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Diffusion and Dissemination of Innovation in The Context of Distance Higher Education in Indonesia

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Abstract: This study evaluates the process of innovation diffusion and explores the characteristics of innovation dissemination patterns in distance higher education (PTJJ) in Indonesia, using the MyUT application at Universitas Terbuka (UT) as a case study. This digital innovation was designed to integrate student academic services online within a single platform. The research used an exploratory qualitative case study approach, drawing on in-depth interviews, field observations, and documentation involving UT staff, regional UT managers, and students from various regions. The analysis shows that MyUT's diffusion follows Rogers' five-stage model (knowledge, persuasion, decision, implementation, and confirmation), mediated by geographical context, digital literacy, and organizational culture. Innovation disseminates not only through formal structural channels from the central office to regional units but is also reinforced by horizontal networks among users, including opinion leaders within student and tutor communities. The study finds that the successful adoption of MyUT depends on a combination of hierarchical and participatory approaches, along with scaffolding that supports the digital transition. These findings imply that innovation diffusion in distance higher education requires adaptive communication strategies, interactive support, and a stronger organizational culture open to digital transformation.

Keywords: diffusion, dissemination, innovation, open and distance higher education, innovation communication.

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INTRODUCTION

Distance Higher Education (PTJJ) provides a solution for expanding access to higher education in Indonesia, a nation with diverse geography and demographics (Sembiring, 2020). Universitas Terbuka (UT), a PTJJ pioneer, plays a central role by delivering technology-based educational services nationwide, including to students in disadvantaged, frontier, and outermost regions (3T). In this context, digital innovation is essential for improving the quality and effectiveness of distance education services (Belawati & Nizam, 2020).

UT's MyUT application is a key digital platform providing integrated academic and administrative services to students (Maulana et al., 2023). As part of UT's digital transformation, MyUT brings services closer to students online, covering course registration, study plan submission, grade checking, and access to learning materials and tuition payment (kompas.tv, 2023). The success of such innovations depends not only on technological sophistication but also on effective dissemination. In distance higher education, dissemination faces specific challenges: geographical dispersion (Liu et al., 2018), digital

infrastructure disparities (Soleimani et al., 2024), and organizational culture dynamics (Park et al., 2025). These factors can all influence responses to change. Therefore, it is important to examine how communication patterns develop and how PTJJ implements innovation dissemination strategies.

Rogers (2003) defines innovation dissemination as the process by which an innovation is communicated through specific channels to members of a social system over time. This process consists of five main stages: knowledge, persuasion, decision, implementation, and confirmation. Five factors also influence the rate of innovation adoption: relative advantage, compatibility, complexity, trialability, and observability (Hayes et al., 2015).

In distance higher education, innovation communication faces multidimensional challenges. Geographical challenges are significant; students are widely dispersed across regions with highly varied access conditions. Many UT students reside in areas with limited information and communication technology infrastructure, including internet access and digital devices (Darojat et al., 2023). This directly affects how students receive messages about digital innovation. Technological challenges also stem from students' diverse levels of digital literacy. Many adult learners who study while working may have limited experience operating new technologies. This requires more intensive and accessible communication approaches. Factors such as internet bandwidth availability, device affordability, and system stability are critical to successfully disseminating educational technology innovations.

Gunawardena et al. (2010) emphasize that in online learning, guidance and gradual support (scaffolding) are essential for users, especially students, to optimize innovation utilization (Croxton, 2014). A study by Sugilar (2017) on online examination implementation at Universitas Terbuka describes UT as a "hotbed of technological innovation in higher education," suggesting it is highly conducive to developing such innovations. Although various innovations have been introduced, effective socialization and perceived ease of access strongly influence student adoption. Drawing on Rogers' diffusion of innovation theory, Sugilar (2017) found that students' perceptions of ease of use and benefits are the main factors determining the speed of online exam adoption at UT.

Studies that specifically examine innovation dissemination patterns and effectiveness within Universitas Terbuka, particularly for the MyUT application, remain limited (Noviyanti et al., 2023; Noviyanti & Belawati, 2024). As a relatively innovation, MyUT has not been extensively evaluated, especially regarding how information is disseminated, who acts as a change agent in supporting adoption, and how users respond to and experience the innovation. This gap forms the focus of the current case study. Unlike previous research, which has primarily emphasized the application's technical aspects or utilization statistics, this study takes a qualitative approach to explore communication dynamics in the innovation dissemination process in distance higher education, focusing on Universitas Terbuka. This research aims to provide a more comprehensive understanding of applied communication patterns, effective strategies, and the challenges encountered. These findings are expected to contribute to theory and provide practical guidelines for developing innovation dissemination strategies in distance higher education, particularly to improve MyUT implementation and similar innovations.

Accordingly, this study aims to characterize and critically examine the dissemination of the MyUT innovation at Universitas Terbuka, with particular attention to the communication processes that support student adoption. The study is guided by three research questions: (RQ1)

How does MyUT diffuse across Rogers' five stages: knowledge, persuasion, decision, implementation, and confirmation? (RQ2) What formal and informal communication patterns, and which change agents, shape the dissemination and adoption of MyUT? (RQ3) How do geographical conditions, technological access and readiness, and organizational culture facilitate or constrain the effectiveness of MyUT dissemination? Addressing these questions is expected to support the refinement of MyUT implementation and inform context-sensitive dissemination strategies for comparable digital innovations in distance higher education.

METHOD

Research Design

This study employed a qualitative approach with an exploratory case study design (Yin, 2015) to investigate how the MyUT innovation was disseminated and adopted within Universitas Terbuka (UT). The case included the UT Central Office and three regional UT offices, Jakarta, Banjarmasin, and Majene, purposively selected to represent contrasting geographical settings and levels of digital-infrastructure readiness. Jakarta represented an urban setting with relatively high access to technology, Banjarmasin a semi-urban setting, and Majene a setting where internet access posed greater challenges. This multi-site design enabled comparison of dissemination processes across institutional and geographical contexts.

Participants

Participants were selected purposively because they had direct experience with disseminating or using MyUT. The study involved 15 participants: nine active UT students who had used MyUT and were enrolled in at least their third semester, and six institutional actors comprising UT Central Office staff or managers and staff or managers from the Jakarta, Banjarmasin, and Majene regional offices. The composition ensured representation of users and institutional change agents across urban, semi-urban, and relatively infrastructure-constrained settings. Participants ranged in age from 20 to 55 and included eight men and seven women. Table 1 summarizes their distribution.

Table 1. Participant profile

Participant Group and Site	n	Age Range	Gender (F/M)
UT Central staff/manager	3	35–55	2/1
Jakarta staff/manager	1	41	0/1
Jakarta students	3	20–34	1/2
Banjarmasin staff/manager	1	38	1/0
Banjarmasin students	3	21–42	2/1
Majene staff/manager	1	45	0/1
Majene students	3	22–46	2/1
Total	15	20–55	8/7

Before data collection, the researchers obtained institutional permission from the leadership of the UT Central Office and the participating regional UT offices. All participants received written information explaining the study's purpose, procedures, voluntary nature, confidentiality safeguards, and their right to withdraw without penalty. Written or electronically recorded informed consent was obtained before each interview and before observations involving

identifiable participants. Names and other identifying information were removed during transcription, analysis, and reporting.

Instruments

Data were collected using two semi-structured interview guides developed from Rogers' (2003) diffusion of innovations framework. The student guide was designed for active students in at least their third semester and examined: (1) sources, clarity, and timeliness of information about MyUT (knowledge); (2) initial reactions, perceived benefits, compatibility, complexity, and peer influence (persuasion); (3) reasons for adopting, postponing, or rejecting MyUT and actors influencing the choice (decision); (4) technical and communication barriers, institutional assistance, and adaptation during use (implementation); and (5) evaluation, feedback, satisfaction, and continued-use decisions (confirmation). It also explored communication effectiveness, distance-related barriers, internal actors, and preferred dissemination strategies. The staff guide, administered to lecturers, administrative staff, and managers at UT Central and regional offices, examined cross-unit collaboration, use of communication technologies, communication styles for distance learners, adaptation to digital change, organizational and infrastructural barriers, audience participation and feedback, and strategic recommendations. Interviews were conducted online or face-to-face, depending on participant availability, audio-recorded with consent, and supplemented by interviewer field notes.

Document analysis covered application guides, brochures, infographics, webinar recordings, internal reports, and MyUT usage statistics. Direct observations focused on online and limited face-to-face training or socialization activities organized by the UT Central Office or regional offices. A structured observation sheet recorded the date and setting, duration, participant and facilitator roles, communication channels, principal messages, demonstrations of MyUT features, user questions or difficulties, assistance provided, and observable responses to the innovation. Descriptive field notes were completed during each activity and expanded immediately afterward to preserve contextual details.

Data Analysis

Data were analyzed thematically using Miles and Huberman's (1992) interactive model, involving data reduction, data display, and conclusion drawing and verification. Interview, document, and observation records were organized according to the three research questions and initially coded using concepts from Rogers' diffusion model while remaining open to themes emerging from the data. Codes were compared across sites and participant groups, grouped into broader themes, and displayed in matrices linking diffusion stages, communication patterns, change-agent roles, and contextual constraints. Conclusions were iteratively checked against the underlying evidence and supported by participant accounts, documents, and observation records. Credibility was strengthened through source triangulation by comparing accounts from students, UT staff, and regional managers across Jakarta, Banjarmasin, Majene, and the UT Central Office. Formal member checking was not conducted; this is acknowledged as a methodological limitation.

■ RESULT AND DISCUSSION

This section presents the findings according to the three research questions. Theme 1 explains how MyUT adoption unfolded across Rogers' five diffusion stages (RQ1). Theme 2 examines the interaction between formal institutional communication, horizontal peer networks, and change agents (RQ2). Theme 3 analyzes how geographical conditions, technological readiness, and organizational culture enabled or constrained the effectiveness of dissemination (RQ3). The interpretation integrates interview, observation,

and documentary evidence and relates the emerging themes to innovation diffusion in open and distance higher education.

The MyUT Diffusion Process across Rogers' Five Stages

The findings indicate that MyUT diffusion followed the broad sequence of knowledge, persuasion, decision, implementation, and confirmation proposed by Rogers (2003). The stages were not experienced uniformly, however. Their timing and meaning varied with users' access to information, prior experience with digital services, institutional roles, and access to local assistance. Table 2 summarizes the analytical pattern at each stage.

Table 2. Stages of MyUT innovation diffusion according to rogers' model

Diffusion Stage	Empirical pattern	Analytical meaning
Knowledge	Information circulated through official digital channels and regional offices, but exposure varied by location.	Institutional reach did not automatically produce equal reception; local mediation remained necessary.
Persuasion	Users reconsidered initial concerns after demonstrations, trial use, and peer testimony.	Relative advantage and compatibility became credible through experience and interpersonal validation.
Decision	Staff adoption was institutionally directed, whereas student adoption was initially more discretionary and gradual.	Authority decisions accelerated organizational adoption, while individual decisions depended on perceived necessity and support.
Implementation	Login, navigation, procedural, and connectivity difficulties were addressed through tutorials, help desks, tutors, and peers.	Scaffolding turned formal adoption into usable practice and reduced uncertainty about implementation.
Confirmation	Continued use depended on service integration, system reliability, feedback, and institutional reinforcement.	Sustained adoption required both positive user experience and responsive organizational support.

Knowledge stage

The uneven distribution of initial information was not caused by geographical distance alone. It also reflected UT's early dependence on centrally managed digital channels, differences in students' connectivity, irregular engagement with official platforms, and the number of organizational levels through which messages had to pass. Students with stable internet access and regular contact with official UT channels encountered MyUT information earlier. In contrast, those who relied on intermittent connectivity or regional-office assistance received the same information later. Thus, a top-down structure achieved wide organizational coverage without guaranteeing equal message reception. This finding extends Rogers' (2003) knowledge stage by showing that, in a geographically dispersed institution, awareness depends not only on message availability but also on the accessibility and local interpretability of the channel. This phenomenon aligns with the literature on the digital divide in distance education, where disparities in technology access create obstacles to equal dissemination of innovation information (Lembani et al., 2020).

Institutional accounts confirmed that information about MyUT initially followed UT's formal organizational structure. The Central Office distributed official information and implementation resources, while regional offices adapted their delivery to locally used communication channels.

> "*When MyUT was introduced, we did not send the information directly to every student from the Central Office. We first distributed the official circular, implementation guide, and presentation materials to the regional offices. We asked them to repeat the information through the channels most used by their students because they understood their local communication conditions better than we did." (CO-01, Central Office staff/manager; translated from Indonesian).*

Regional personnel therefore performed an interpretive, rather than merely distributive, function. A staff member from Banjarmasin explained:

> *"The material from the Central Office was complete, but some students still did not understand what they had to do. We simplified the explanation, sent step-by-step screenshots through WhatsApp groups, and demonstrated the process during registration services. In practice, we had to translate the general instruction into something the students could immediately follow." (RO-BJM-01, Banjarmasin regional staff/manager; translated from Indonesian).*

Regional UT personnel responded by repeating central announcements through locally used channels, explaining unfamiliar terms, integrating MyUT guidance into orientation and registration activities, and providing direct assistance when students could not act on online instructions independently. Local staff therefore functioned as contextual mediators rather than simple message relays. Their work reduced the distance between institutional policy and students' everyday technological conditions, consistent with the role of change agents as intermediaries between innovators and target users (de Jong et al., 2023).

Persuasion

Initial attitudes toward MyUT were shaped by a tension between anticipated convenience and perceived complexity. Before trying the application, some participants associated a new integrated platform with additional procedures and possible technical difficulty. Demonstrations and trial use changed this interpretation because users could compare the single-sign-on service with the fragmented procedures they had used previously. Relative advantage and compatibility therefore became persuasive only when they were experienced in practice, not merely announced by the institution. This supports diffusion theory, which identifies perceived usefulness, compatibility, and complexity as central to attitude formation.

> *"At first, I felt anxious and confused. Because I had been away from university for a long time, I did not know where to begin when I saw the MyUT interface. The terms used in several menus were also not intuitive for an ordinary user like me." (INF-03, working transfer student with lower digital literacy; translated from Indonesian).*
>
> *"I saw MyUT as a much-needed improvement over the previous portal. My initial perception was quite positive because its interface followed a more contemporary web-application style, although I was still uncertain whether the server could handle peak registration traffic." (INF-02, fifth-semester student with higher digital literacy; translated from Indonesian).*

Interpersonal communication strengthened this shift. Students and tutors with greater digital experience translated formal explanations into

concrete demonstrations, shared troubleshooting advice through WhatsApp groups and online forums, and provided credible testimony based on successful use. Opinion leaders were persuasive because their explanations were grounded in circumstances familiar to other users. Their contribution was therefore not merely promotional; it reduced uncertainty by turning abstract benefits into observable outcomes, consistent with Rogers' emphasis on interpersonal influence in persuasion and with Zhang and Gong's (2022) account of opinion-leader credibility.

Students also found MyUT fairly compatible with their independent study needs (Noviyanti & Belawati, 2024). Respondents highlighted that the app facilitated access to learning materials and academic information without requiring visits to regional UT offices. These findings align with diffusion theory, which posits that perceived relative advantage and compatibility strongly influence individuals' decisions to adopt an innovation. Another finding is that initial concerns about technological complexity tend to diminish when users experience firsthand the innovation's benefits and its compatibility with their learning habits. Neves et al. (2025) found that when a new system aligns with users' existing habits and adds value, technical complexity is no longer a major barrier.

Decision

The decision stage followed different paths for institutional actors and students. Staff adoption increasingly reflected an authority innovation-decision because MyUT became the designated platform for academic and administrative processes. For students, adoption was initially more discretionary: some tried MyUT early, while others continued to rely on conventional assistance. This difference helps explain why organizational implementation could appear rapid even as student adoption remained uneven. As registration, payment, grade access, and other services became concentrated in MyUT, the practical space for non-adoption narrowed. Consequently, adoption decisions combined perceived benefit with institutional necessity. This pattern aligns with general innovation adoption trends in which technology-familiar groups lead adoption, followed by the majority, and finally those most resistant to change (Damayanti et al., 2024).

Evidence from institutional participants supports the interpretation that staff adoption reflected an authority innovation decision. The decision to implement MyUT was established at the institutional level because the platform had been formally designated as the principal access point for integrated academic services.

> *"After MyUT was designated as the official access point for registration, payment, grades, and learning services, its implementation was no longer optional for the units. Every regional office had to adjust its service procedures. The question was not whether we would use it, but how each unit could become ready to use it." (CO-02, Central Office manager; translated from Indonesian).*

The decision's organizational effect was also evident at the regional level. A participant from Jakarta described how formal direction clarified staff responsibilities:

> *"At first, some staff still used the previous service procedures because the responsibilities had not been clearly divided. After we received formal instructions and participated in the briefing, each officer understood which part of the MyUT service they had to handle. From that point, using MyUT became part of our routine service." (RO-JKT-01, Jakarta regional staff/ manager; translated from Indonesian).*

These accounts indicate that staff adoption was not determined solely by individual perceptions of usefulness. Formal designation provided legitimacy, clarified responsibilities, and narrowed the organizational space for non-adoption. Nevertheless, implementation still required training and role clarification before the institutional decision could be translated into routine practice.

Variation among students was more defensibly explained by prior digital experience, connectivity, perceived risk, and access to assistance than by broad generational labels such as 'digital natives' or 'millennials.' Participants who were familiar with online services and could observe successful use by peers decided earlier, whereas those facing unstable access or uncertainty postponed adoption. The result supports Nazir & Roomi's (2021) argument that infrastructural and contextual barriers can delay technology adoption even when the innovation is perceived as useful.

Implementation stage

Implementation highlighted the difference between deciding to adopt MyUT and using it effectively. Interview and observation coding identified recurring difficulties involving account access, forgotten passwords, navigation, unfamiliar procedures, and intermittent connectivity. These difficulties did not necessarily lead to rejection, but they increased reliance on regional staff, tutors, help desks, manuals, and peer networks. The analytical issue was therefore not simply whether technical problems occurred, but how the support structure prevented those problems from becoming discontinuance.

> *"During my first registration attempt, I could not access MyUT because I had forgotten my password. After receiving help resetting it, the registration process was still interrupted several times because the internet connection in my area was unstable. I eventually completed the process with help and internet access provided at the regional UT office." (INF-01, student experiencing connectivity constraints; translated from Indonesian).*
>
> *"I initially had difficulty locating the course-registration menu and understanding the sequence of steps. During the registration period, the page also loaded very slowly, and the connection was interrupted several times before I could complete the process. After a staff member on social media demonstrated the procedure, I was able to repeat the steps independently." (INF-02, fifth-semester student with higher digital literacy; translated from Indonesian).*
>
> *"When I tried to download my examination admission document, the system suddenly froze and returned to the home page without displaying a clear error message. The navigation was still not very user-friendly because the internal search feature often failed to provide precise results." (INF-04, third-semester Information Systems student; translated from Indonesian).*

Rahmani et al. (2024) found that, in an online learning context, insufficient interaction and support during implementation contribute to high dropout rates in online programs. To prevent this, UT ensured active interaction and adequate assistance during MyUT implementation. Student interviews indicated that many successfully used MyUT thanks to help from peers or tutors, particularly during their first attempt. Some regional UT offices launched local initiatives, such as MyUT clinics during registration periods, where staff guided students through each step until they completed it successfully. Active interaction between users and service providers during

implementation also built social presence, making users feel supported. This matters because high social presence increases user satisfaction in online environments (Salimon et al., 2021). Overall, the implementation stage at UT was characterized by gradual adaptation. Users initially tested MyUT features on a small scale, such as registering for a single course, then expanded their use to more functions, like accessing learning materials or participating in tutor discussions, as their confidence grew. This process reflects trialability, meaning the easier an innovation is to test on a limited scale and demonstrate results, the smoother its implementation.

Scaffolding was most effective when it involved demonstration and guided practice. During registration periods, staff or more experienced users reportedly walked students through account activation and course-registration steps, allowing them to complete the process while receiving immediate correction. This form of learner–interface and learner–support interaction made institutional assistance tangible and increased users' confidence (Katsarou & Chatzipanagiotou, 2021). It also explains why horizontal communication complemented rather than replaced formal support.

> *"I eventually went directly to a SALUT service center because I did not understand how to select the examination schedule in MyUT. The staff member patiently guided me from the beginning from logging in until the registration receipt was successfully printed." (INF-03, working transfer student; translated from Indonesian).*

Table 3. Evidence matrix for early implementation challenges

Coded issue	Observed Consequence	Support Response	Evidence to Cite
Login/password	Delayed access	Help desk and account gAuidance	INF-01 and INF-04 interview excerpts
Interface navigation	Confusion about procedures	Tutorial and direct demonstration	INF-02 and INF-04 interview excerpts
Connectivity	Interrupted registration	Regional-office access and assistance	INF-01 and INF-02 interview excerpts
Limited prior experience	Dependence on intermediaries	Tutor and peer scaffolding	INF-03 interview excerpt

Confirmation

Confirmation emerged when repeated use demonstrated that MyUT could simplify access to registration, payment, grades, and learning materials. Continued use was strengthened by service integration, institutional directives, and the perception that feedback led to improvements. At the same time, server disruption, uneven responsiveness, and unresolved usability problems could generate dissonance and weaken trust. Confirmation was therefore not final or irreversible; it depended on continued system reliability and visible institutional responsiveness. This interpretation is consistent with Rogers' (2003) account of reinforcement and discontinuance and with Mabunda's (2023) finding that unstable digital services can erode student confidence.

Formal and Informal Communication Patterns and Change Agents

MyUT dissemination operated through two interdependent communication systems. The formal system moved policy, official information, technical materials, and implementation responsibilities from UT Central to regional

offices and service units. This structure offered legitimacy, coordination, and nationwide reach. Within one semester of MyUT's launch, nearly all regional UT offices were aware of and had begun implementing it in their local services. This indicates that UT's internal formal communication channels have been relatively effective in spreading the innovation to all units. This aligns with Hikmah & Asmawi (2023), who emphasize that educational institutions need innovation-diffusion strategies that involve change agents at every organizational level to achieve widespread adoption. Leaders in regional UT offices serve as local change agents by encouraging subordinates, such as ICT staff, registration officers, and librarians, to master MyUT and support students. They act as catalysts, translating central innovations into local contexts by providing extra guidance to students facing cultural or technical challenges. Innovation literature calls this mechanism diffusion through networking, as innovations spread faster when user communities are well-connected and actively communicate (Buskens, 2020). UT indirectly supports this process by promoting an online culture in which students engage in virtual study groups, easing the circulation of innovation-related information. However, standardized messages did not always account for differences in connectivity, digital experience, local routines, or opportunities for direct clarification.

The informal system consisted of student groups, tutors, colleagues, early users, and online communities. These networks circulated experiential knowledge: how to activate an account, interpret a feature, solve a login problem, or decide whether the platform was trust worthy.

> *"In our area, the main difficulty was often the internet connection, not the students' willingness to use MyUT. Some students came to the regional office or SALUT because they could not complete the process from home. We provided internet access, guided them directly, and reported recurring access problems to the Central Office." (RO-MJN-01, Majene regional staff/manager; translated from Indonesian).*

These findings show that regional personnel performed three interconnected change-agent functions. They translated formal instructions into locally relevant guidance, provided technical and procedural scaffolding, and communicated recurring user problems back to the institution. Change agency therefore involved both mediating institutional policy downward and communicating local implementation constraints upward.

Informal communication accelerated adoption because it was timely, contextual, and relational. However, it depended on well-connected users and could not replace reliable official information or accountable technical support. They tend to adopt MyUT quickly as a natural part of their distance learning experience. Some even act as informal champions, encouraging their peers to transition to MyUT, consistent with findings that millennials are generally more adaptive and willing to serve as change agents for their peers (Hershatter & Epstein, 2010). On the other hand, older students or those from communities with conventional organizational cultures often resist initially. For instance, senior tutors accustomed to face-to-face teaching or manual administration may see MyUT as a drastic change to their work routines. Some fear that personal interactions with students will diminish as digital platforms replace traditional modes. This phenomenon is known as cultural resistance to new technology (Winsor et al., 2019). UT's organizational culture, as a hierarchical public institution, also initially posed a barrier. Several staff members were reluctant to adopt MyUT without explicit instructions from supervisors or formal training opportunities. In this context, cultural transformation became critical. Recent studies emphasize that organizations with rigid, change-resistant cultures

often struggle to adopt digital technology, leading to slow adaptation and employee pushback (Bozkus, 2024). UT addressed this challenge through a structured change management approach. UT leadership actively communicated the vision of MyUT as an integral part of the institution's modernization and demonstrated usage themselves (led by example). Furthermore, UT provided intensive training and incentives to motivate reluctant staff. These efforts to shift organizational mindsets yielded positive results. After several semesters, MyUT usage became the norm among staff and was embedded in standard operating procedures. This pattern resembles diffusion lag across regions, where a time gap exists between the innovation center and peripheral areas before full adoption occurs (Jain & Jain, 2025).

Opinion leaders occupied the bridging position between the two systems. Regional staff and experienced students translated formal messages, demonstrated procedures, filtered uncertainty, and returned user concerns to institutional channels. Their centrality explains why diffusion was most effective when vertical authority and horizontal trust operated together. Thematic relationships derived from the coding are summarized in Figure 1.

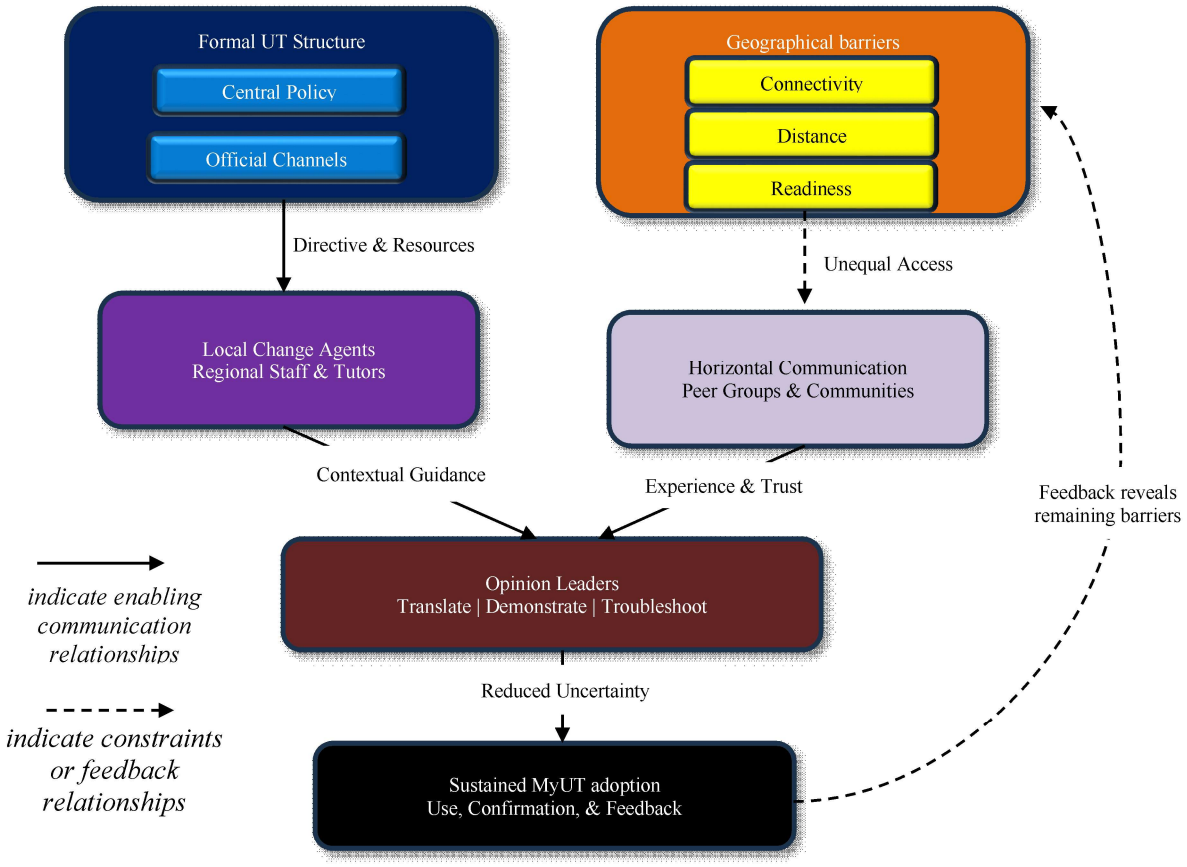

Figure 1. Dissemination pattern of the MyUT innovation

Contextual Enablers and Constraints of MyUT Dissemination

Geography and digital infrastructure

Cross-site evidence indicated that dissemination proceeded more smoothly where users had stable internet connectivity, frequently engaged with digital services, and had ready access to institutional support. In locations with greater access constraints, information tended to reach participants later, and users relied more

heavily on regional staff, service centers, and peer-mediated support. This pattern aligns with van de Werfhorst et al. (2022), who show that inequalities in online education arise not only from access to digital technology but also from differences in users' digital readiness and institutional capacity to support technology use. Similarly, Zhao et al. (2022) show that disparities between rural and urban learners are shaped by unequal access to infrastructure and digital capital, which subsequently influence the outcomes of e-learning participation. These studies reinforce the view that connectivity and institutional support work together: infrastructure determines whether users can receive and act on information. At the same time, local assistance helps compensate for unequal access and capability. However, because the participating regional offices did not standardize comparable MyUT usage records, the present study does not report an aggregate adoption percentage or statistically compare adoption speed. The finding is therefore interpreted as a qualitative pattern of spatial diffusion based on participants' accounts and cross-site observations.

Digital readiness and organizational culture

Digital readiness varied with participants' prior experience with digital services, established work routines, confidence in using technology, and expectations about institutional instruction. Participants accustomed to digital academic services adapted more readily and were more likely to help other users, whereas those accustomed to manual or face-to-face procedures needed clearer guidance, repeated demonstrations, and more practice. The relevant distinction was therefore experiential rather than generational. Helsper and Eynon (2010) support this interpretation, finding that breadth of technology use, accumulated experience, education, and skills can be as important as age in explaining advanced engagement with digital technologies. Digital readiness should thus not be treated as an inherent characteristic of a particular generation but as a capability that can be developed through exposure, learning, and continued use. Within UT's hierarchical organizational setting, explicit leadership direction provided legitimacy and initial momentum for staff adoption. Nevertheless, formal direction alone was insufficient to establish sustained use. Training, peer assistance, knowledge sharing, and opportunities for guided practice helped users translate institutional compliance into everyday routines. This finding corresponds with Trenerry et al. (2021), who identify leadership, human-resource support, employee capabilities, and organizational culture as interconnected factors in workplace digital transformation. Their framework also emphasizes that management and peer support can facilitate technology adoption across individual, group, and organizational levels. Accordingly, UT's organizational culture operated simultaneously as an initial constraint and as a mechanism for institutionalizing MyUT once leadership direction, training, and peer-supported practices became embedded in routine service delivery.

Interactive feedback and adaptive support

Two-way communication strengthened dissemination by letting users report problems, request clarification, and see institutional responses. Satisfaction surveys, support channels, student groups, and question-and-answer forums created feedback loops between users and the institution. Their value lay not only in collecting complaints but also in showing that the institution recognized and addressed adoption problems. In culturally and geographically diverse settings, support was more inclusive when instructions used accessible language, multiple media, demonstrations, and locally relevant explanations (Gunawardena, 2020; Gunawardena et al., 2025).

Taken together, the findings show that MyUT dissemination cannot be explained as a linear administrative flow. Diffusion emerged from the interaction of institutional authority, technological conditions, local mediation, and interpersonal trust. Formal communication created legitimacy and scale; local change agents contextualized the message; peer networks reduced uncertainty; and responsive feedback supported confirmation. Geographical and infrastructural barriers weakened each connection by delaying information, interrupting use, or limiting access to assistance.

The theoretical contribution lies in positioning opinion leaders and local change agents as bridging actors in distance higher education. Their role extends beyond persuasion: they translate policy, provide technical scaffolding, connect formal and informal networks, and communicate local constraints back to the institution. Practically, UT and comparable ODL institutions should identify local champions early, provide standardized but adaptable communication resources, maintain multi-channel support, document recurring problems consistently, and use feedback to refine both the technology and its dissemination strategy. Sustainable adoption therefore depends not only on introducing a useful platform but also on maintaining an inclusive communication ecology around it.

■ CONCLUSION

This study examined the characteristics of MyUT innovation dissemination at Universitas Terbuka (UT), particularly the communication processes supporting student adoption. The findings show that the diffusion process can be understood through Rogers' five stages: knowledge, persuasion, decision, implementation, and confirmation. Across these stages, formal top-down communication enabled institution-wide dissemination, but its practical effectiveness depended on regional UT staff, tutors, and pioneering students who translated institutional messages, helped, and acted as local change agents or opinion leaders. These roles were especially important in an Open and Distance Learning (ODL) environment characterized by geographical dispersion, unequal digital access, varying digital literacy, and infrastructure constraints.

MyUT's dissemination therefore followed a hybrid pattern that combined institutional hierarchy with horizontal student and tutor networks. Adoption was supported not only by formal announcements and directives but also by peer interaction, informal troubleshooting, and scaffolding that helped users interpret and apply the innovation. Participants in locations with more reliable digital infrastructure generally described smoother access and fewer implementation barriers. In contrast, participants in more infrastructure-constrained settings reported delayed access to information, greater technical difficulty, and a stronger need for assistance. This pattern reflects context-specific perceptions drawn from interviews, observations, and participant accounts, rather than a statistically measured difference in adoption speed between regions. Organizational readiness and openness to technological change also shaped how users responded to MyUT.

Overall, disseminating innovation in ODL institutions requires a multilevel, interactive, context-sensitive approach that links institutional planning to the social dynamics of user communities. For UT and comparable institutions, this means strengthening local change agents, maintaining accessible formal and informal communication channels, providing continuous technical and peer support, and adapting dissemination strategies to differences in infrastructure, digital literacy, and organizational culture. Because this exploratory case study relies on qualitative evidence from selected UT settings, its conclusions explain perceived dissemination

processes and contextual differences rather than population-level adoption rates. Future research should combine qualitative evidence with longitudinal usage data across regions to test the relationship between infrastructure conditions, communication strategies, and the pace and sustainability of digital-innovation adoption.

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■ DECLARATION OF GENERATIVE AI USAGE IN THE WRITING PROCESS

During drafting and revision, the authors used ChatGPT (OpenAI) to support English-language editing, refine sentence structure, improve academic clarity, and organize the manuscript's presentation. The tool was not used to generate research data or replace the authors' interpretation of the findings. Following its use, the authors critically reviewed, verified, and revised the generated suggestions and accept full responsibility for the accuracy, integrity, and final content of the article.

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