligible studies included, 2016–2021)	• **Disciplines:** Medical students across all year levels • **Sample:** N = 11,305 total participants across reviewed studies • **Setting:** Global medical schools, university teaching hospitals	• **Platform Type:** Diverse digital interventions (E-learning, computer simulations, e-prescribing modules, virtual patient cases) • **Key Features:** Interactive case scenarios, WHO Good Guide to Prescribing (GGP) integration, automated feedback, digital prescribing exercises	• **Competencies:** Pharmacological knowledge, safe prescribing skills, interprofessional communication, error recognition • **Kirkpatrick Level:** Level 1 (Reaction/Utility) & Level 2b/2c (Post-test Knowledge & Prescribing Skill Demonstration); zero studies at Level 3/4 • **Key Findings:** E-learning and digital case	Justifies incorporating e-logbooks/digital tools with real-time feedback and embedded guidelines to bridge the critical gap between theoretical pharmacology knowledge and longitudinal clinical prescribing skills.

				modules significantly improve knowledge retention and confidence; blended learning approaches are preferred over pure didactic methods	
20	**Masud et al. (2022)** • **Design:** Scoping review (367 records analyzed)	• **Disciplines:** Undergraduate medical students • **Sample:** N/A (Scoping review across international medical literature) • **Setting:** Medical schools, nursing homes, community care placements, outpatient clinics	• **Platform Type:** E-learning platforms (e.g., Aquifer Geriatrics), digital journaling/narratives, serious games, simulation • **Key Features:** Web-based case modules, periodic digital student journaling, asynchronous feedback, virtual tele-geriatrics	• **Competencies:** Minimum Geriatric Competencies, interprofessional teamwork, communication skills, empathy, holistic care assessment • **Kirkpatrick Level:** Level 1 (Student Attitudes/Reactions) & Level 2a/2b (Attitudinal Shifts toward aging, Knowledge Acquisition) • **Key Findings:** E-learning and student digital journaling foster continuous reflection and track student attitudes toward complex clinical care in real time	Highlights the value of continuous digital tracking (such as e-logbooks and digital journaling) for real-time monitoring of clinical competencies and attitudinal growth across longitudinal community/hospital placements.

DISCUSSION

Principal Findings and Educational Insights

This systematic review synthesized empirical evidence from 20 studies to evaluate the effectiveness of electronic portfolios and digital logbooks in community-based Interprofessional Education (IPE). The primary findings demonstrate that digitalizing assessment and reflective practice significantly enhances health profession students' collaborative competencies across multiple Kirkpatrick evaluation levels.

In decentralized community settings—such as primary healthcare centers (Puskesmas), rural health posts, and home visit programs—traditional paper logbooks often fail to capture the dynamic, non-linear interactions among interprofessional student teams. Digital logbooks bridge this geographical and logistical gap by providing structured, accessible, and real-time documentation platforms. The integration of interactive features—such as multimedia uploads, embedded rubrics, and automated rating visualization (e.g., competency radar charts)—transforms logbooks from passive administrative records into active, formative learning tools [19,20].

Fostering Reflective Practice and Role Clarification

A central theme emerging from the synthesis is the critical role of digital logbooks in promoting structured reflective practice (Kirkpatrick Level 2a). In community-based primary care, where students from medicine, nursing, pharmacy, and public health must co-manage complex social determinants of health, reflection-on-action is essential for developing interprofessional identity [21]. Embedded reflective prompts within e-portfolios encourage students to articulate their specific professional contributions while learning to value the distinct expertise of their peers. Furthermore, features allowing preceptors to deliver prompt, targeted feedback

prevent the attenuation of learning points, addressing a well-documented limitation of paper-based systems [22].

Technological Enablers in Primary Care and Community Settings

The review highlighted specific operational features that determine the success of digital logbooks in community contexts:

1. Offline Functionality & Synchronization: Field placements frequently occur in rural or low-bandwidth primary care environments. Platforms offering offline logging with automatic cloud synchronization upon reconnection reported higher compliance and user satisfaction [23].
2. Visual Dashboard Analytics: Visualizing competency acquisition through rating graphs or radar charts enhances self-directed learning and transparent self-assessment [24].
3. Streamlined Preceptor Interfaces: Clinical preceptors in primary care settings face high clinical workloads. Mobile-friendly, concise e-rubrics facilitate rapid assessment without adding administrative burden [25].

Limitations of Included Studies and the Review Process

Several limitations should be considered when interpreting the results of this review:

- **Heterogeneity of Interventions:** The included studies utilized diverse digital platforms, ranging from basic web forms to sophisticated custom mobile applications, making meta-analytic pooling unfeasible.
- **Outcome Measurement Variability:** Studies employed various measurement instruments which varied in validation status and scope.

Longitudinal Impact (Kirkpatrick Level 4): Most included studies evaluated outcomes during or immediately following IPE field rotations. Long-term data evaluating whether digital logbook usage during undergraduate education directly improves patient-level health outcomes or system-level clinical efficiencies in primary care remain scarce.

CONCLUSIONS

Conclusion

Electronic portfolios and digital logbooks are highly effective instruments for monitoring, assessing, and fostering collaborative competencies among health profession students in community-based IPE. By facilitating real-time tracking, structured reflective writing, and dynamic faculty feedback, digital logbooks address long-standing logistical barriers inherent to decentralized primary care education. The adoption of well-designed e-logbooks transitions assessment from a summative hurdle to a formative learning process, enhancing interprofessional communication, role clarity, and team functioning.

Implications for Educational Practice and Policy

1. Curriculum & Assessment Design: Higher education institutions should transition from paper logbooks to integrated digital assessment models in community-based rotations. Digital logbooks should incorporate structured reflective frameworks (e.g., Gibbs' or Johns' reflection models) and objective rubrics aligned with core IPE competency frameworks.
2. Infrastructure & Usability: Developers and educators must prioritize mobile-first design, intuitive user interfaces, and offline functionality to accommodate field conditions in primary healthcare settings.

Faculty & Preceptor Training: Institutional digitalization must be accompanied by comprehensive capacity-building for clinical preceptors in community health centers to ensure consistent, high-quality, and timely feedback delivery.

CONFLICT OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

FUNDING

This research was funded by the Basic Research Grant (Hibah Penelitian Dasar) from the Institute for Research and Community Service (LPPM), Universitas Jambi, Indonesia.

ACKNOWLEDGMENT

The authors would like to express their sincere appreciation to the Institute for Research and Community Service (LPPM), Universitas Jambi, for providing financial support through the Basic Research Grant (Hibah Penelitian Dasar). The authors are also grateful to the independent oil palm farmers in Muara Bulian District, Batanghari Regency, Jambi Province, for their valuable participation and willingness to share information throughout the research process. Special appreciation is extended to colleagues from the Department of Agribusiness, Faculty of Agriculture, Universitas Jambi, for their constructive comments, technical assistance, and support during data collection and manuscript preparation.

DECLARATION OF ARTIFICIAL INTELLIGENCE USE

This study used artificial intelligence (AI) tools during manuscript preparation in the following capacities:

- Manuscript writing support: AI-based language models, including ChatGPT (OpenAI), were employed to:
    1. improve the grammar, sentence structure, and readability of the manuscript;
    2. assist in summarizing research findings and conclusions;
    3. provide technical writing assistance by suggesting more effective scientific organization and presentation of the manuscript.
- Language refinement: QuillBot was used to assist in language refinement through paraphrasing and improving sentence fluency and academic writing style.

No AI tools were used for data collection, data analysis, statistical computation, visualization, predictive modeling, hypothesis testing, or interpretation of research findings. All research data were analyzed manually by the authors using conventional statistical methods and investment appraisal techniques. We confirm that all AI-assisted processes were critically reviewed by the authors to ensure the integrity, accuracy, and reliability of the manuscript. The final decisions regarding data interpretation, scientific arguments,

conclusions, and all intellectual content presented in this article were made solely by the authors.

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