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Article

Guided inquiry design for online information literacy media: A production-centric loop under structural pressures

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Nove E Variant Anna
Associate Professor, Faculty of Vocational Studies, Universitas Airlangga, Surabaya, Indonesia. Email: nove.anna@vokasi.unair.ac.id. ORCID: 0000-0002-1700-2315.

Miyarso Dwi Ajie
Senior Librarian, Universitas Pendidikan Indonesia, Bandung, Indonesia. Email: mdajie@upi.edu. ORCID: 0009-0002-6141-3901.

Piyapat Jarusawat
Assistant Professor, Department of Library and Information Science, Faculty of Humanities, Chiang Mai University, Chiang Mai, Thailand. Email: piyapat.j@cmu.ac.th. ORCID: 0000-0001-5106-407X.

Yollanda Nundy Alshafa
Assistant Researcher, Universitas Airlangga, Surabaya, Indonesia. Email: alshafayollanda09@gmail.com.

Abstract

Purpose

To examine how academic librarians in Indonesia design online information literacy (IL) instructional media, focusing on their design workflows, the competencies they draw on, and the contextual constraints they navigate when integrating instruction and technology in post-pandemic digital environments.

Design/methodology/approach

This qualitative descriptive study used an asynchronous qualitative instrument with purposive, criteria-based sampling (academic librarians with ≥1 year of experience who had created online IL media within the past two years). Eighteen librarians from multiple regions participated. Respondents provided narrative accounts and shared examples of their online IL media; follow-

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up clarifications were conducted via email and WhatsApp. Data were analysed using qualitative content analysis and organised through Guided Inquiry Design (GID) as the primary analytic lens.

Findings

Librarians describe a recurring workflow that enacts GID as a production-centric loop rather than a fully balanced, sequential cycle. All GID phases are present, but work clusters heavily in Gather-Create-Share (media production and dissemination), while Open/Immerse, Explore/Identify, and Evaluate are compressed, informal, and often under-documented. A phase-structured competency ecosystem underpins this loop, with competencies distributed across phases: instructional awareness and user-needs sensing; media and interaction design; information architecture and copywriting; platform operations; and basic analytics, supported by cross-cutting soft skills. These patterns are shaped by structural pressures, including limited time and staffing, multiple role responsibilities, uneven infrastructures, and visibility demands driven by social media metrics, which collectively push librarians toward rapid, output-focused workflows and lightweight, engagement-based evaluation.

Practical implications

The study suggests practical levers for strengthening online IL media design in academic libraries, including lightweight planning tools aligned with GID phases, targeted micro-trainings in instructional and evaluative design, simple enhancements to evaluation (e.g. brief checks, user polls, and feedback prompts), cross-functional collaboration, and the development of reusable digital assets. The proposed model can serve as a diagnostic tool for libraries to reflect on where competencies and resources are concentrated and where planning or evaluation phases may need reinforcement.

Originality/value

This study provides one of the first qualitative accounts of online IL media design from Indonesian academic librarians and extends the IL and GID literature by theorising a production-centric adaptation of GID, articulating a phase-structured competency ecosystem, and framing the contextual constraints of IL media work as structural pressures. It offers a context-sensitive explanation of how inquiry-based instructional frameworks are operationalised in resource-variable academic library environments in Southeast Asia.

Limitations

The study draws on a small purposive sample and self-reported accounts supplemented by artefacts, without direct observation or student outcome measures. Future research should incorporate ethnographic or longitudinal data, learner analytics or assessments, and broader or comparative samples to examine the transferability and boundary conditions of the production-centric GID loop in other institutional and regional contexts.

Keywords
academic librarians; higher education; Indonesia; information literacy; instructional design; online instruction; online resources; qualitative research

1. Introduction

The COVID-19 pandemic accelerated the transition to digital learning environments, compelling academic libraries to rethink their instructional strategies for information literacy (IL). While studies have explored online instruction design in library contexts (Goodsett, 2020; Martzoukou, 2021), rapid advances in hybrid learning and inquiry-based instructional approaches call for a re-examination of academic librarians' roles as designers of technology-mediated instructional media.

Designing online IL instructional media, such as instructional videos, interactive tutorials, and web-based learning modules, requires librarians to integrate technological tools with sound instructional frameworks. Beyond technical integration, librarians must also adopt interactive and student-centered teaching approaches that enhance engagement and critical thinking, as demonstrated in recent studies on library instruction strategies and IL pedagogy (Anna et al., 2023; Goodsett & Schmillen, 2022; Singh, 2015). Consequently, this process also demands competencies in instructional design, multimedia development, and digital accessibility skills that are increasingly vital for librarians in the digital era (Aini & Istiana, 2018).

Previous studies have examined librarians as educators, instructional designers, and research partners (Bapte, 2019; Landøy et al., 2020; Pritchard, 2019; Thomas et al., 2020) and emphasised the role of IL instruction in fostering critical thinking (Goodsett, 2020; Martzoukou, 2021; Paul & Elder, 2019). However, these studies largely focus on traditional or in-person instructional contexts, with limited attention to the lived experiences of librarians who develop online-based instructional media amid post-pandemic digital transformation. Moreover, while Guided Inquiry Design (GID) offers a learner-centred framework for IL instruction, little research examines how librarians operationalise this model within digital environments and under real-world constraints such as time, staffing, and infrastructure.

This study addresses how academic librarians in Indonesia develop online IL instructional media in post-pandemic conditions marked by uneven institutional resources. Rather than treating GID as a static checklist, we use it as an analytic lens to structure librarians' operational workflow across the Open, Immerse, Explore, Identify, Gather, Create, Share, and Evaluate phases. The study offers an empirically grounded account of a recurring design cycle based on the GID framework and highlights how local constraints shape librarians' enactment of inquiry-driven instructional design.

Accordingly, this study explores the experiences of academic librarians in Indonesia as they design, develop, and implement online-based IL instructional media. To achieve this objective, the study addresses the following research questions:

1. How do academic librarians experience and describe the process of designing online-based IL instructional media?
2. What competencies do librarians draw on when designing online-based IL instructional media?
3. What challenges do librarians encounter, and what strategies do they use, when developing online-based IL instructional media?

2. Literature Review

2.1 IL and Instruction

IL is widely recognised as a core competency in the digital era, encompassing the ability to locate, evaluate, synthesise, and use information ethically and critically (ALA, 2015). IL supports academic success, professional development, civic engagement, and lifelong learning (Khan, 2020; Lubis et al., 2023). Consequently, higher education institutions and academic libraries have prioritised IL instruction as part of their mission to enhance students' information use and independent learning (Carlsson, 2025; Ozor & Toner, 2022). While IL instruction spans school, public, and academic settings, this study specifically focuses on academic libraries, where instructional responsibilities are closely integrated with university curricula, research support, and higher education learning outcomes.

Early studies on IL instruction primarily focused on traditional, face-to-face sessions led by librarians and emphasised technical skills such as database searching and citation management (Landøy et al., 2020; Pritchard, 2019). More recent scholarship argues that effective IL instruction must integrate instructional strategies that promote reflective engagement, ethical reasoning, and inquiry (Goodsett, 2020; Singh, 2015). As teaching and learning increasingly occur in digital environments, the role of librarians has expanded from content providers to instructional designers who curate, package, and deliver learning experiences across multiple platforms (Thomas et al., 2020).

2.2 Online Based IL Instruction

The COVID-19 pandemic accelerated the adoption of online and hybrid learning, compelling libraries worldwide to redesign IL instruction for digital delivery (Makdis, 2020). Online-based IL instruction now takes multiple forms, including interactive tutorials, modular web-based content, educational videos, virtual workshops, and gamified learning environments (Dempsey & Heil, 2021; Pickard & Sterling, 2022; Pothier, 2020). These formats expand the reach of IL instruction to diverse user groups, including students in remote areas, users with disabilities, or those facing time constraints (Fernández-Ramos, 2019).

Despite these opportunities, research consistently highlights persistent challenges. Librarians often lack institutional support, formal training in instructional design, and access to emerging technologies required to develop high-quality digital learning materials (Julien et al., 2018; Kerrigan et al., 2023). While online IL initiatives improve accessibility (Fernández-Ramos, 2019), gaps in pedagogical preparation and uneven infrastructure indicate that digital tools alone are insufficient without robust instructional design frameworks.

In addition, recent studies highlight the growing use of micro-learning and social media platforms for delivering short, modular instructional content, typically through brief videos, infographics, and bite-sized learning units that can be accessed on-demand via mobile devices (Alias & Razak, 2025; Denojean-Mairet et al., 2024). These approaches allow librarians to provide just-in-time support and reach students through familiar digital spaces, leveraging platforms such as Instagram, TikTok, Twitter, and other social networks to extend IL instruction, enhance engagement, and support virtual or distance learning environments (Denojean-Mairet et al., 2024).

2.3 Instructional Design Models in Library Context

Instructional design models such as ADDIE (Analyse, Design, Develop, Implement, Evaluate) offer structured approaches for planning and developing learning materials (Mangtani, 2024). These models emphasise systematic processes and alignment with learning objectives, providing librarians with practical templates for instructional media development. However, scholars note that linear models like ADDIE are often insufficient for IL instruction, which requires iterative, inquiry-driven, and learner-centered approaches (Landøy et al., 2020). While such models provide procedural clarity, they may not fully capture the exploratory and reflective nature of IL learning, where students construct knowledge through ongoing inquiry rather than fixed instructional sequences (de Jong et al., 2023).

2.4 Guided Inquiry Design (GID)

To address this gap, Kuhlthau's GID framework offers an eight-phase model, Open, Immerse, Explore, Identify, Gather, Create, Share, and Evaluate, that emphasises iterative engagement, inquiry, and the affective dimensions of learning (Kuhlthau, Maniotes, & Caspari, 2012). Unlike linear instructional models, GID foregrounds learners' cognitive, emotional, and metacognitive processes throughout the inquiry journey, making it particularly suited to IL contexts (DuBoff, 2022; Al Mamun et al., 2022).

In face-to-face library instruction, GID has been used to scaffold research activities, guide collaborative exploration, and support students' meaning-making through staged inquiry tasks (Mustaham, 2024). These principles are equally transferable to online environments, where digital tutorials, videos, and web-based modules can structure learners' progression through inquiry phases while maintaining interaction and reflection (Al Mamun et a., 2022).

GID aligns well with digital instructional contexts where learners navigate complex information environments and benefit from scaffolded inquiry (Goodsett, 2020; Martzoukou, 2021). In library settings, GID provides a conceptual and operational structure that can guide how librarians plan and develop online IL materials. This study adopts GID as an analytic framework to map the workflow and design decisions enacted by librarians during the development of online IL instructional media.

2.5 Research Gap

Existing research has established the importance of IL instruction, the expanded role of librarians as instructional designers, and the availability of instructional design models for developing learning materials. However, several gaps remain. First, most studies still focus on traditional or in-person IL instructional activities, with relatively limited attention to how librarians design digital IL media in post-pandemic environments. Second, while inquiry-based models like GID are conceptually relevant, little research has examined how librarians operationalise these models within real-world digital production settings that involve constraints such as time, workload, staffing, and technological limitations. Third, studies seldom explore how librarians integrate pedagogical, technological, and contextual factors when developing online instructional media, particularly in regions undergoing rapid digital transformation.
Despite increasing digitalisation in Southeast Asia, no empirical study to date has investigated how academic librarians in this region adapt and enact the GID framework when producing online IL instructional media. This leaves a critical gap, as institutional resources, technological

infrastructure, and professional development opportunities in Southeast Asia differ substantially from those in Western contexts that dominate the existing literature, potentially shaping distinct instructional design practices and constraints. This study addresses this gap by providing an empirically grounded account of how librarians structure, iterate, and navigate design work using GID in the context of online IL instruction.

3. Method

3.1 Research Design

This study employed an exploratory qualitative design to investigate academic librarians' experiences in designing online-based IL instructional media. Given the geographical dispersion of participants across multiple cities in Indonesia (Jakarta, Bandung, Yogyakarta, Surabaya) and their varied professional schedules, an asynchronous qualitative instrument complemented by follow-up elicitation interviews via email and WhatsApp was used. This two-stage approach enabled participants to provide rich and reflective responses at their convenience, while allowing the research team to clarify and deepen emerging insights without the logistical constraints of synchronous interviews.

3.2 Participants and Sampling

Participants were recruited through purposive, criteria-based sampling to ensure information-rich cases aligned with the study objectives. Eligible participants were:

1) Academic librarians with at least one year of professional experience, and
2) Directly involved in designing online IL instructional materials within the past two years.

A total of 42 librarians were invited, and 18 agreed to participate. This relatively small sample reflects both the rarity of the phenomenon, since not all academic librarians engage in instructional media development, and practical constraints such as workload, scheduling, and geographic dispersion. In qualitative research, adequacy is determined by analytic sufficiency rather than statistical representativeness, and the sample captured diverse institutional contexts and design practices.

3.3 Data Collection Techniques

Data were collected in two stages. First, participants completed an open-ended online instrument delivered via Google Forms. The prompts (Table 1) solicited narrative accounts of the types of instructional media produced, their design and evaluation processes, the competencies required, and challenges encountered.

Second, participants were invited to submit digital artefacts of their instructional media (e.g., tutorial videos, interactive modules, posters, web guides, e-learning materials). These artefacts enabled document analysis and methodological triangulation between self-reported practices and actual instructional products.

Follow-up elicitation via email and WhatsApp was conducted to clarify incomplete responses, request elaboration, and verify preliminary interpretations. This asynchronous exchange functioned as a form of member checking and allowed deeper engagement while respecting participants' time constraints.

The open-ended prompts were developed based on the study objectives, existing literature on IL instruction, and the GID. The questions were discussed among the research team to ensure clarity and alignment with the constructs under investigation. A brief pilot review with two librarians was conducted to refine wording and eliminate ambiguity before distribution.

Table 1: Open-Ended Interview Questions

No.	Question
Q1	What types of online information literacy instructional media have you designed?
Q2	What is your process for designing and developing such media?
Q3	What considerations inform your selection of media types and formats?
Q4	How do you evaluate the instructional media you produce?
Q5	What challenges do you face in developing online IL instructional media?
Q6	What competencies do librarians need to design effective online IL instructional media?

3.4 Data Analysis

Data from the online instrument, follow-up clarifications, and submitted artefacts were analysed using qualitative content analysis (Schreier, 2012). Kuhlthau's GID framework (Kuhlthau, Maniotes, & Caspari, 2012) served as the primary analytic lens for organising and interpreting librarians' design activities across the Open, Immerse, Explore, Identify, Gather, Create, Share, and Evaluate phases.

The analysis proceeded through the following stages:

1. All responses and artefacts were reviewed to ensure completeness and relevance;
2. Meaningful units of text were coded to capture key concepts, actions, and considerations described by the participants;
3. Related codes were grouped into categories; and
4. Categories were refined into themes that represented recurring patterns in librarians' design practices, competencies, and challenges.

Document analysis of instructional artefacts (e.g., videos, tutorials, guides) was used to validate participants' accounts and enrich the thematic interpretation, following established procedures for qualitative document analysis (Morgan, 2022; Wood et al., 2020). Triangulating narrative responses with actual media outputs strengthened the credibility and contextual grounding of the findings.

4. Analysis and Findings

The population of this research are librarians who often design library IL media in digital format. Questionnaires were distributed to various university libraries in Java, Indonesia, using email and social media (WA), and then respondents filled out the questionnaire form online. This section presents the findings derived from the open-ended instrument summarised in Table 1, followed by respondents' demographic characteristics and thematic results.

4.1 Respondent profile

Table 2: Respondent Profile

Gender	Total	Percentage
Male	4	22%
Female	14	78%
Education Level		
Library and Information Science (Bachelor)	9	50%
Information Systems (Bachelor)	1	6 %
Library Science (Master)	6	33%
Communication Science (Master)	1	6%
Master of Management	1	6%
Work Experience		
1-5 years	5	28%
5-10 years	5	28%
10-15 years	2	11%
15-20 years	2	11%
20-25 years	3	17%
above 25 years	1	6%

From table 2, the participants in this study predominantly have a background in library science, with 83% (15 respondents) holding a Bachelor's degree in this field. Despite some holding Master's degrees in non-library disciplines, all participants initially completed a D3 or Bachelor's degree in library science, highlighting a shared foundation in the field. The respondents who were the main subjects were librarians with various work experiences. The most widely represented range of work experience for librarians is between 10 and 25 years, covering 7 respondents or around 35% of the total respondents. They have significant experience in the library field, which can provide in-depth insight into this research topic.

4.2 Process in Designing Online IL Instruction

To address RQ1, how academic librarians experience the design of online IL instructional media, we analysed the data using Kuhlthau's GID as the operational scaffold for mapping librarians' workflow. GID enabled us to organise design activities across the Open, Immerse,

Explore, Identify, Gather, Create, Share, and Evaluate phases, while recognising that librarians enacted these phases in non-linear, recursive ways. Each narrative segment and artefact was coded to a primary GID phase, allowing us to trace how specific actions, decisions, and design outputs aligned with inquiry-driven instructional design. Participant identifiers (e.g., P01–P18) are used to illustrate representative evidence. Codes may appear across multiple tables depending on the themes they contributed to; therefore, they do not indicate one-to-one correspondence between themes and participants.

Table 3: Themes on Online IL Instruction Media Design Process

Theme / Key Finding	GID phase	Representative activities / documents	Quotation & Documents
Benchmarking & topic brainstorming	Open / Immerse	Team huddles; scanning peer libraries' posts; collecting raw materials; monthly topic brief	e.g., P02 and P03
Design goals	Identify	Source-evaluation rubrics; Q&A/DM prompts; Research-topic; webinars;	e.g., P10 and P03; A-10: rubric excerpt
Media selection & Learning Outcome	Explore / Identify	Choosing platform/format (IG, YouTube, web PDF, TikTok, LMS); Setting learning outcomes;	e.g., P04 and P08
Production of instructional media	Gather / Create	Step-by-step web guides; captioned videos; checklists/rubrics; bilingual visuals	e.g., P16 and P13
Social media micro-lessons	Create / Share	Short reels, e-posters, carousels; IG/YouTube shorts with prompts and mini-tasks	e.g., P04 and P12; A-01, A-10 and A-13: IG carousel on database access
Website guides & repository access PDFs	Create / Share	Downloadable PDF guides (repository, Turnitin, SAGE/Mendeley); contact info	e.g., P08 and P03 A-03, A-08, A-09, A-10, A-12 and A-14: Website guides & PDF with screenshots & steps
E-learning / LMS modules & webinars	Create / Share	LMS modules; webinar recordings; downloadable materials; follow-up tasks	e.g., P02 and P07 A-02, A-05, A-06 and A-13: LMS module outline; attendance summary
Games, memes, fun-facts, treasure hunts	Create / Share	Guessing games, treasure hunts, trend-aligned memes; comments/quiz rewards	e.g., P07 and P17 A-13: #FunFact series; participation count
Dissemination & scheduling strategy	Share	Multi-channel releases; themed series; posting calendar; cross-links	e.g., P04 and P14 A-04, A-10, A-13 and A-15: publishing plan; cross-post log
Validation & internal review	Evaluate	Management/team review; content accuracy checks before release	e.g., P08 and P08

Theme / Key Finding	GID phase	Representative activities / documents	Quotation & Documents
Analytics-driven iteration & user feedback	Evaluate	Platform insights (views, retention, comments/DM), micro-surveys; minor weekly edits	e.g., P10 and P04

Source: Data processing from participants answer

4.3 Narrative Interpretation of the Design Process

The mapping reveals an inquiry-driven workflow that operates as a flexible cycle rather than a linear sequence. Librarians typically begin in the Open/Immerse phase by scanning user questions, benchmarking peer libraries, and discussing emerging needs in brief team huddles. As one participant explained, *"We usually start by checking what students have been asking on Instagram and WhatsApp, those questions guide our topics for the month."* (P03)

In the Explore/Identify phase, librarians consider the goals of the instructional content and the formats most suitable for their users' bandwidth, device access, and familiarity with platforms. For instance, P04 stated, *"We choose between video, carousel, or PDF based on how easy it will be for students to access with their phones."* Decisions at this stage reflect a pragmatic balancing of instructional intentions with infrastructural realities.

The most intensive activity occurs in the Gather/Create phases. Librarians produce step-by-step guides, captioned videos, e-posters, and bilingual visuals. Many describe self-taught or peer-supported learning of design tools, with P16 noting, *"I learned video editing from YouTube because we had no formal training, over time, the content became more polished."* Artefacts show consistent patterns of chunking procedural steps, embedding screenshots, and simplifying instructions for quick comprehension.

During Create/Share, content is released through multiple channels, Instagram, YouTube, the library website, and LMS platforms, to maximise reach. Several participants described a "micro-learning" approach using short reels or carousel posts to trigger interest. As P12 stated, *"Short reels get attention; then we link to a longer guide on the website if they want details."*

Finally, the Evaluate phase is characterised by lightweight, analytics-driven refinement. Librarians monitor platform metrics (views, retention time, comments), check direct messages, and conduct informal peer reviews before or after publication. P10 explained, *"If the video has low retention, we shorten it next time. If many students DM with the same confusion, we update the steps."* This iterative evaluation loops back into Open/Immerse, shaping the next cycle of production.

4.4 Interpretive Summary Librarians Competencies

Overall, the data indicate that librarians enact GID as a short-cycle, production-oriented inquiry loop. Early phases (Open/Immerse and Explore/Identify) are brief, informal, and often undocumented, driven by user requests and platform trends. Middle phases (Gather/Create) dominate the workflow, reflecting the heavy demands of producing digital media with limited time and tools. Later phases (Share/Evaluate) are closely tied to the affordances of social media

metrics and the need for rapid iteration. This pattern demonstrates a pragmatic adaptation of GID under real-world constraints such as workload, bandwidth, and team size.

Rather than following GID sequentially, librarians move fluidly across phases, using inquiry as a guiding logic while prioritising formats and processes that ensure visibility, accessibility, and feasibility. This dynamic sheds light on how GID is translated into everyday design practice in academic libraries, serving less as a formal instructional model and more as a scaffold for organising digital media production in resource-limited settings.

4.5 Librarian Competencies in Designing IL Instruction

To address RQ2, we examined the competencies librarians draw on when designing online IL instructional media. The analysis shows that librarians mobilise a constellation of skills distributed across the phases of GID. These competencies span pedagogy-oriented decision-making, media production, information architecture, platform operations, and a wide range of soft skills. Together, they form what participants described as a practical "skill mix" required to sustain continuous digital content production.

Several librarians noted that their work begins with understanding user needs and aligning topics with IL priorities. As one participant shared, *"We always start by asking what students are struggling with usually from their messages or comments. That becomes our topic direction."* (P03) This reflects early-stage competencies in instructional awareness and user-centred topic identification.

Table 4: Competencies that librarians must have

GID phase	Competencies evidenced	Typical activities / documents reported
Open / Immerse	• Instruction & learning design (understanding user needs; aligning topics to IL goals); • Platform & social media operations (peer scanning, trend watching) • Project/collaboration & soft skills (brief huddles, time management, creativity, empathy)	Brainstorming with colleagues; scanning other libraries' posts; collecting raw materials; compiling monthly topic (P03; P04)
Explore / Identify	• Instruction & learning design (setting learning goals/outcomes) • Media & interaction design (choosing format: video, e-poster, PDF, tutorial flow) • Platform operations (selecting channel: website, LMS, IG/YouTube/TikTok) • Technical foundations/ICT (tool feasibility; affordability constraints)	Choosing format/platform; drafting scripts/storyboards; deciding "what fits audience/bandwidth" (P13; P15)
Gather / Create	• Media & interaction design (graphic design, video editing, layout, illustration, e-publishing, image editing)	Producing captioned videos, e-posters/e-brochures, step-by-step web/PDF guides, tutorials,

GID phase	Competencies evidenced	Typical activities / documents reported
	• Information & content creation (information processing/analysis/identification/search; information architecture; metadata; writing/copywriting) • Technical foundations/ICT (learning tech, IMS; database use; reported tool use) • Soft skills (creativity; analytical)	storyboards (P09; P17)
Share	• Platform & social media operations (multi-channel release; scheduling; series/themes; community interaction) • Information & content engineering (clear copy; links; CTAs) • Technical foundations/ICT (publishing via website/LMS/social platforms)	Posting on website/IG/YouTube/TikTok/LMS; cross-linking; calendars/themes (P04; P13)
Evaluate	• Assessment & basic analytics (engagement metrics: views, likes, comments/DMs, micro-surveys) • Quality review/internal validation (managerial/team checks for accuracy) • Project/collaboration & soft skills (analytical; time management for revisions)	Internal review before release; reading platform insights; minor weekly edits; collecting quick feedback (P18; P08)

In the Explore/Identify phases, librarians draw on pedagogical reasoning and media planning skills to select appropriate formats and channels. P15 explained, *"If the topic is heavy, we choose PDF or website guides; if it's light and visual, we make carousels or short videos."* This demonstrates a combination of instructional judgment, media interaction design, and sensitivity to bandwidth, device constraints, and platform behaviours.

The Gather/Create phase requires the greatest concentration of competencies. Librarians rely on media design (graphic design, layout, video editing), information management (content structuring, metadata, writing), and technical skills (ICT tools, image editing, CMS/LMS use). Many acknowledged that these skills were self-developed. As P17 noted, *"Most of us learned design tools by ourselves—we help each other when someone gets stuck."* Artefacts confirm consistent use of step-by-step visual guides, captioned videos, and bilingual text to simplify complex processes.

In the Share phase, librarians employ platform operation skills to manage multi-channel dissemination, scheduling, and cross-promotion. For example, P04 described coordinating releases across Instagram, the website, and YouTube: *"We try to post in a sequence-short reel first, then the full guide on the website."* This highlights the operational expertise required to maintain visibility and accessibility across platforms.

Finally, the Evaluate phase requires basic analytics interpretation and internal quality review. Librarians monitor engagement metrics and direct messages to identify confusion points or

common errors. As P18 explained, *"If many students ask the same question, we know the guide needs revision. Analytics tell us what content works."*

4.6 Interpretive Summary Design Workflow

The GID-based competency mapping illustrates a phase-structured yet highly interconnected competency ecosystem. Early phases rely on instructional awareness, social media literacy, and collaborative soft skills. Middle phases depend heavily on media production, information architecture, and ICT proficiency. Later phases emphasise platform management and lightweight analytics. Cross-cutting soft skills communication, creativity, time management, and problem-solving anchor all phases.

Overall, librarians demonstrate a pragmatic blending of instructional, technical, and operational competencies that enable them to sustain an inquiry-driven digital design workflow. These competencies emerge not as isolated skill sets but as a flexible, adaptive repertoire shaped by institutional constraints and the demands of rapid, iterative content creation.

4.7 Challenges faced by Librarians

To address RQ3, the challenges faced by librarians when designing online IL instruction are summarised in Table 5.

Table 5: Challenge Faced by Librarian based on GID

GID phase	Challenge	Evidence from the data	Consequence
Open / Immerse	Converting dispersed feedback into clear user needs/levels	Social-media comments and DMs; "contact us" link; online feedback forms; quick scans of peer libraries; brief team huddles P02 and P08	Planning stays lightweight/under-documented; uncertainty persists
Explore / Identify	Platform/format trade-offs under bandwidth/device limits	Use of IG/YouTube/TikTok/Twitter, website, e-learning/LMS; mentions of limited internet/device access; general references to "accessibility/affordability" (no formal standard named) P08 and P13	Decisions skew to reach/speed; risk of LO–media mismatch
Gather / Create	Making content engaging *and* critical with uneven instruction	Strong focus on graphics/video, posters, tutorials; many rely on training/self-learning; fewer explicit critical-thinking prompts/rubrics mentioned P04 and P1	Strong production; instructional depth varies; critical-thinking scaffolds inconsistent
Share	Sustaining multi-channel release with small teams	Scheduled posts/themes mentioned; dissemination via website, IG, YouTube, TikTok, e-learning P04 and P14	Cadence strained by workload; equity depends on ad-hoc workarounds
Evaluate	Engagement-heavy evaluation; limited	Views/likes/comments/DMs; social-media insights; online surveys/feedback forms; peer/manager review before/after release	Iteration = minor edits; weak link back to learning aims

GID phase	Challenge	Evidence from the data	Consequence
	learning evidence	P04 and P19	

Table 5, above, shows where each challenge appears across the GID cycle and how these constraints accumulate in practice. In the Open/Immerse phase, early planning is often hindered by difficulties in conceptualising themes and aligning ideas with user needs. Librarians reported that "*the process of planning information literacy media starts from selecting themes and designs*" (P1) and that determining "*the concept*" (P15) can stall development, with some noting that projects were "*concepts that were temporarily halted*" (P17). These fragmented beginnings result in lightweight and under-documented planning.

During Explore/Identify, librarians struggle to align formats, pedagogy, and user characteristics. Several participants emphasised the need to adjust designs to audience preferences, such as creating content that is "*easy to understand, engaging, and up-to-date*" (P4) and "*not monotonous and adjusted to younger audiences*" (P5). At the same time, they acknowledged the pedagogical burden of defining learning outcomes and assignments, as "*developing assignments requires pedagogical competence because librarians are also educators*" (P8). These competing demands often cause mismatches between instructional intentions and chosen media.

In the Gather/Create phase, production is constrained by limited technical and design competencies. Librarians cited "*limited graphic design skills*" (P6) and the need to continually update digital competencies because "*media continues to develop very rapidly*" (P9). Others noted that even copywriting has become essential, as "*librarians also need to learn copywriting*" (P13). As a result, while content is produced, instructional depth and quality vary considerably.

Challenges intensify in Share, where dissemination depends on small teams managing multiple responsibilities. Respondents described difficulties maintaining consistency, including "*consistency in uploading regularly*" (P12), "*tight timelines*" (P11), and pressure for "*speed of publication*" (P14). Limited staffing further complicates scheduling, as "*one librarian may handle two to three roles at the same time due to staff shortages*" (P18). These conditions strain sustainable multi-channel engagement.

Finally, Evaluate is indirectly affected by workload and capacity issues. Rather than systematic assessment, evaluation often relies on minimal revisions due to competing duties. As one librarian reflected, challenges frequently stem from personal and organisational limitations, including "whether or not one is willing to update information and maintain motivation, which sometimes fluctuates" (R18), suggesting that reflective improvement is constrained by time and energy.

Cross-cutting pressures, including limited staff, uneven IT competence, equipment and funding constraints, and competing tasks, compress early inquiry phases and cap evaluation depth, pushing effort toward production and dissemination. Taken together, these findings depict a production-centric loop characterised by rapid, iterative adjustments rather than a fully elaborated inquiry cycle.

5. Discussion

5.1 Conceptual Contribution

To synthesise the findings across the three research questions, we developed a visual model of how academic librarians enact GID when creating online IL instructional media. Whereas prior work has primarily framed GID as a learner-centred pedagogical framework for teaching IL (Heinström, 2019; Kuhlthau et al., 2012), this study repositions GID as an operational scaffold for librarians' own design work under structural pressures. Figure 1 integrates the processual patterns, competency clusters, and contextual constraints identified in the data into a single analytic representation. It shows how librarians' competencies, inquiry-based design activities, and institutional conditions interact, providing a holistic view of the production-centric adaptation of GID that emerges in this study.

Figure 1: Production-centric GID loop, competency ecosystem, and structural pressures in online IL media design

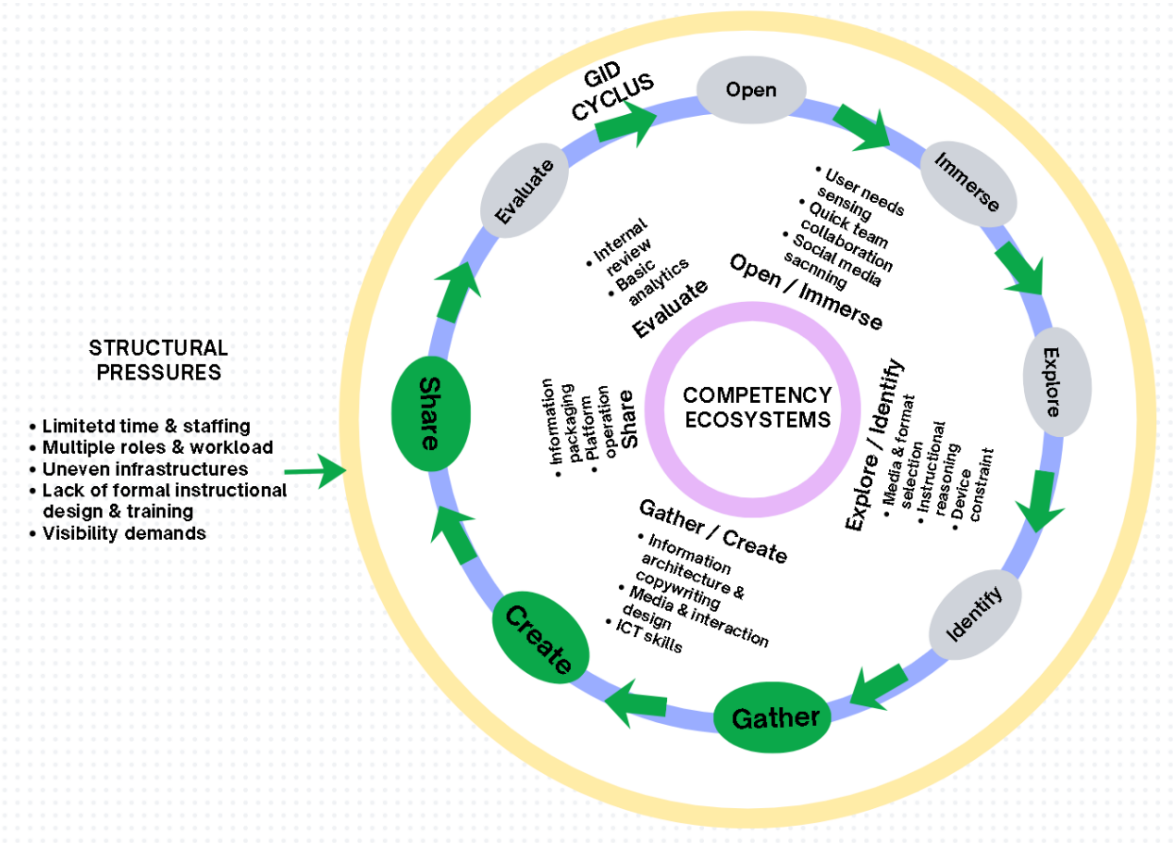

Figure by authors

The inner circle represents a phase-structured competency ecosystem, showing how librarians' pedagogical, technical, and platform-management competencies are activated across the GID phases. The middle circle depicts the full GID cycle (Open, Immerse, Explore, Identify, Gather, Create, Share, Evaluate), with the Gather-Create-Share segments visually emphasised to

indicate where most effort and time are concentrated, and thinner segments for Open/Immerse and Evaluate to reflect more compressed, informal enactment. The outer ring presents structural pressures limited time and staffing, multiple roles and workload, uneven infrastructures, lack of formal instructional design training, and visibility demands that act on the cycle and help explain why GID is pragmatically adapted into a production-centric loop in this context.

As illustrated in Figure 1, GID functions as an operational scaffold rather than a uniformly enacted sequence: all eight phases are present, yet librarians' work clusters most heavily around Gather, Create, and Share, where media production and dissemination occur. The inner competency ecosystem highlights how specific skill sets such as user needs sensing, media and interaction design, information architecture, platform operations, and basic analytics are distributed across phases and integrated in practice. The surrounding structural pressures make visible why planning (Open/Immerse, Explore/Identify) and evaluation (Evaluate) tend to be compressed: limited time and staffing, competing role demands, infrastructural constraints, and visibility expectations push librarians toward rapid, output-focused cycles. Together, the model clarifies how inquiry-based design, competencies, and structural conditions combine to produce a production-centric GID loop in the design of online IL instructional media.

5.2 A production-oriented adaptation of GID

The findings reveal that academic librarians operationalise GID not as a full, sequential inquiry cycle but as a short-cycle, production-oriented loop driven by institutional realities, platform demands, and time constraints. While GID emphasises a balanced progression from Open and Immerse through Explore, Identify, Gather, Create, Share, and Evaluate, librarians' actual practices cluster heavily in the Gather-Create-Share phases as a research-based pedagogical framework for IL instruction (Heinström, 2019; Kuhlthau, Maniotes, & Caspari, 2012). These stages absorb the bulk of their time, effort, and skill application, whereas the early (Open/Immerse) and late (Evaluate) phases remain lightweight, informal, and often undocumented.

This pattern does not indicate an absence of planning but rather reflects a pragmatic adaptation of inquiry under operational constraints. As participants described, topic discovery is largely based on immediate user requests ("questions students ask on Instagram"), quick team discussions, and benchmarking other libraries' posts. These Open/Immerse activities function as *micro-inquiry triggers* rather than structured instructional planning. Similarly, Explore/Identify decisions such as selecting formats or platforms are made rapidly to accommodate bandwidth limitations, user habits, and production capacity ("we choose the format based on what students can access on their phones"). This approach reflects a broader principle identified in the literature, where responsiveness to user needs, such as actively collecting feedback and adapting services based on user habits and preferences, is considered key to enhancing the quality of academic library services (An & Qing, 2023; Perera et al., 2025).

Taken together, these findings suggest a form of inquiry that is compressed at the beginning and expanded in the middle. The result is a cycle in which librarians "jump quickly into production" because producing visible digital content is perceived as their primary mandate and the most tangible indicator of service performance. This priority aligns with the increasing importance of digital content marketing in libraries, where creating engaging and easily

accessible content is viewed as a primary way to meet user information needs and enhance their engagement (Naseri et al., 2021; Okuonghae, 2021).

This production orientation is further reinforced by structural pressures such as limited staffing, lack of design training, and high demand for continuous digital presence. Social media and platform analytics amplify this dynamic by rewarding rapid, frequent output while offering minimal support for deeper pedagogical evaluation. Consequently, the Evaluate phase is reduced to lightweight metrics views, likes, comments, drop-off points rather than learning assessments or reflective inquiry. These analytics inform minor edits and future topic choices but do not constitute systematic evaluation of instructional effectiveness. Recent studies highlight that while engagement metrics such as user perceptions, collaborative annotations, and task outcomes are commonly used to assess user experience and engagement, systematic assessment of learning outcomes is still rarely applied consistently in digital library evaluation practices (Lee, 2025).

While this pattern diverges from the idealised GID sequence, it represents a contextually rational adaptation of inquiry-based instructional design in resource-limited environments which emphasise critical thinking and structured assessment (Goodsett, 2020). Rather than viewing this as a deficit, we interpret it as an emerging model a production-centric GID loop characterised by:

- Compressed early inquiry: quick scanning of user needs, trend-watching, and lightweight brainstorming.
- Expanded production phase: intensive effort on media creation, aesthetics, accuracy, and platform compatibility.
- Platform-driven dissemination: multi-channel releases optimised for visibility and reach.
- Lightweight evaluation: analytics-informed iteration rather than pedagogical assessment.

This production-centric loop demonstrates how inquiry-based frameworks like GID are translated into real-world practice in academic libraries, where librarians must balance instructional aspirations with technological, temporal, and organisational constraints (Lance & Maniotes, 2020). It also highlights the need to reconceptualise inquiry not only as a pedagogical process for learners but also as an operational design logic for librarians working within fast-paced digital ecosystems, where a solid understanding of 21st-century digital pedagogies and adequate digital skills enables academic librarians to adapt their practices to the demands of dynamic digital environments (Saib et al., 2022).

5.3 A Phase-Structured Competency Ecosystem

The competency patterns identified in this study show that librarians' design work is supported by a phase-structured ecosystem of skills that aligns closely with the GID model. This is consistent with prior research indicating that librarians who apply inquiry-based approaches can facilitate inquiry learning more effectively, as their skills are deployed according to practical needs across each phase, from initial planning to reflection and assessment (Lance & Maniotes, 2020). Moreover, librarians' skills are developed and applied dynamically, often shaped by the demands of context and specific instructional phases rather than being generic or static (Hostetler & Luo, 2022).

In the Open/Immerse phase, librarians rely on instructional sensitivity, user-needs assessment, social media literacy, and collaborative soft skills to identify relevant topics and emerging user problems. These early competencies are subtle but crucial: they allow librarians to interpret signals from user inquiries, trends, and platform dynamics. Such skills support rapid topic recognition and align with findings from Goodsett (2020), who argues that IL work increasingly depends on the ability to read learning contexts rather than only teaching content.

During Explore/Identify, librarians draw on pedagogical reasoning and media-planning skills. Their decisions about formats, platforms, and accessibility reflect an understanding of learners' constraints and the affordances of different media. These competencies reflect what Martzoukou (2021) conceptualises as the practical enactment of digital pedagogy, where librarians translate instructional goals into accessible digital learning materials adapted to students' varied technological contexts.

The Gather/Create phase showcases the densest concentration of competencies. Media production occupies a central role in librarians' work: graphic design, video editing, caption writing, metadata structuring, scripting, and layout decisions are repeatedly described as the most time-consuming tasks. These competencies form the operational heart of the production-centric GID loop, reflecting a shift from librarians as educators to librarians as instructional media producers. This shift is consistent with broader developments in the profession, where librarians are increasingly involved in digital library development, digital content management, and the use of emerging educational technologies, activities that demand interdisciplinary and practical digital skills (Bolasco, 2023). The evolving "blended librarian" model further reinforces this hybrid identity by merging traditional librarianship with instructional design and technology (Hovious & Smith, 2023).

In Share and Evaluate, librarians leverage platform management, multi-channel dissemination, basic analytics, and refinement strategies. Multi-channel dissemination is a key strategy, as libraries seek to reach diverse audiences and maximise engagement across platforms (Athukorala, 2024; Drivas et al., 2022; Pasipamire, 2025). Their evaluation practices largely based on engagement metrics and direct messages are consistent with lightweight analytics commonly used in social-media-based learning environments. These competencies reflect a functional, rather than pedagogical, orientation to evaluation, reinforcing the compressed nature of early inquiry and the expanded focus on production identified earlier.

Together, these distributed competencies reveal that librarians' design practices are not defined by any single skill but by an adaptive integration across phases. This competency ecosystem underpins the pragmatic, inquiry-driven workflow identified in RQ1 and highlights the professional agility required in digital IL environments.

5.4 Structural Pressures and the Emergence of a Visibility-Driven Design Culture

The findings also highlight the significant role of structural pressures, time constraints, staffing limitations, uneven institutional support, and reliance on platform analytics, in shaping librarians' design practices. Similar constraints have been documented elsewhere, with librarians facing overwhelming workloads, technical difficulties, and limited funding that hinder the adoption of new service models and sustained professional development, often pushing them toward quick, visible outputs rather than deeper, long-term initiatives (Shahzad et al., 2023). These conditions

give rise to what we term a visibility-driven design culture, in which producing frequent, visually engaging, and platform-appropriate content becomes a central measure of service performance. This shift aligns with broader transformations in online librarianship, where serving an increasingly digital user base requires flexible service models in the absence of stable, universally agreed-upon guidelines (Pitts et al., 2019).

Several participants noted that formal instructional planning is deprioritised because libraries operate within environments where *"consistent posting is expected"* and where social media visibility serves as a proxy for user engagement. This pattern aligns with recent studies showing that academic libraries frequently centre their social media work on maintaining a continuous stream of updates and visually appealing posts to sustain engagement and visibility, even when such practices displace deeper strategic or instructional planning (Athukorala & Jayasundara, 2025; Poplavskyi, 2024; Wani & Ahmad, 2024).

Technological and infrastructural inequalities reinforce this dynamic. Limited access to professional design tools, slow institutional bandwidth, and competing responsibilities reduce the feasibility of extended planning or evaluation cycles. Recent findings show that many libraries particularly those facing budget constraints and weak technological infrastructure are unable to invest in professional design software or robust IT systems, leading librarians to rely on low-cost, user-friendly platforms that require minimal technical expertise (Mohapatra et al., 2025). As a result, librarians turn to lightweight, flexible solutions, free editing apps, mobile-friendly templates, and asynchronous peer checks, which further amplify production-centric workflows.

The reliance on platform analytics (views, likes, retention time, comments) creates a feedback loop where evaluation becomes synonymous with engagement. While practical, this form of evaluation is not aligned with deeper pedagogical assessment. However, in the context of constrained environments, it serves a functional purpose: it enables librarians to iterate content quickly and respond to user confusion. In this sense, short-format online IL media may replicate some of the longstanding limitations of the "one-shot" instruction model, where time constraints restrict deeper engagement and assessment. The digital environment extends reach but does not automatically resolve structural limits on sustained learning interaction. Recent studies indicate that librarians and cultural heritage administrators leverage daily behavioural analytics to optimise content performance (Drivas et al., 2022), while engagement metrics such as likes, comments, and views act as practical proxies for evaluating user responses to different types of posts (Doney et al., 2020). Together, these findings reinforce the notion that "agile adaptation" often takes precedence over formal assessment in environments with limited resources (Sharples et al., 2020).

These pressures collectively shape a working environment where inquiry-based design is reinterpreted as rapid, iterative responsiveness rather than comprehensive instructional planning. The result is an emergent design culture that values speed, visibility, and adaptability, traits that align with social media ecosystems but diverge from traditional understandings of GID. University libraries are increasingly moving away from rigid, phase-based instructional design models, such as ADDIE, toward more flexible, iterative, and organic approaches that allow continuous revision and rapid response to emerging challenges (Ezell, 2021; O'Donnell & Anderson, 2021; Onwusu-Ansah & Korkuvi, 2024). This shift reflects how operational pressures,

resource constraints, and the demands of digital engagement shape contemporary library instructional practices.

This cultural shift has important implications. It suggests that IL instruction in digital environments is increasingly governed by operational logic rather than pedagogical logic, and that librarians are required to negotiate between instructional ideals and organisational demands (Engeness, 2020; Perrotta et al., 2020). Recognising these structural dynamics is crucial for understanding why the production-centric GID loop emerges and why certain phases of GID (Open/Immerse and Evaluate) become compressed.

5.5 Pedagogical Implications of Visibility-Driven Design

While engagement metrics such as views, likes, and retention time provide indicators of reach and surface-level interaction, systematic reviews indicate that student engagement is commonly measured through log data (e.g., clicks and views) or self-reported use, with a predominant focus on behavioural indicators rather than cognitive or deep learning processes (Papageorgiou et al., 2025). Consequently, such metrics do not necessarily capture whether students achieve deeper conceptual understanding or transferable IL skills. Short-format social media videos may function effectively as supplementary learning resources that enhance short-term knowledge gains and perceived engagement, yet their impact on long-term retention and overall examination performance appears limited (Alsaid et al., 2025).

A similar pattern of adaptive service modification was observed during the COVID-19 pandemic, when academic libraries created new digital services and reconfigured existing ones to sustain education and research under crisis conditions (Beglou & Akhshik, 2023).

Although participants did not explicitly articulate a formal shift toward outcome-based assessment, several described the pedagogical demands of defining learning goals and assignments, suggesting an awareness of deeper instructional aspirations. However, structural constraints and platform logics limit the feasibility of implementing more sustained assessment models.

It remains unclear whether the production-centric pattern identified here reflects a uniquely Southeast Asian adaptation or a broader global shift in digital academic librarianship. In contexts where libraries operate under stronger instructional partnerships or embedded librarian models, more outcome-oriented approaches may be feasible (Mullins et al., 2024). Comparative cross-regional studies would be valuable to examine whether similar visibility-driven cultures emerge in other institutional environments.

5.6 Limitation and Direction for Future Research

This study has several limitations that also delimit the scope of the proposed model. Firstly, the findings are based on a relatively small sample of academic librarians from Indonesian institutions who were already engaged in online IL media development. The production-centric GID loop and associated competency ecosystem therefore reflect the practices of early adopters in a specific regional and institutional context and should not be assumed to represent all library settings. Secondly, the data are derived from asynchronous narrative accounts and artefact submissions rather than extended ethnographic observation; as such, the model captures librarians' reported practices and products, but not the fine-grained dynamics of their

everyday work or interactions with learners. Thirdly, the study does not include direct evidence of student learning or behaviour across GID stages, so the model is intentionally confined to the design side of IL media production rather than its learning outcomes. Finally, the cross-sectional design offers a snapshot of practice during a particular post-pandemic period and does not account for how workflows, competencies, or structural pressures may evolve over time as infrastructures, institutional priorities, and technologies change.

The model should therefore be read as an analytic lens rather than a prescriptive blueprint. Researchers who wish to use it in other contexts are encouraged to retain the full eight-phase GID cycle and examine which phases become most salient in their own settings, rather than assuming that a Gather-Create-Share dominance will always occur. The model can be used comparatively—to test whether similar production-centric patterns and structural pressures appear elsewhere—or diagnostically, as a way for libraries to reflect on where their current competencies and resources are concentrated and where planning or evaluation phases might need strengthening. Future studies might refine, extend, or challenge the model by combining it with observational data, learner analytics, or multi-stakeholder perspectives, thereby examining the boundary conditions and transferability of the production-centric GID loop beyond the institutions studied here.

6. Conclusion

The findings show that librarians do not implement GID as a fully balanced, sequential inquiry cycle. Instead, they enact a production-centric GID loop in which the Gather-Create-Share phases dominate, while Open/Immerse, Explore/Identify, and Evaluate are compressed, informal, and often under-documented. Planning is driven by micro-inquiry triggers such as user questions, social media interactions, and quick team discussions, and evaluation relies largely on engagement metrics and direct feedback rather than systematic assessment of learning. This pattern reflects a contextually rational adaptation of GID in environments where visible digital output is a primary marker of service performance.

The study also identifies a phase-structured competency ecosystem underpinning this loop. Librarians draw on nuanced combinations of instructional awareness, user-needs sensing, media and interaction design, information architecture, ICT skills, platform operations, and basic analytics, with the densest concentration of competencies located in the production-oriented phases. These competencies enable librarians to sustain continuous digital content creation but leave planning and evaluation comparatively thin, especially in the absence of formal instructional design training and dedicated design roles.

Crucially, the production-centric GID loop and associated competency patterns are shaped by structural pressures, including limited time and staffing, multiple role responsibilities, uneven infrastructures, and visibility demands driven by social media metrics. Together, these conditions push librarians toward rapid, output-focused workflows and make extended planning or learning-focused evaluation difficult to maintain. Recognising these structural dynamics is essential for understanding how inquiry-based frameworks such as GID are translated into operational practice in academic libraries, particularly in resource-variable settings.

Practically, the study suggests that lightweight planning tools, targeted micro-trainings in instructional and evaluative design, simple enhancements to evaluation practices, cross-

functional collaboration, and reusable design assets could help strengthen the less developed phases of GID without imposing unrealistic burdens on librarians. Conceptually, the study contributes by theorising a production-centric adaptation of GID, articulating a phase-structured competency ecosystem, and framing the contextual constraints of IL media work as structural pressures. Future research could build on these contributions by incorporating observational and learner data, conducting longitudinal or comparative studies across institutions and regions, and examining how different configurations of resources, roles, and policies support or constrain more balanced enactments of GID in digital IL instruction.

Declarations

Ethics Approval

Ethical approval was not considered necessary in alignment with the University's guidance on the conduct of ethical research.

Funding

Not applicable.

AI-generated content

This study made limited and transparent use of generative artificial intelligence (ChatGPT), as a supportive research tool. AI was employed to assist with (a) refining the clarity and coherence of narrative sections; (b) organising analytic insights that had already been generated by the author(s); (c) checking conceptual consistency across sections; and (d) helping articulate the visual model derived from the study's empirical findings.

AI did not perform data analysis, generate codes, identify themes, interpret findings, or create the conceptual model independently. All analytic decisions, thematic interpretations, data-grounded insights, and theoretical contributions, including the production-centric GID loop, phase-structured competency ecosystem, and structural pressures, were conceived, evaluated, and validated by the author(s).

The use of AI followed ethical research guidelines: human researchers maintained full control over interpretation, authenticity, and intellectual contributions. The integration of AI is presented here openly to reflect a commitment to transparency and to demonstrate how emerging tools can enhance scholarly thinking without replacing the researcher's critical, contextual, and domain-specific expertise.

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