Turnitin Report

Toward+Multi-Stakeholder+Requirements+for+Digital+Readiness+As (1)

Cek Plagiasi

Document Details

Submission ID **trn:oid:::3618:148840476**

Submission Date

Aug 20, 2026, 1:25 PM GMT+7

Download Date

Aug 20, 2026, 1:34 PM GMT+7

File Name

Toward+Multi-Stakeholder+Requirements+for+Digital+Readiness+Assessment+Systems+(DRAS)+….pdf

File Size

872.8 KB

14 Pages

6,502 Words

43,423 Characters

7% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

Filtered from the Report

- Bibliography
- Quoted Text
- Small Matches (less than 6 words)

Match Groups

23 Not Cited or Quoted 7%
Matches with neither in-text citation nor quotation marks

1 Missing Quotations 0%
Matches that are still very similar to source material

0 Missing Citation 0%
Matches that have quotation marks, but no in-text citation

0 Cited and Quoted 0%
Matches with in-text citation present, but no quotation marks

Top Sources

6%	Internet sources
2%	Publications
5%	Submitted works (Student Papers)

Match Groups

- **23** Not Cited or Quoted 7%
  Matches with neither in-text citation nor quotation marks
- **1** Missing Quotations 0%
  Matches that are still very similar to source material
- **0** Missing Citation 0%
  Matches that have quotation marks, but no in-text citation
- **0** Cited and Quoted 0%
  Matches with in-text citation present, but no quotation marks

Top Sources

6%	Internet sources
2%	Publications
5%	Submitted works (Student Papers)

Top Sources

The sources with the highest number of matches within the submission. Overlapping sources will not be displayed.

1	Internet	
www.ijadis.net		1%
2	Student papers	
University of Melbourne on 2023-08-24		1%
3	Internet	
ijadis.com		1%
4	Internet	
brieflands.com		<1%
5	Internet	
ijadis.org		<1%
6	Internet	
orcid.org		<1%
7	Internet	
ijrp.org		<1%
8	Internet	
www.mdpi.com		<1%
9	Internet	
ejournal.anjasana.com		<1%
10	Publication	
Fang Wang, Hongzhi Zhu. "Cognition, horizon and practice: formation of the nons...		<1%

11 Publication

Luqman Hakim, Jalaluddin Al Yamani, Tasya Salsabila. "Transformasi Akad: Peran ... <1%

12 Student papers

Al Zaytoonah University on 2026-06-25 <1%

13 Student papers

BIMM Group on 2026-05-05 <1%

14 Student papers

University of South Africa on 2026-08-19 <1%

15 Internet

ojs.unpkediri.ac.id <1%

International Journal of Advances in Data and Information Systems
Vol. 7, No. 2, August 2026, pp. 747~760
ISSN: 2721-3056, DOI: 10.25008/ijadis.v7i2.1581

Toward Multi-Stakeholder Requirements for Digital Readiness Assessment Systems (DRAS): A Participatory Approach in Higher Education

Agus Pamuji[1], Amat Damuri[2], Reza Hardian[3]
[1]Informatics, Universitas Islam Negeri Siber Syekh Nurjati, Cirebon, Indonesia
[1]Doctoral Program of Information System, Universitas Diponegoro, Semarang, Indonesia
[2]Informatic Management, STMIK Al Muslim, Bekasi, Indonesia
[3] Statistics, Universitas Diponegoro, Semarang

Article Info
Article history:
Received Mar 31, 2026
Revised June 22, 2026
Accepted June 23, 2026

Keywords:
Participatory Action Research
Digital Readiness Assessment
Multi-Stakeholder Requirements
Thematic Analysis
Digital Transformation

ABSTRACT
A digital readiness assessment is essential for governing digital transformation in higher education; however, existing models are largely technology-centric, neglecting stakeholder needs in early system development, and provide limited guidance for system design. Consequently, current tools are fragmented, weakly aligned with institutional realities, and insufficient for strategic decision-making. This study develops stakeholder-driven requirements and an integrated assessment scenario using a participatory approach. A qualitative design combining Participatory Action Research with two sequential Focus Group Discussions involving diverse stakeholder groups across Indonesian higher education institutions was employed. Data were analysed through thematic analysis supported by a structured involvement matrix to ensure balanced and iterative participation. The findings identify six interrelated domains of digital readiness assessment systems: Data Management, Assessment Processes, Analytics and Reporting, Governance Support, User Interaction, and Technical Infrastructure. Collectively, these domains provide a socio-technical foundation that supports continuous monitoring, evidence-based planning, and institutional learning rather than one-time evaluation, highlighting the importance of inclusive co-design. The study provides a structured set of stakeholder-informed requirement domains to support future DRAS development.

Corresponding Author:
Agus Pamuji,
Informatics, Universitas Islam Negeri Siber Syekh Nurjati,
Jl. Perjuangan ByPass Sunyaragi, Kec. Kesambi,
Cirebon, Indonesia, Jawa Barat 45131
Email: aguspamuji@uinssc.ac.id

1. INTRODUCTION

Digital transformation (DT) in higher education has intensified the adoption of information systems to support governance, teaching, learning, and institutional management [1]. In this context, digital readiness assessment (DRA) has become an essential instrument for evaluating an institution's preparedness to implement and sustain technology-enabled initiatives [2], [3]. Such assessments inform strategic planning, resource allocation, policy development, and risk management [4], [5]. However, existing readiness frameworks predominantly focus on measuring maturity levels, infrastructure availability, or organisational capabilities after systems have already been conceptualised or implemented [6]. Consequently, DRA is frequently treated as a diagnostic tool rather than as a foundational input for system development and decision-making processes [7].

Despite substantial research on DR, several limitations persist. First, many assessment approaches rely on top-down or expert-driven models that inadequately capture the perspectives of diverse stakeholder groups [8]. DR is inherently socio-technical, shaped not only by technological resources but also by governance structures, human competencies, data practices, organisational culture, and institutional workflows [9]. Systems designed without incorporating these multidimensional perspectives risk limited adoption, poor usability, and misalignment with operational realities. Second, prior studies primarily emphasise measurement instruments and maturity indices, offering limited guidance on how readiness assessments themselves should be designed as information systems [10]. As a result, the requirements for DRA systems remain insufficiently explored, particularly from a multi-stakeholder standpoint [11]. Third, stakeholder involvement is often confined to validation stages rather than integrated throughout the requirement elicitation process, reducing contextual relevance and organisational ownership of the resulting systems [12].

These limitations indicate the need for an involvement-driven approach that systematically integrates stakeholder perspectives into the early stages of system conceptualization. Participatory research methodologies provide a suitable pathway for addressing this need by enabling collaborative knowledge construction and iterative refinement grounded in real organisational contexts. Engaging institutional leaders, academic staff, technical personnel, administrative staff, and students allows the identification of latent needs, reconciliation of divergent priorities, and development of requirements that reflect both strategic and operational dimensions of DR [13].

Unlike prior digital readiness assessment studies that primarily focus on measurement models, maturity evaluation, or readiness indicators, this study focuses on the design requirements of Digital Readiness Assessment Systems (DRAS). Furthermore, while stakeholder participation in previous studies is often limited to validation activities, the present study adopts a participatory approach that engages stakeholders throughout the requirement elicitation and prioritisation process. This combination of participatory action research, involvement-based stakeholder engagement, and thematic requirement development represents a distinct contribution to the digital readiness assessment literature.

Accordingly, this study aims to derive multi-stakeholder requirements for DRA systems using a participatory qualitative approach. The research combines Participatory Action Research (PAR), two-stage Focus Group Discussions (FGDs), and thematic analysis (TA) to capture, structure, and prioritise stakeholder perspectives [14]. Rather than developing or evaluating a specific software artefact, the study focuses on generating a conceptual foundation to guide the design of assessment systems aligned with institutional needs and practices. To address this objective, the study is guided by the following research questions:

- RQ1. What problems and needs do stakeholders identify in current DRA practices?
- RQ2. What system requirements emerge from participatory engagement among multiple stakeholder groups?
- RQ3. How can these requirements be structured into coherent domains reflecting the socio-technical nature of DR?
- RQ4. How can participatory qualitative methods support the generation and prioritisation of requirements for DRA systems?

This study makes three specific contributions after Table 1 confirms the state-of-the art to the digital readiness assessment literature [15], [16]. First, it shifts the focus of digital readiness assessment from measurement-oriented frameworks toward the early-stage design of assessment information systems, an area that remains underexplored in prior studies. Second, it introduces a multi-stakeholder and participatory approach that systematically incorporates the perspectives of academics, practitioners, researchers, and policymakers throughout the requirement elicitation process rather than limiting stakeholder involvement to validation activities.

Table 1. Positioning of the Present Study

Previous digital readiness studies	The present study
Readiness measurement and maturity assessment; Indicator and instrument development; Technology adoption evaluation; Expert-driven assessment frameworks;	Focuses on Digital Readiness Assessment System (DRAS) requirements; Investigates how assessment systems should be designed; Employs Participatory Action Research (PAR); Integrates stakeholders throughout the requirement elicitation process;
Stakeholder participation mainly during validation.	Produces a socio-technical structure of stakeholder-derived requirements for future DRAS development.

Third, it develops an integrated socio-technical requirement structure consisting of six interrelated domains that can serve as a conceptual foundation for future Digital Readiness Assessment Systems (DRAS) development and implementation.

2. RESEARCH METHOD

2.1 Research design and methodological approach

Figure 1 presents the methodological approach, which consists of three primary conceptual design blocks: literature review, participatory approach, and thematic analysis (TA) [17]. These integrated conceptual blocks were designed to inform the development of a conceptual assessment information system for measuring Digital Readiness (DR) [18]. The study employs a qualitative approach utilizing participatory action research (PAR) to collect data from participants. Thematic analysis was subsequently applied to generate system requirements and scenarios for DR assessment systems.

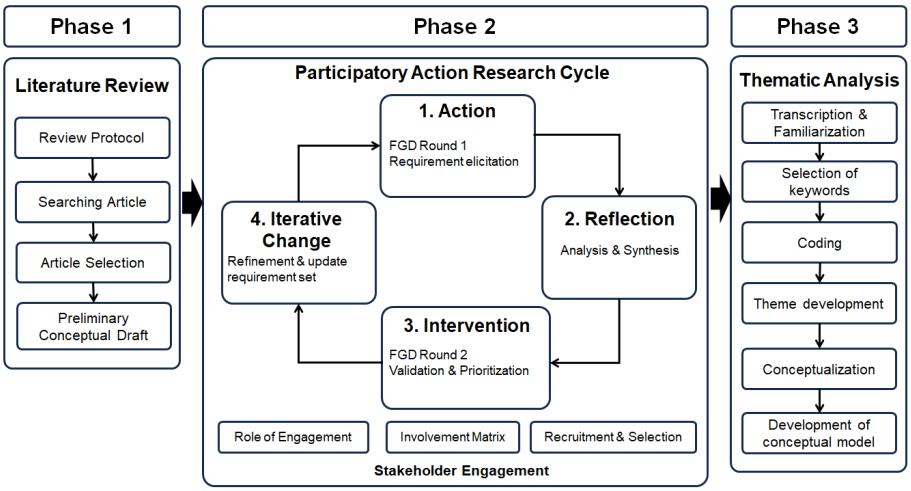

Figure 1. Workflow of Proposed Methodology

Figure 1 is presented to illustrate the overall workflow of the proposed methodology adopted in this study. It shows that the research process is organised into three sequential phases, Literature Review, PAR, and TA, each consisting of structured activities that progressively refine the research outputs. It also demonstrates that insights derived from prior studies were systematically integrated with participatory data collection and qualitative analysis to produce the final conceptual model. A PAR approach was employed to generate and prioritise DRA requirements, supported by TA of stakeholder discussions.

2.2 Participatory action research design

Figure 2 presents a simplified overview of the PAR stages used to collaboratively develop system requirements [19]. The sequence illustrates a structured progression from initial idea generation to prioritisation and final decision-making [20]. The process ensures that the resulting outcomes are comprehensive, feasible, and based on shared consensus, through the involvement of multiple stakeholders at each stage [21].

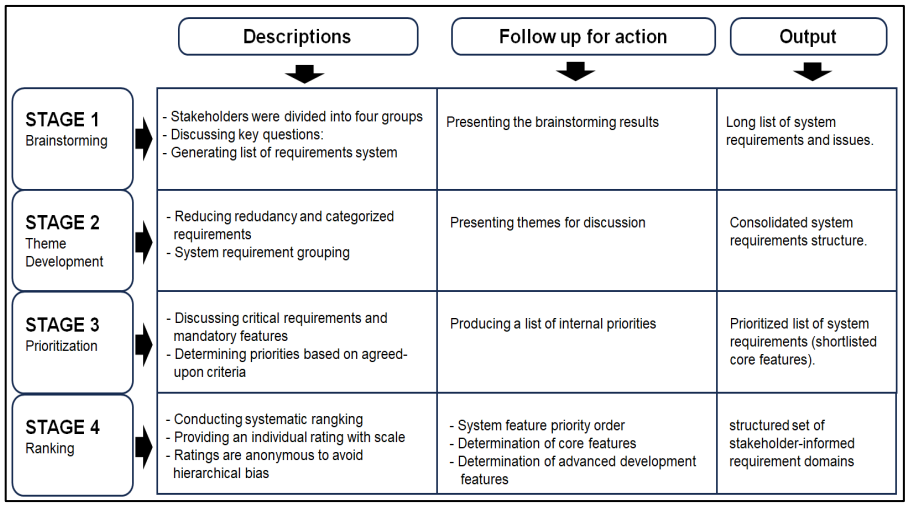

Figure 2. Simplified Summary of stage PAR sequences

The PAR process is organised into four consecutive stages, from brainstorming to final ranking and decision-making. In the first two stages, stakeholder inputs are collected and then synthesised into thematic system requirements through FGD. Subsequently, participants prioritise, rank, and finalise the requirements for a DRA system [22].

2.3 Roles of engagement in the research

As presented in Table 2, the distribution of engagement roles maps primary roles to their core functions and dominant stakeholder groups [12]. In the early stages, listeners and co-thinkers explore problems, share experiences, and articulate system needs [23].

Table 2. Distribution of role of engagement

Primary Roles	Core Functions	Dominant Stakeholders
Listener, Co-Thinker	Exploration of problems and system needs	All stakeholder groups (Academics, Researchers, Practitioners, Policy Makers)
Advisor, Partner	Structuring, refining, and validating conceptual requirements	Academics and Researchers (with input from all groups)
Partner, Co-Thinker	Negotiating priorities, and assessing feasibility and impact	All stakeholder groups
Decision-Maker, Partner	Final validation and strategic alignment	Policy Makers / Institutional Leaders (with participation of all groups)

Advisors and partners then refine and validate requirements while integrating theoretical and practical perspectives [24]. Stakeholders collaboratively negotiate priorities, assess feasibility and impact, and build cross-group consensus. Finally, decision-makers provide strategic direction and formally endorse the prioritised outcomes.

2.4 Involvement matrix

As illustrated in Figure 3, the involvement matrix (IM) maps stakeholder roles across different stages of the project or research process [23]. This figure highlights varying levels of influence, ranging from listeners to decision-makers [25]. It also demonstrates how participation evolves from information to authoritative decision-making in reception.

	Low Influence ← Role in Project/Research → Low Influence				
Involvement Matrix / Stages	Listener	Co-thinker	Advisor	Partner	Decision-maker
	Is given information	Is asked to give opinion	Gives solicited advice	Work as an equal partner	Takes initiative (final) decision
Brainstorming	Receive information about purpose, scope, and current assessment problems	Share experiences, needs, and expectations regarding the assessment system	Provide preliminary conceptual framing of digital readiness and assessment scope	Collaborate in identifying key issues and system needs	Ensure discussions align with institutional context and objectives
Theme Development	Review synthesized themes and requirements	Provide feedback on relevance and clarity of proposed system components	Offer theoretical, methodological, and technical validation of requirements	Co-develop structured system requirements and categories	Approve thematic structure for further prioritization
Mid / Interim Prioritization	Observe prioritization process and receive updates	Express preferences on feasibility and importance	Evaluate priorities based on evidence and standards	Negotiate and agree on core system features	Ensure priorities align with strategic feasibility and resources
Final Voting & Ranking	Receive results of ranking outcomes	Reflect on final priorities and implications	Validate robustness and coherence of final design	Endorse consensus-based decisions	Make final strategic decisions and authorize implementation

Figure 3. Involvement matrix with PAR stages and role of engagement relationship

Across the stages, stakeholder contributions are differentiated according to their roles and levels of authority. During brainstorming and theme development, information and feedback are provided, and requirements are refined collaboratively. In the mid or interim prioritisation phase, preferences are expressed, and priorities are evaluated based on feasibility and evidence. Finally, consensus is endorsed, and strategic decisions are made to authorise implementation of the finalised system design.

2.5. Focus Group Discussion with 2 phases

As depicted in Figure 4, the research process is structured into two sequential FGDs: Exploratory & Co-Design (FGD 1) and Prioritisation & Validation (FGD 2). The demonstrated figure shows how inputs, processes, and outputs are organised within each FGD to support systematic requirement development. It also highlights the iterative linkage between the two sessions through feedback and thematic refinement [26]. The two-stage FGD process employed in Fig. 6 was designed to elicit system requirements for DRA.

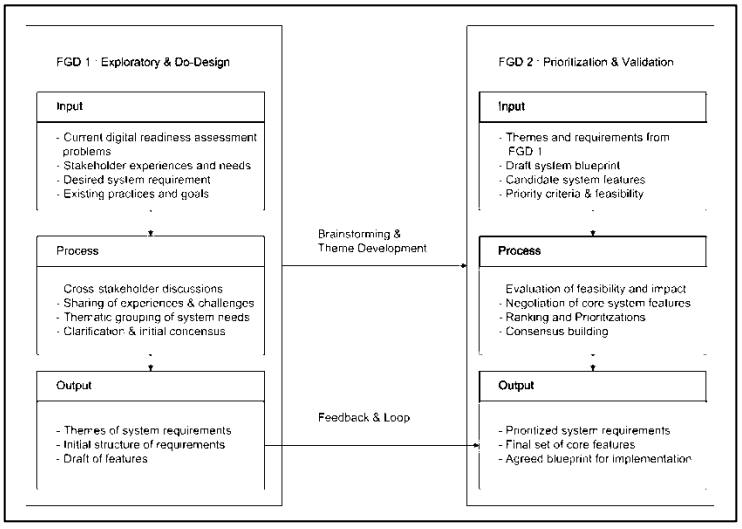

Figure 4. FGD Scheme in Participatory approach

The first session, Exploratory & Co-Design, gathered inputs on existing problems, stakeholder experiences, institutional practices, and desired requirements, enabling participants to share challenges, cluster needs into themes, and formulate an initial set of system features and structural concepts. Building on these preliminary outputs, the second session, Prioritisation & Validation, evaluated feasibility and importance using agreed criteria, during which participants negotiated core functionalities, ranked candidate features, and consolidated an implementation. The

feedback loop between stages ensured that insights from prioritisation informed earlier assumptions, thereby strengthening consensus and enhancing the robustness and validity of the final requirements.

Table 3. Participant Characteristics

Stakeholder Group	Number of Participants	Role in DRAS Development
Academics	3	Teaching, curriculum, and institutional operations
Researchers	2	Research and assessment expertise
Practitioners	2	System implementation and operational experience
Policymakers	3	Strategic planning and governance

A total of 10 participants in Table 3 representing four stakeholder groups participated in the study. The participants were drawn from 3 higher education institutions in Indonesia and included academics, researchers, practitioners, and policymakers with experience in digital transformation, information systems, higher education management, and policy development. The diversity of stakeholder backgrounds was intended to ensure a comprehensive understanding of Digital Readiness Assessment System (DRAS) requirements from multiple perspectives.

Ten participants from three HEIs were purposively selected to participate in the focus group discussions. Rather than seeking statistical representativeness, the study aimed to obtain rich and context-specific insights from individuals possessing relevant expertise and substantial experience in institutional digital transformation. Participants held diverse roles and had direct involvement in planning, implementing, managing, or evaluating digitalization initiatives within their respective universities. Therefore, the selection strategy prioritized information richness and diversity of perspectives to support the exploratory objective of developing a set of stakeholder-informed requirement domains.

2.6. Thematic analysis and synthesis

TA is a widely recognised qualitative research strategy for identifying and interpreting recurring patterns or themes within a dataset, thereby generating analytical insights and theoretical understanding [27]. Its core principles, including systematic coding, iterative theme development, analytical refinement, and transparent reporting, align closely with other qualitative approaches, particularly discourse analysis, which similarly emphasises the interpretive construction of meaning [28]. More specifically, TA involves the identification and interpretation of patterns embedded in qualitative data [29]. These patterns, which are interpreted for latent and manifest meanings, emerge through careful engagement with the keywords articulated by participants that reflect their experiential perspectives and contextual realities [30]. This interpretive engagement enables researchers to clarify the underlying structures of meaning within qualitative accounts. Building on this methodological foundation, this paper advances a systematic TA framework to support the synthesis of participant-generated findings derived from PAR conducted through FGDs. The framework is integrated to complement and extend the participatory orientation adopted during the earlier research phase within the present study.

The systematic TA framework comprises six cumulative stages: transcript creation and data familiarisation; keyword identification; coding; theme development; conceptual integration; and conceptual model construction. Each stage builds on the previous one, enabling a coherent and progressive interpretation of qualitative data. Transcript familiarisation supports immersion in the dataset, keyword identification captures salient expressions, and coding organises these expressions into analytically meaningful categories. Themes are then developed through the consolidation of related codes, followed by conceptual integration that clarifies the relationships among keywords, codes, and themes [31]. This process ultimately leads to the construction of a conceptual model grounded in empirical interpretation. The initial coding process was conducted by the lead researcher based on the FGD transcripts and supporting notes. To enhance analytical trustworthiness, the resulting codes, categories, and emerging themes were subsequently reviewed and discussed with the co-authors through peer-review and consensus-building sessions. Any differences in interpretation were resolved through discussion until agreement was reached. Given

the exploratory nature of the study and the emphasis on collaborative interpretation, formal inter-coder reliability measures were not applied.

The framework is described as "systematic" because it follows a sequential analytical logic that strengthens internal consistency of interpretation. By making explicit connections between data, analytical decisions, and conceptual outcomes, the framework supports methodological rigour and facilitates the replicability of findings. It also enables researchers to examine whether interpretive judgments remain theoretically coherent and defensible across analytical stages, thereby reinforcing the credibility of the inquiry. The process for the TA consisted of the following steps:

1. **Transcription, Familiarization with the Data, and Selection of Quotations:** As an initial analytical foundation, the first step focused on the meticulous transcription of all FGDs recordings to ensure the accurate preservation of participants' expressions, and contextual nuances. Following transcription, the research team engaged in an iterative familiarization process, repeatedly reading the transcripts to achieve a comprehensive understanding of the data corpus. Throughout this stage, analytical attention was deliberately directed toward participant statements that articulated collective reflections, and contrasting viewpoints emerging from the participatory process. Salient quotations were carefully selected to retain the authenticity of participants' voices for subsequent analytical stages.
2. **Selection of Keywords:** Building upon the preliminary familiarisation with the data, the second step involved the interpretive identification of keywords embedded within participants' narratives. Keywords were defined as salient terms or phrases that encapsulated core ideas, perceptions, or meanings recurrently expressed during the FGDs. Rather than relying on frequency-based criteria, the selection process prioritised contextual relevance and analytical significance. Through a recursive review of the transcripts, the research team refined the keyword set to ensure that it accurately reflected participants' perspectives while remaining analytically manageable. This step enabled the transformation of raw textual data into focused analytical units.
3. **Coding:** Following the identification of keywords, the analysis progressed to the systematic coding stage. At this point, selected keywords and associated quotations were organised into preliminary codes. Coding was conducted in an iterative and reflexive manner, allowing emerging insights to inform ongoing refinement. During this stage, codes were continuously compared or differentiated to enhance conceptual clarity. This structured categorisation facilitated a deeper analytical engagement with the data and established a robust foundation for subsequent thematic development.
4. **Theme Development:** Once a stable coding structure had been established, the analysis advanced to the development of themes. This step involved the interpretive synthesis of interrelated codes into broader thematic constructs. Themes were not treated as mere aggregations of codes but were critically examined for coherence, distinctiveness, and empirical grounding. Through iterative comparison between themes, codes, and original transcripts, the research team ensured that each theme meaningfully represented shared experiential dimensions articulated during the participatory process. This step marked the transition from categorical organisation to higher-order conceptual interpretation.
5. **Conceptualization Through Interpretation of Keywords, Codes, and Themes:** With the thematic structure in place, the analysis moved toward an integrative phase of conceptualisation. In this step, the relationships among keywords, codes, and themes were systematically examined to identify underlying conceptual linkages. Rather than interpreting themes in isolation, this stage emphasised relational analysis, focusing on how themes interacted, reinforced, or contextualised one another within the broader participatory framework. Through sustained analytical reflection and theoretical sensitivity, preliminary analytical assertions were articulated, ensuring that interpretations remained both empirically grounded and conceptually coherent.
6. **Development of Conceptual Model:** As the culmination of the systematic TA framework, the final step involved the structured development of a conceptual model that synthesised the integrated analytical insights. Drawing directly from the interpretive relationships established in the preceding stage, the model was constructed to represent the key themes and their

interconnections in a coherent and theoretically informed manner. This conceptual model extends beyond a descriptive summary of findings by offering an analytically grounded representation of the phenomena under investigation. By systematically translating interpretive insights into a structured conceptual form, this final step completed the analytical process and provided a robust foundation for subsequent discussion and interpretation.

3. RESULTS AND DISCUSSION

3.1. Outcomes of the Participatory Action Research Process

Firstly, the brainstorming stage provided an exploratory platform for stakeholders to articulate existing challenges, unmet needs, and expectations regarding a DRA system, this was provided in Table 4. Participants, representing academic, practitioner, research, and policy domains, engaged in group-based discussions to identify problems associated with current assessment practices and to propose potential system capabilities [32]. Across groups, several recurring issues emerged, including fragmented data management, reliance on manual evaluation procedures, limited analytical support, and the absence of standardised assessment criteria. Participants emphasised the need for an integrated system capable of automating scoring processes, supporting multi-level user management, enabling analytical dashboards, and maintaining longitudinal data for continuous monitoring.

Table 4. Initial Systems Requirement Categories

Requirement Area	Example Needs Identified	Level of Requirement	Dominant Stakeholder Group
Data Management	1. Integrated database 2. longitudinal storage	Very High	Researchers, Policymakers
Assessment Process	1. Automated scoring 2. standardized metrics	Very High	Academics, Practitioners
Analytics	1. Dashboards 2. performance indicators	High	Researchers, Policymakers
Governance	1. Policy alignment 2. approval workflows	High	Policymakers, Executives
User Management	1. Multi-level access control	Medium	Practitioners, Administrators
Reporting	1. Customizable reports 2. benchmarking outputs	Medium	Academics, Policymakers
Technical Infrastructure	1. System integration 2. scalability	Medium	IT Practitioners
Usability	1. Intuitive interface 2. Training support	High	Practitioners

Stakeholder perspectives on system requirements are summarised according to their key concerns and desired capabilities, which are illustrated in Table 5. Academics emphasise evaluation rigour and require a valid measurement framework, while practitioners focus on operational feasibility supported by user-friendly workflows. Researchers prioritise data quality and advanced analytics, whereas policymakers highlight strategic alignment and the need for decision-support features [33].

Table 5. Stakeholder Perspectives for requirement of system

Stakeholder Group	Key Concerns	Desired System Capabilities
Academics	Evaluation rigor	Valid measurement framework
Practitioners	Operational feasibility	User-friendly workflows
Researchers	Data quality	Advanced analytics
Policymakers	Strategic alignment	Decision-support features

The first stakeholder engagement cycle focused on requirement elicitation and brainstorming activities. Participants identified key functionalities, challenges, and expectations for a Digital Readiness Assessment System (DRAS). The outcomes of this action phase were synthesised into a set of preliminary requirement categories, as presented in Table 4. The preliminary requirement categories identified during the first cycle were subsequently presented to stakeholders in a second engagement cycle. This stage served as an intervention and validation process, during which participants reviewed, refined, prioritised, and ranked the proposed

requirements. The resulting stakeholder perspectives and prioritisation outcomes are summarised in Table 5.

Moreover, Table 4 presents system requirements organised into thematic domains along with their descriptions, representative requirements, and sources of input. Data management and assessment processes focus on handling the assessment lifecycle and conducting evaluations through indicators and scoring models. Analytics and reporting emphasise result interpretation through dashboards and trend analysis, while governance support ensures policy alignment and compliance monitoring. Technical infrastructure and user interaction address system performance, integration, accessibility, and usability to support effective implementation across stakeholders. To enhance transparency, illustrative examples of the coding and theme development process are presented in Table 5. The table demonstrates how representative stakeholder statements were translated into initial codes, synthesised into themes, and subsequently mapped to the final requirement domains.

Table 6. Illustrative Examples of the Thematic Analysis Process

Sample Quote	Initial Code	Category	Final Theme
Assessment data are stored in different systems and difficult to monitor over time.	Data fragmentation	Data handling	Data Management
Scoring should be automated and based on standard indicators.	Automated assessment	Assessment workflow	Assessment Processes
Leaders need visual summaries and trend monitoring.	Dashboard requirement	Performance analysis	Analytics & Reporting
Assessment results should support compliance and policy implementation.	Policy compliance	Governance mechanism	Governance Support
Different users require different access privileges and simple interfaces.	Role-based access	User experience	User Interaction

The identified requirements were supported by recurring stakeholder concerns expressed during the discussions. For example, in Table 6, one participant noted that “assessment data are currently scattered across multiple systems, making it difficult to track institutional progress over time,” highlighting the importance of data integration and management. Another participant emphasised that “leaders need a simple dashboard that can quickly show readiness status and trends,” reflecting the need for analytics and reporting capabilities.

Table 7. Thematic Organization of System Requirements

Theme / Domain	Description	Representative Requirements	Origin of Inputs
Data Management	Management of assessment data lifecycle	Data integration, storage, historical tracking	All groups
Assessment Processes	Mechanisms for conducting evaluations	Indicators, scoring models, benchmarks	Academics, Practitioners
Analytics & Reporting	Interpretation and visualization of results	Dashboards, trend analysis, reports	Researchers, Policymakers
Governance Support	Alignment with institutional policies	Approval workflows, compliance monitoring	Policymakers
Technical Infrastructure	System performance and interoperability	Scalability, integration with existing systems	IT Practitioners
User Interaction	Accessibility and usability features	Interface design, training support	Practitioners

The six domains presented in Table 7 represent the thematic organisation of stakeholder-derived requirements rather than detailed software specifications. Each domain consolidates multiple functional and non-functional requirements identified during the participatory process and provides a structured basis for subsequent prioritisation and future DRAS development.

Table 8. Interim Prioritization of Requirement Domains

Theme / Domain	Relevance to Objectives	Feasibility	Strategic Impact	Interim Priority Level
Data Management	Very High	High	Very High	Critical
Assessment Processes	Very High	Medium	High	Critical
Analytics & Reporting	High	Medium	High	High
Governance Support	High	Medium	Very High	High

Technical Infrastructure	Medium	High	Medium	Medium
User Interaction	Medium	High	Medium	Medium

The interim prioritisation in Table 8 evaluates requirement domains based on relevance to objectives, feasibility, and strategic impact. Data management and assessment processes are classified as critical due to their very high relevance and impact despite varying feasibility levels [34]. Analytics and reporting, along with governance support, are assigned high priority as they contribute significantly to decision-making and policy alignment. Technical infrastructure and user interaction receive medium priority, reflecting their supportive but essential role in system implementation. Additionally, Participants were asked to individually rank the identified requirement domains based on their perceived importance. The resulting rankings were aggregated and subsequently discussed during the group session to achieve consensus on the final prioritisation presented in Table 9.

Following the focus group discussions, all ten participants independently evaluated each of the six domains using the Urgency–Seriousness–Growth (USG) prioritization method [35]. Each domain was assessed against the criteria of urgency, seriousness, and growth using a five-point scale ranging from 1 to 5. For interpretive purposes, the numerical ratings were categorized into qualitative degrees, with 1 indicating Very Low, 2 Low, 3 Moderate, 4 High, and 5 Very High. All participants assessed all six domains, and the resulting scores were aggregated to determine the relative priority ranking of the domains.

Table 9. Final Ranking of Requirement Domains

Rank	Requirement Domain	Priority Level	Rationale for Priority
1	Data Management	Very High	Foundation for reliable assessment
2	Assessment Processes	Very High	Core evaluation functionality
3	Analytics & Reporting	High	Enables actionable insights
4	Governance Support	High	Aligns results with decision-making
5	User Interaction	Medium	Supports usability and adoption
6	Technical Infrastructure	Medium	Enables system performance

Table 9 illustrates the final ranking orders of requirement domains according to their priority levels and underlying rationale. Data management and assessment processes occupy the top positions due to their fundamental role in ensuring reliable and functional evaluation. Analytics reporting and governance support follow as high-priority domains because they enable insight generation and decision alignment. User interaction and technical infrastructure are ranked as medium priority, reflecting their importance in supporting usability and system performance rather than core assessment functions.

The six requirement domains identified in this study are broadly consistent with prior digital readiness and digital transformation research, which frequently emphasises technological infrastructure, data management, governance, and user-related factors as key determinants of organisational digital capability. However, unlike many existing readiness models that focus primarily on measurement dimensions or maturity assessment, the present study adopts a requirements-oriented perspective by identifying stakeholder-derived system requirements for DRAS development. This distinction extends existing work by linking digital readiness concepts with requirements elicitation and prioritisation processes.

The results collectively address the four research questions of this study. RQ1 is addressed through the identification of key requirements for a Digital Readiness Assessment System (DRAS). RQ2 is reflected in the stakeholder perspectives, validation, prioritisation, and ranking processes. RQ3 is addressed through the synthesis of stakeholder inputs into structured requirement domains. Finally, RQ4 is demonstrated through the participatory stakeholder engagement process, which facilitated collaborative refinement, consensus-building, and requirement development throughout the study.

3.2 Theoretical, Practical Implications, and Limitations

The findings extend existing digital readiness assessment literature by demonstrating that readiness assessment should not be viewed solely as a measurement activity but also as a socio-technical information system design challenge. Previous studies have predominantly focused on readiness indicators, maturity levels, and evaluation metrics. In contrast, this study identifies the underlying system requirements necessary to operationalise digital readiness assessment in institutional settings. Furthermore, the participatory approach adopted in this study highlights the value of integrating multiple stakeholder perspectives during requirement elicitation. The resulting six-domain structure reflects a broader understanding of digital readiness that encompasses technical, organisational, governance, analytical, and user-centred considerations. This interdisciplinary perspective strengthens the relevance of the proposed framework across information systems, digital transformation, organisational management, and higher education research. Practically, the framework provides guidance for institutions seeking to design or procure digital readiness assessment systems that support evidence-based planning, governance, and continuous improvement initiatives.

This study has several limitations. First, the findings were derived from stakeholders within Indonesian higher education institutions and therefore may not fully represent the diversity of digital transformation contexts in other countries or sectors. Second, the study focused on requirement elicitation and conceptual development rather than the implementation and evaluation of an operational Digital Readiness Assessment System (DRAS). Third, the qualitative nature of the study prioritised depth of understanding over statistical generalisation. Future research should validate the proposed framework across different institutional settings and examine its effectiveness through system development and empirical implementation.

3.3 Originality and Contribution

The originality of this study lies not in proposing another digital readiness measurement model, but in reframing digital readiness asses sment as a system design problem. Existing studies have largely concentrated on determining readiness levels and assessment indicators. In contrast, this research investigates the underlying requirements needed to develop Digital Readiness Assessment Systems capable of supporting continuous monitoring, governance, analytics, and organisational learning. By combining participatory action research, stakeholder engagement, and thematic requirement synthesis, the study introduces an alternative perspective for future digital readiness research and system development.

4. CONCLUSION

This study proposed a participatory approach to generating system requirements for a DRA by integrating PAR with two-stage FGDs and TA. The approach enabled stakeholders with diverse roles to collaboratively articulate problems, expectations, and priorities, resulting in contextually grounded requirements rather than externally imposed criteria. The findings show that DR for assessment systems is multidimensional and socio-technical, spanning governance, infrastructure, human capacity, data management, organisational culture, and mechanisms for evaluation and continuous improvement. Together, these domains highlight how readiness should be viewed as an ongoing organisational capability rather than a static technological state. The involvement of stakeholders with diverse backgrounds enriched the discussion and contributed to a more comprehensive understanding of digital readiness requirements. By translating stakeholder themes into requirement domains and design principles, the research offers a structured foundation for the development of decision-support systems. The findings provide a conceptual foundation for the development of Digital Readiness Assessment Systems within Indonesian higher education institutions and may offer transferable insights for institutions facing similar digital transformation challenges. Future studies are encouraged to validate and refine the identified requirement domains in different organisational and national contexts.

This study advances information systems research by showing how participatory approaches generate context-sensitive system requirements and by framing DRA as a dynamic socio-technical process. Practically, it provides guidance for HE institutions to evaluate and

strengthen readiness for digital assessment initiatives. Future studies can validate the study across diverse contexts, develop operational instruments grounded in the identified domains, and assess system effectiveness in supporting DT outcomes. Although focused on Indonesia, the socio-technical domains identified indicate broader relevance for institutions confronting similar DT challenges worldwide and across varied educational systems.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this article.

DATA AVAILABILITY

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

AUTHOR CONTRIBUTIONS

Agus Pamuji: Conceptualization; Methodology; Writing-Original Draft; Writing & Editing . **Amat Damuri**: Data Labelling, Writing-Review & Editing. **Reza Hardian**: Writing-Review & Editing, .

REFERENCES

[1] G. Li, X. Sun, M. Ye, and A. Mardani, "Assessment of digital transformation challenges for business model innovation in the context of higher education institutions using a decision support approach," *Journal of Innovation & Knowledge*, vol. 9, no. 3, p. 100527, 2024.

[2] Y. Ali, H. U. Khan, F. Khan, and Y. Moon, "Building integrated assessment model for IoT technology deployment in the Industry 4.0," *Journal of Cloud Computing*, vol. 13, no. 1, p. 155, 2024.

[3] I. Ansari, M. Barati, M. R. Sadeghi Moghadam, and M. Ghobakhloo, "An Industry 4.0 readiness model for new technology exploitation," *International Journal of Quality & Reliability Management*, vol. 40, no. 10, pp. 2519–2538, Mar. 2023.

[4] S. Heaton, D. Teece, and E. Agronin, "Dynamic capabilities and governance: An empirical investigation of financial performance of the higher education sector," *Strategic Management Journal* , vol. 44, no. 2, pp. 520–548, Feb. 2023.

[5] S. H. Zolfani, R. Bazrafshan, F. Ecer, and Ç. Karamaşa, "The Suitability-Feasibility-Acceptability Strategy Integrated with Bayesian BWM-MARCOS Methods to Determine the Optimal Lithium Battery Plant Located in South America," *Mathematics*, vol. 10, no. 14, p. 2401, 2022.

[6] Y. Zhao, Y. Li, Y. Xiao, H. Chang, and B. Liu, "Factors Influencing the Acceptance of ChatGPT in High Education: An Integrated Model With PLS-SEM and fsQCA Approach," *SAGE Open*, vol. 14, no. 4, 2024.

[7] O. Laraichi, T. Daim, S. Alzahrani, L. Hogaboam, G. I. Bolatan, and M. M. Moughari, "Technology readiness assessment: Case of clinical decision support systems in healthcare," *Technology in Society*, vol. 79, p. 102736, 2024.

[8] D. M. Azilagbetor, G. Davies, L. D. Geneviève, D. M. Shaw, and B. S. Elger, "Developing more inclusive approaches to animal research and patient involvement," *Medicine, Health Care and Philosophy*, vol. 28, no. 4, pp. 735–750, 2025.

[9] Z. Blakong, C. Savithi, and S. Khantong, "Modeling the Determinants of Smart Campus Success: An Empirical Study in Thailand," *Sustainability*, vol. 17, no. 24. p. 11048, 2025.

[10] M. Romero Jeldres, E. Díaz Costa, and T. Faouzi Nadim, "A review of Lawshe's method for calculating content validity in the social sciences," *Frontiers in Education*, vol. Volume 8-, 2023.

[11] D. Agostino and C. Costantini, "A measurement framework for assessing the digital transformation of cultural institutions: the Italian case," *Meditari Account. Res.*, vol. 30, no. 4, pp. 1141–1168, Nov. 2022.

[12] K. McEwan *et al.*, "Co-Producing Personalised Discharge Planning: Developing a Toolkit to Improve Caregiver Involvement in Hospital Transitions," *Heal. Expect.*, vol. 28, no. 6, p. e70483, Dec. 2025.
[13] Y. Li, A. N. Khan, Y. Zhang, and N. A. Khan, "From leadership to digital maturity in public healthcare: evidence from Pakistan's digital transformation journey," *Journal Health Organization Management*, pp. 1–13, Nov. 2025.
[14] J. Nandhakumar, "Design for success?: critical success factors in executive information systems development: [1]," *Eur. J. Inf. Syst.*, vol. 5, no. 1, Mar. 1996.
[15] W. Sakitri, K. Kardoyo, T. Tusyanah, and K. Setiaji, "Determinants of work readiness as a teacher for higher education students in industry revolution of 4.0," *Journal of Applied Research in Higher Education.*, vol. 17, no. 3, pp. 1099–1108, Jun. 2024.
[16] S. Santika and T. Mauritsius, "Determinant Factors of Success for the Village Information System in Providing Sustainable Services and Governance," *International Journal of Advanced Computer Science and Applications*, vol. 16, no. 7, p. 14, 2025.
[17] M.-C. Balaam and G. Thomson, "Evaluation of a participatory action project to improve safety and outcomes in maternity care," *Health Research Policy and Systems*, vol. 23, no. 1, p. 50, 2025.
[18] D. Cockerham, "Participatory action research: building understanding, dialogue, and positive actions in a changing digital environment," *Educational technology research and development*, vol. 72, no. 5, pp. 2763–2791, 2024.
[19] I. T. Awidi and M. Paynter, "An Evaluation of the Impact of Digital Technology Innovations on Students' Learning: Participatory Research Using a Student-Centred Approach," *Technol. Knowl. Learn.*, vol. 29, no. 1, pp. 65–89, 2024.
[20] C. Jesus *et al.*, "Better together: participatory action research for co-constructing an intervention to enhance leisure activities in non-ambulatory adolescents with cerebral palsy," *Research Involvement and Engagement*, vol. 11, no. 1, p. 69, 2025.
[21] A. Jarkiewicz, A. Krawczyk, and E. Szulewicz, "The Development of the Participatory Approach to Digital Learning: Research Findings from Poland," *Technology, Knowledge and Learning*, 2025.
[22] M. Signorini and A. P. Pomè, "Shaping the future of facility management. Market and literature insights on digital twin adoption," *Facilities*, vol. 43, no. 11–12, pp. 818–834, Apr. 2025.
[23] D.-W. Smits, K. van Meeteren, M. Klem, M. Alsem, and M. Ketelaar, "Designing a tool to support patient and public involvement in research projects: the Involvement Matrix," *Research Involvement and Engagement*, vol. 6, no. 1, p. 30, 2020.
[24] N. Samaisong, C. Somprasert, and L. Pawloski, "The Development of a Care Model for Sarcopenic Obesity in Older Adults: Participatory Action Research," *Nursing Reports*, vol. 15, no. 10. p. 357, 2025.
[25] T. N. S. Sachit, G. Mahboobeh, S. Hadi, and D. J. Edwards, "The Impact of Using Information Systems on Project Management Success Through the Mediator Variable of Project Risk Management: Results from Construction Companies," *Buildings*, vol. 15, no. 8, p. 1260, 2025.
[26] N. Baigabylov, K. Mukhambetova, K. Baigusheva, O. Shebalina, M. Kudabekov, and A. Akpanov, "Identifying risks in the digital transformation of higher education," *Journal of Turkish Science Education*, vol. 22, no. 1 SE-Articles, pp. 147–172, 2025.
[27] S. K. Ahmed *et al.*, "Using thematic analysis in qualitative research," *Journal of Medicine, Surgery, and Public Health.*, vol. 6, p. 100198, 2025.
[28] Muhammad Naeem, Wilson Ozuem, Kerry Howell, and Silvia Ranfagni, "Demystification and Actualisation of Data Saturation in Qualitative Research Through Thematic Analysis," *International Journal of Qualitative Methods*, vol. 23, p. 16094069241229776, May 2024.
[29] M. Goyanes, C. Lopezosa, and B. Jordá, "Thematic analysis of interview data with ChatGPT: designing and testing a reliable research protocol for qualitative research," *Quality & Quantity*, vol. 59, no. 6, pp. 5491–5510, 2025.

[30] A. Cernasev and D. R. Axon, "Research and scholarly methods: Thematic analysis," *JACCP: Journal of The American College of Clinical Pharmacy.*, vol. 6, no. 7, pp. 751–755, Jul. 2023.

[31] V. Braun and V. Clarke, "Toward good practice in thematic analysis: Avoiding common problems and be(com)ing a knowing researcher," *International Journal of Transgender Health*, vol. 24, no. 1, pp. 1–6, Jan. 2023.

[32] I.-A. Chounta, A. Ortega-Arranz, S. Daskalaki, Y. Dimitriadis, and N. Avouris, "Toward a data-informed framework for the assessment of digital readiness of higher education institutions," *International Journal of Educational Technology in Higher Education*, vol. 21, no. 1, p. 59, 2024.

[33] M. Iskarim, Aenurofik, and Junaeti, "Readiness of Islamic Higher Education Institutions in Indonesia for future quality assurance," *Quality Assurance in Education*, vol. 33, no. 1, pp. 80–92, Sep. 2024.

[34] P. Alcaide-Pulido, B. Gutiérrez-Villar, E. Ordóñez-Olmedo, and M. Pérez-Escolar, "Analysis of faculty readiness for online teaching: assessing impact and adaptability in diverse educational contexts," *Smart Learning Environments*, vol. 12, no. 1, p. 5, 2025.

[35] N. S. Ariyanti, M. A. Adha, R. B. Sumarsono, and Sultoni, "Strategy to determine the priority of teachers' quality problem using USG (Urgency, Seriousness, Growth) matrix," *International Research-Based Education Journal*, vol. 2, no. 2, pp. 54–62, 2020.