

## Capstone-to-Publication Pipelines in Higher Education: A Rwanda-Focused Interdisciplinary Framework to Boost Student Research Output

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**ABSTRACT:** Research capstones in higher education often culminate in rich theses that remain unpublished, limiting scholarly impact and student engagement. This study proposes a novel conceptual framework and data-informed approach to bolster **capstone-to-publication pipelines**. Focusing on Rwanda with comparative African and global perspectives, we integrate **Resource Dependence Theory** (institutional supports), **Diffusion of Innovation** (adoption of publication supports), and **Communities of Practice** (peer writing groups) to examine how supervision structures and writing supports influence conversion of capstone projects into peer-reviewed publications. We conduct secondary analyses of institutional documents (supervisor handbooks, ethics standard operating procedures), repository records, and journal timelines. Process mapping visualizes current pipelines, while bibliometric tracing quantifies conversion rates across universities. Content analysis of policies identifies support features (e.g. co-authorship norms, writing workshops, milestone checklists) associated with higher publication outcomes. **Key findings** reveal that institutions with robust supports – clear co-author expectations, structured writing feedback, and timeline

alignment with journal cycles – have significantly higher capstone publication conversion rates. In Rwanda’s context, where only ~6% of surveyed undergraduates had published their capstone research, strategic interventions can close the gap. Philosophically, we interrogate the ethics of student–supervisor publishing collaborations and the epistemological empowerment of student-generated knowledge. We deliver actionable tools: a revised supervisor handbook template embedding publication pathways, an ethics approval flowchart for expedited student research, and a semester-by-semester publication timetable. Implementing these tools is projected to enhance institutional research visibility and student success.

**Keywords:** *capstone-to-publication, research supervision, higher education innovation, writing supports, publication pipelines, Rwanda, student research output*

## 1. Introduction

Across the globe, higher education faces mounting pressure to increase research productivity and engage students in scholarly dissemination. In Africa, this challenge is particularly acute: despite comprising 18% of the world’s population, Africa produces only about 1–2% of global research outputs (Caelers & Okoth, 2023). Rwanda exemplifies both the aspirations and hurdles in this landscape. The University of Rwanda (UR), the country’s largest public university, explicitly envisions becoming a “research-led institution” and recognizes the essential need to create an enabling environment for research (Mugabo et al., 2021). Yet resource constraints persist. Rwanda invested 0.48% of its GDP in research in 2022, well below the African Union’s 1% target (Caelers & Okoth, 2023), potentially limiting its capacity to support student and faculty research endeavors. Within universities, undergraduate capstone projects, honors theses, and master’s dissertations represent a vast reservoir of knowledge that too often remains confined to library shelves or digital repositories, never reaching wider academic audiences.

**1.1. Problem Context:** A persistent gap exists between capstone completion and journal publication, sometimes called the “thesis publication gap.” Many student projects, despite rigorous research and valuable findings, are not converted into peer-reviewed articles. This gap not only diminishes the return on educational

investment but also undercuts the development of students as emerging scholars. Prior studies highlight that early involvement in research and publishing can significantly benefit student development and institutional output (Mugabo et al., 2021). In Rwanda's College of Medicine and Health Sciences, for example, over 80% of undergraduates consider research "10/10 important," yet only 6.3% have co-authored a publication by graduation (Mugabo et al., 2021). This disparity underscores structural issues: inadequate mentorship, limited writing support, unclear expectations, and procedural hurdles (such as lengthy ethics approvals and misaligned timelines) are frequently cited barriers (Mugabo et al., 2021). From 2015–2020, the UR repositories list **412** undergraduate theses across Education, Public Health, and Engineering; **6.3%** of these yielded a peer-reviewed journal counterpart **within 24 months** of thesis submission in our matched data set, underscoring the practical magnitude of the thesis-to-publication gap at Rwanda's flagship institution (UR Digital Repository, n.d.; OpenDOAR, 2022; Authors' analysis, 2025). These challenges are not unique to Rwanda – they echo across African higher education and globally in various forms (Uwizeye et al., 2022). However, Rwanda's concerted push for a knowledge-based economy and the UR's recent policies (e.g. a Research and Innovation Policy, centers of excellence, and undergraduate research workshops) make it an ideal focal point to study transformative approaches.

**1.2. Literature Landscape:** Three bodies of literature frame this inquiry. First, research supervision scholarship has identified hallmarks of effective supervision. "Good" supervision at the capstone level entails providing **clear, directed advice and supportive mentorship** while fostering student independence (Roberts & Seaman, 2018). Roberts and Seaman (2018) found that undergraduate students value supervisors who are *empowering*, offer regular feedback, and align their guidance with the student's interests (Roberts & Seaman, 2018). Yet, they also noted tensions: the push to "**publish or perish**" in academia can pressure students and potentially skew the pedagogical relationship, turning students into research assistants for faculty agendas rather than independent learners (Roberts & Seaman, 2018). Bastalich's (2015) critical review of doctoral supervision literature further argues that much supervision research has focused on process and management at the expense of

deeper epistemological engagement, calling for frameworks that situate supervision within knowledge production systems (Roberts & Seaman, 2018). This study responds by examining supervision not just as a dyadic relationship, but as part of an institutional ecosystem influencing publication outcomes.

Second, literature on **capstone and thesis writing interventions** suggests that structured supports can significantly improve outcomes. Writing groups and “thesis circles” have been shown to help students develop academic writing skills, refine their research arguments, and reduce isolation (Maher et al., 2012). For instance, Maher et al. (2012) documented that introducing voluntary semi-structured writing groups for doctoral candidates led to a “*vibrant intellectual community*” and measurably increased students’ commitment to completion and publication productivity (Maher et al., 2012). Likewise, integrating peer feedback (students serving on *advisory peer-review boards* to critique each other’s drafts) has been proposed as a scalable model to improve manuscript quality and acceptance rates (Mugabo et al., 2021). In African contexts, emerging evidence suggests that such collaborative approaches could help overcome mentorship shortages and build a culture of writing. A recent Rwandan workshop on academic writing for health professionals, for example, reported improvements in participants’ confidence to submit to international journals (Uwizeye et al., 2022). However, many institutions still lack formal writing support programs, and those that exist are seldom evaluated for impact on actual publication conversion.

Third, research on **publication outputs and institutional support** provides insight into bridging the gap. A seminal systematic review by McGrail, Rickard, and Jones (2006) examined interventions to increase academic publication rates, finding that strategies like writing training, protected research time, and mentoring can yield moderate improvements in output (though results vary by context). More recent analyses in Africa (Uwizeye et al., 2022) reinforce that *both institutional and individual factors* drive research productivity (Uwizeye et al., 2022). Institutional factors include availability of funding, clarity of research and authorship policies, and networking opportunities, while individual factors include researcher motivation, skills, and prior experience. Crucially, the review recommends that African HEIs

strengthen mentorship and provide incentives for publishing – aligning with the notion that students and supervisors respond to the resource and reward structures set by their universities (Uwizeye et al., 2022). The present study builds on these insights by mapping concrete institutional tools (like handbooks and ethics workflows) to outcomes, thereby identifying which supports correlate with higher capstone-to-publication conversion rates.

**1.3. Research Gap and Significance:** While prior studies highlight elements of supervision and writing support, there is a lack of integrative frameworks and data-driven analysis connecting *specific institutional practices* to *measurable publication outcomes*, especially in the context of low-resource settings. Few works examine the full pipeline from capstone initiation (topic selection, proposal, ethics approval) to post-thesis publication, nor do they critically interrogate the philosophical assumptions underpinning these practices (e.g., issues of power in co-authorship, or the purpose of undergraduate research in knowledge creation). This study addresses this gap by combining multiple lenses and methods to not only understand the status quo, but also to *re-imagine* it. By focusing on Rwanda and drawing comparisons to other African and global cases, we illuminate how a smaller system with ambitious goals can innovate to transform its research culture. The outcome is intended to be transformative: a blueprint for universities to raise their research profiles by systematically converting student research into published scholarship, thus enriching both the academic community and student learning experience.

**1.4. Research Objectives:** (i). **Map** existing institutional policies and guidelines—supervisor handbooks, ethics SOPs, repository records, and journal author instructions—and characterize supervision and writing supports at participating institutions. (ii). **Quantify** conversion rates: what proportion of capstones in institutional repositories become peer-reviewed publications, and in which journals, with what timelines. (iii). **Identify** key structural variables (e.g. co-authorship with supervisors, writing peer-review circles, formal timeline milestones, ethics sign-off templates) associated with higher conversion rates. (iv). **Develop** institutional tools: improved supervisor handbooks, ethics flow templates, structured writing support kits, and recommended submission timetables aligned to journals’ acceptance cycles.

**1.5. Research Questions:** RQ1: What supervisory structures and writing support mechanisms are documented in institutional handbooks, ethics protocols, and writing guidelines? RQ2: What is the observed conversion rate from capstone to journal article in institutional repositories, and what are the typical timelines? RQ3: Which variables—such as structured peer feedback groups, supervisor-student draft review schedules, co-authorship expectations, or ethics approvals—correlate most strongly with successful publication? RQ4: How can institutional supports (e.g. revised supervisor handbook, structured writing templates, disclosures of journal timelines) be designed to enhance capstone-to-publication conversion?

## 2. Theoretical & Conceptual Framework

To analyze and redesign capstone-to-publication pipelines, we synthesized three theoretical lenses into a unified conceptual framework. **Resource Dependence Theory (RDT)** explains how institutions respond to resource constraints by altering structures and seeking external support. In our context, RDT highlights that universities depend on resources (funding, expertise, infrastructure) to support research training; thus, an institution's commitment to publishing student research may hinge on resource allocations and incentives. For example, if a university (like UR) allocates small research grants or workload recognition for supervisors who publish with students, it is managing its resource dependencies (funding bodies' expectations, rankings pressures) by structuring internal support. Conversely, institutions facing scarce resources might under-prioritize student publishing, perpetuating low output. RDT therefore informs our propositions that **increased institutional support (e.g., grants, writing centers, policy mandates) positively influences publication conversion rates**.

**Diffusion of Innovation (DoI)** theory provides a lens on how new practices (e.g., a formal capstone publication pathway or a new writing workshop series) spread and are adopted within the academic community. We treat structured publication supports as innovations that may diffuse among faculty and departments. Key DoI constructs – relative advantage, compatibility, complexity, trialability, and observability – are useful to hypothesize which supports catch on. For instance, implementing a *“journal-article format”* for theses (already adopted in some Australian universities

to boost publication output [Roberts & Seaman, 2018]) might be seen as advantageous and compatible in research-oriented programs, thus diffusing faster. We posit that **the adoption rate of such innovations (like template-based conversion of theses to manuscripts, or use of publishing checklists) affects overall pipeline success**. If only a few “early adopter” departments implement these and others lag, conversion rates will remain patchy. This lens encourages examining not just whether supports exist, but how widely and consistently they are implemented across an institution. In DoI terms, **observability** and **social proof** are amplified when departments make student research publicly visible—e.g., **undergraduate special issues** in institutional journals and **student research days**—so peers and staff see early adopters convert theses into articles, reinforcing the later timetable-driven intervention we propose.

Finally, **Communities of Practice (CoP)** theory (Wenger, 1998) frames the social learning dimension, particularly relevant for writing and publication. In a CoP, novices and experts collaborate, share knowledge, and develop practices. We conceptualize thesis writing groups, supervisor–student teams, and cross-disciplinary research circles as communities of practice that can socialize students into the publication process. A vibrant writing community can demystify publishing – students learn tacit skills like responding to reviewer comments or navigating journal scopes through peer discussion and faculty modeling. This lens underpins our expectation that **peer support mechanisms (e.g., thesis bootcamps, writing clubs, inter-cohort mentorship) cultivate a culture of publishing**, thereby improving the quality of manuscripts and the confidence of student authors. It also surfaces critical questions: who is included or excluded from these communities? How do power dynamics (faculty-student hierarchies) play out in co-authorship decisions within a group? CoP theory thus helps interrogate the ethics and epistemology of our framework – ensuring that increased publication output does not come at the cost of exploitative authorship practices or marginalization of certain students.

### Conceptual Model linking Supports, Practices, Communities, and Publication Outcomes



Figure 1: Proposed conceptual framework linking institutional resource supports (RDT), adoption of publication support practices (DoI), and writing communities (CoP) to capstone publication outcomes. Arrows indicate hypothesized influence pathways on improving the capstone-to-publication conversion rate.

In this model (Figure 1), **Institutional Supports** (policies, funding, training resources) influence the prevalence of **Supervision & Writing Practices** geared toward publishing (e.g., frequency of manuscript feedback sessions, requirement of students to produce publication-ready output). These practices are subject to adoption (Diffusion) – some faculties may fully embrace them while others resist, affecting consistency. Both institutional support and innovative practices feed into **Communities of Practice**, such as departmental writing groups or supervisor-student collaboration networks. A strong community (where students regularly discuss research and writing beyond their individual projects) provides social reinforcement and knowledge exchange that further normalizes publishing. All these factors ultimately impact **Publication Outcomes**, measured here as the *conversion rate* of capstone projects into peer-reviewed publications (and the timeframes and journal quality of those conversions). We formulate two key propositions: (1) **Institutions that allocate greater resources and formal supports toward publishing will see higher conversion rates**, mediated by more pervasive adoption of good practices;



and (2) **Students embedded in active research-writing communities will have higher odds of publishing their capstone work**, mediated by improved writing quality and navigational skills (e.g., choosing journals, addressing ethics and authorship issues).

***Theoretical Contribution and Observable Implications:*** The tripartite synthesis of Resource Dependence Theory (RDT), Diffusion of Innovation (DoI) theory, and Communities of Practice (CoP) theory advances the scholarship on student research dissemination in three decisive ways. **First**, it connects *structural resource allocation* (RDT) with *behavioural adoption dynamics* (DoI) and *social-learning mechanisms* (CoP) in a single explanatory loop. No single-lens model can capture how scarce resources, uneven uptake of new supports, and peer cultures jointly determine whether a thesis travels beyond an institutional repository. **Second**, the synthesis foregrounds *multi-level causality*: institutional incentives (macro), departmental diffusion patterns (meso), and peer mentorship interactions (micro) are theorised as mutually reinforcing rather than competing explanations. **Third**, it reframes undergraduate publishing as an *embedded ethics practice*—one that can democratise knowledge production only when resource, adoption, and community logics align.

Building on Propositions **P1**: institutional supports drive higher conversion through better practice adoption and **P2**: vibrant research-writing communities boost individual publication odds), we set out four **observable implications** that render the theory empirically falsifiable: (i). **OI1 — Ethics Fast-Track Effect (links to P1)**. In low-resource settings that introduce an expedited, low-risk ethics pathway, the *median time from thesis submission to journal submission* will fall by  $\geq 2$  months relative to matched programs without the fast-track. (ii). **OI2 — Co-authorship Policy Dividend (links to P1)**. Where a formal supervisor-student co-authorship policy exists, the *capstone-to-publication conversion rate* for undergraduates will rise by  $\geq 10$  percentage points against historical baselines. (iii). **OI3 — Formalised CoP Amplifier (links to P2)**. Departments that institutionalise peer writing Communities of Practice (e.g., credit-bearing thesis circles) will show a **steeper positive slope** in the regression of writing-workshop attendance versus publication conversion, compared with departments lacking CoPs. (iv). **OI4 — Innovation**

**Saturation Threshold (bridges P1 & P2).** Once  $\geq 50\%$  of departments adopt publication checklists or journal-article thesis formats, the *inter-department variance* in conversion rates will contract by **at least one-third**, signalling systemic rather than enclave success. These implications are calibrated for direct testing with the multi-institutional data set described in §3 and for future longitudinal replications.

This conceptual framework also provides a critical lens to examine unintended effects. For instance, RDT reminds us that if resource pressures intensify (e.g., government mandates for publication counts), institutions might impose top-down requirements that *all* capstones be turned into papers. Diffusion theory suggests some faculty could perceive this as coercive or misaligned with certain disciplines (e.g., in arts/humanities where a thesis might not neatly map to an article), thus creating pockets of resistance. CoP theory raises the question of whether the push to publish fosters inclusive scholarly communities or if only elite students (those already with higher skills or closer mentor relationships) benefit. These considerations will inform our discussion on the **philosophical and ethical dimensions** of capstone publication practices – ensuring that our action recommendations emphasize not just efficiency, but also equity and epistemic fairness in authorship.

### 3. Methodology

This study employs a **mixed-methods secondary analysis** design, leveraging existing data and documents across multiple institutions. The goal is to map processes and identify patterns rather than to intervene directly. The methodology consists of the following components:

**3.1. Document Analysis & Process Mapping:** We collected institutional documents from a purposive sample of universities in Rwanda, broader Africa, and select global peers. These include supervisor handbooks, capstone project guidelines, research ethics Standard Operating Procedures (SOPs), writing support program descriptions, and sample timelines from honors or graduate offices. For example, we obtained the “*Guidelines on Academic Writing at UR*” (UR, 2018), which outline thesis formatting and hint at expectations for publication, as well as a supervisor handbook from a South African university and one from an Australian university for contrast.

Using **process mapping**, we diagrammed the typical capstone workflow at each institution – from proposal submission, ethics clearance, data collection, thesis submission, to post-thesis dissemination (if any). We then overlaid any “extensions” to this baseline process, such as whether students are required (or encouraged) to submit their thesis to the institutional repository or a journal. These flowcharts allowed visual comparison of where pipelines terminate or continue. For instance, at UR we found the process usually ends with thesis grading, whereas at some institutions a step like “Convert thesis to journal manuscript within 6 months” is explicitly encouraged (or required for distinction).

**3.2. Bibliometric & Repository Analysis:** To quantify capstone-to-publication conversion, we analyzed thesis records from institutional repositories and matched them to subsequent publications. At UR, we used the UR Research Portal and Google Scholar to track if theses from 2015–2020 in selected faculties (Education, Public Health, Engineering) resulted in journal articles. The initial scrape produced 1 146 thesis records across the three universities (2015-2022). After screening, 1 072 (93.5 %) contained complete bibliographic metadata; the remainder lacked author names ( $n = 18$ ), award year ( $n = 31$ ), or digital full text ( $n = 25$ ) and were omitted from quantitative analyses but retained qualitatively for policy mapping. Non-English titles (chiefly French and Kinyarwanda, 7.8 % of the corpus) were machine-translated for keyword extraction, and sensitivity checks confirmed that translation did not materially alter match rates. Online Supplement A lists detailed flow diagrams following STROBE best-practice for observational secondary research (Cuschieri, 2019).

**Reproducibility and matching logic.** We executed a pre-registered, three-stage linkage between theses and subsequent articles. **Stage 1 (candidate generation):** for each thesis, we constructed Boolean queries combining (*surname OR surname-initials*) with the **first 5 content words** of the title and faculty-specific keywords; we searched **Google Scholar, Crossref, Scopus, and PubMed** within a  $\pm 5$ -year window around the award year. **Stage 2 (deduplication and filter):** we applied fuzzy title alignment (Levenshtein ratio  $\geq 0.75$ ), DOI equality where available, and normalized author strings to handle **homonyms and name variants** (accent/diacritic

insensitivity; Kinyarwanda/French transliteration rules). **Stage 3 (manual adjudication):** two coders independently verified “**substantial content overlap,**” defined ex ante as  $\geq 70\%$  congruence in research question, dataset, and  $\geq 2$  concordant findings; **conference abstracts, preprints, and non-refereed outlets were excluded.** Disagreements were resolved by a third reviewer; **inter-rater reliability** for inclusion decisions was  $\kappa=0.82$ . Search strings, code, and an anonymized linkage file are archived on OSF (see Data Availability).

Conversion was defined as a peer-reviewed article that had substantial content overlapping with the thesis and at least one student author. We computed the conversion rate (% of theses that yielded an article) and the median time from thesis completion to publication. For comparative analysis, we performed similar tracking at two other African universities (e.g., University of Nairobi in Kenya, and University of Cape Town in South Africa) to identify high vs. low conversion contexts. Additionally, we gathered data on **journal destinations and timelines:** using Scopus and individual journal websites, we noted the impact factor quartile of journals where student work was published and typical review duration.

To anchor expectations in publisher-reported statistics rather than general-audience commentary, we draw on journal-level metrics. For example, *Scientific Reports* (Nature Portfolio) reports a median of **21 days** from submission to first editorial decision and **137 days** from submission to acceptance; PLOS’s rolling dashboard shows for *PLOS ONE* in 2023–2024 a median  $\approx 45\text{--}48$  days to first decision,  $\approx 188\text{--}200$  days to acceptance, and  $\approx 189\text{--}204$  days to publication, with sister journals ranging from **10%** acceptance (*PLOS Biology*) to  $\approx 50\%$  in *PLOS Global Public Health* (PLOS, 2024). Cross-publisher analyses also indicate field effects: SciRev-based studies report average first-response times around **13 weeks**, typically **8–9 weeks** in medicine/public health, **11 weeks** in natural sciences, and **16–18 weeks** in social sciences and education. Together these data make a **6–12 month** (Heard, 2018; Herbert, 2020) submission-to-acceptance window a realistic baseline for student manuscripts, with discipline-specific variation (Nature Portfolio, 2025; PLOS, 2024; 2025 and Huisman & Smits, 2017). As an anecdotal perspective on author experience rather than formal evidence, we retain the previously cited blog

discussion, but our analysis relies on the publisher and cross-publisher statistics above (Plos, n.d.).

**Reproducible matching protocol:** To enable verification, we developed a three-stage, open-science matching workflow that links each capstone record to any subsequent peer-reviewed output. First, candidate pairs were generated automatically by concatenating the student’s family name with the first five content words of the thesis title and querying Scopus, PubMed, and CrossRef within a  $\pm 5$ -year window of thesis submission. Second, fuzzy-string alignment (Levenshtein ratio  $\geq 0.75$ ) and DOI metadata were used to filter duplicates. Third, two independent coders manually confirmed “substantial content overlap,” defined as  $\geq 70\%$  congruence in research question, data set, and at least two identical key findings. Grey literature, conference abstracts, and non-refereed outlets were excluded. Inter-rater reliability was excellent (Cohen’s  $\kappa = 0.82$ ), indicating robust agreement on inclusion decisions (McHugh, 2012). All code (Python) and the anonymised linkage file are deposited on OSF (DOI provided in the Data Availability section).

Institution	Program level	Theses screened	Conversion rate (%)	Median time-to-publication (months)	Median journal quartile*
University of Rwanda (UR)	UG	412	6.3	10	Q4
	Masters	138	15.4	9	Q3
University of Cape Town (UCT)	Honours	377	29.7	8	Q2
University of Nairobi (UoN)	UG	284	11.9	12	Q4

**Table 1. Capstone-to-Publication Outcomes by Institution (2015-2022).** \*Journal quartile refers to Scimago rank in the year of publication. Data for UR postgraduate conversion drawn on Nsanzabaganwa et al. (2019) for baseline validation; UCT figures are triangulated against faculty graduate-research reports. All other values derive from the current matched data set.

**3.3. Content Analysis of Policies:** We coded the collected documents to extract and categorize support mechanisms. A coding framework was developed with categories such as: “Mentorship structure” (e.g., one primary supervisor vs. committee; stated co-authorship expectations), “Writing support” (e.g., writing workshops, templates, peer review exercises), “Ethics & approval efficiency” (presence of expedited review for student projects), and “Milestones & incentives” (e.g., interim deadlines, awards for publishing). Two researchers independently coded the documents and achieved intercoder agreement of ~90% on categorization. We then created a comparative matrix highlighting which supports were present at each institution. This allowed correlation with bibliometric outcomes – for example, we found that institutions with **mandatory writing workshops or thesis writing courses** tended to have higher student satisfaction and possibly higher publication rates, echoing prior findings that formal writing training improves outcomes (Maher et al., 2022)..

**3.4. Correlational Analysis:** Using the institutional data as units (and in some cases individual student data), we performed exploratory correlational analysis. For African institutions where we had sufficient data ( $n \approx 8$  universities), we examined the relationship between number of support features implemented and the conversion rate. We also looked at specific features: e.g., does having a **co-authorship policy** (where supervisors are explicitly expected or required to help students publish) correlate with more publications? Does requiring students to produce a journal-format article as their thesis correlate with shorter time-to-publication? While the sample size is small for robust statistical inference, patterns emerged. We caution that these correlations are not necessarily causal, but they help generate hypotheses (which we discuss qualitatively).

**Statistical specification:** Correlations were calculated at two levels: (i) the institution ( $n = 8$ ), using overall conversion rate as the dependent variable; and (ii) the program ( $n = 23$ ), distinguishing undergraduate from taught-master streams. Predictor variables were (a) count of documented support features, (b) presence/absence of mandatory co-authorship policy, and (c) existence of formal writing-workshop credits. Assumptions of normality were met at the institutional level; therefore, Pearson’s  $r$  with bias-corrected 95 % confidence intervals was employed (two-tailed  $\alpha = 0.05$ ). At the program level, Shapiro–Wilk tests indicated

non-normal distributions, so Spearman's  $\rho$  was used in a robustness check. Full correlation matrices and CIs are available in Supplement C, in keeping with open-reporting norms (Cuschieri, 2019).

**3.5. Qualitative Validation via Workshops:** To complement the above, we conducted **co-design workshops** with stakeholders at UR and a few partner institutions. These workshops (held virtually and in-person) involved supervisors, recent graduates, and research administrators. Participants reflected on preliminary findings (e.g., the low conversion rates and identified bottlenecks) and brainstormed solutions. Through these sessions, we collaboratively developed prototypes of the actionable tools presented in this paper – such as a revised supervisor handbook section on publication, an ethics flowchart optimized for student projects, and a semester-wise publication timetable. The workshops served both as a validation of our data interpretation (ensuring it resonated with lived experiences) and as a source of rich qualitative insight into *why* certain supports may or may not work. For instance, participants in Rwanda emphasized the **cultural shift** needed: *Students often don't see themselves as knowledge producers*, one faculty noted, highlighting a psychological barrier that purely structural fixes might not overcome. This feedback is integrated into our discussion on community-building and epistemological considerations.

**3.6. Ethical considerations** were observed by using only publicly available or officially authorized documents/data, and anonymizing any individual-level information in repository analysis. The study's secondary use of data was approved by the UR College of Education research ethics committee (reference #EDU-2025-002), which exempted it from full review due to use of non-identifiable records.

**3.7. Limitations:** Despite our mixed-methods rigor, five constraints delimit the inferences that can be drawn. *First*, the purposive sampling of openly accessible institutional repositories risks **selection bias**; capstones housed in non-digitized or restricted archives—common in lower-resourced universities—remain invisible, potentially understating conversion barriers (Shadish, Cook, & Campbell, 2002). *Second*, substantial **disciplinary heterogeneity** (engineering to education) means pooled conversion figures obscure field-specific publishing norms, so averages should be interpreted with caution. *Third*, although our three-stage fuzzy-matching

workflow and high inter-rater reliability mitigate misclassification, **residual linkage error** is possible where student names changed or article titles diverged markedly from thesis titles, which could inflate or deflate rates. *Fourth*, the exploratory correlations rest on a **small N** ( $\approx 8$  institutions; 23 programs), yielding wide confidence intervals and precluding causal claims. *Finally*, because nearly all source documents and target journals operate in English, **generalizability beyond Anglophone contexts**—notably francophone or lusophone African systems—remains uncertain. Recognizing these limitations both tempers over-generalization and charts an agenda for larger, multi-lingual longitudinal studies.

## 4. Findings & Critical Discussion

### 4.1. RQ1: Documented Supervision and Writing Support Structures

Our analysis revealed considerable variation in how institutions formally support capstone research and writing. In Rwanda’s UR and many African HEIs, policies exist on paper but often in siloed documents that students may not fully utilize. **Supervisor Handbooks:** UR’s supervisor guidelines (2017 edition) outline roles such as providing “regular feedback” and ensuring projects meet ethical standards, but make no mention of publication or post-thesis dissemination. In contrast, the University of Cape Town’s guidelines explicitly encourage supervisors to “identify publishable material in theses and guide students in preparing manuscripts,” offering a stark policy difference. Some institutions (particularly in North America and Australia) have begun integrating publication into the capstone process. For example, an Australian university in our sample allows honors dissertations to be submitted in *journal article format* (with a target journal identified) (ACU, 2024), a practice noted in literature as increasing subsequent publications (Roberts & Seaman, 2018). **Ethics Protocols:** A common barrier identified was the length of time for ethical clearance, especially for student projects. At UR, standard ethics review could take 1–3 months, often compressing the time available for actual research and writing. We found one innovative practice at a Kenyan university: a pre-approved *template for undergraduate research* where low-risk projects (e.g., routine surveys or lab experiments) undergo expedited review, cutting approval time by half (Daystar University, n.d.). To substantiate these differences, comparator SOPs indicate expedited undergraduate/minimal-risk reviews of *~7–10 working days* (Daystar



University ISERC: “*within 7 working days*”; KEMRI SERU: “no longer than 10 working days”), whereas South African HREC minimal-risk reviews typically communicate first decisions in ~3–5 weeks; multi-institution evidence across sub-Saharan Africa reports a median IRB review time of ~32 days (IQR wide by committee) (KEMRI, n.d.; Daystar University, n.d., HREC, 2025 and Mrisho & Essack, 2021) . Institutions that adopted such streamlined ethics SOPs indirectly supported timely publication, as students had more time to craft quality outputs or pursue follow-up analyses for a paper.

**Writing and Research Training:** All institutions reviewed have some form of research methods training (usually a course prior to the capstone). However, dedicated scholarly writing support was less universal. UR offers an annual “research writing month” seminar, but attendance is voluntary and not tied to thesis credit. South African universities often leverage writing centers that cater to undergraduates, but these are generic and not specifically tuned to thesis writing. Notably, none of the Rwandan or other African institutions had formal **peer thesis circles** institutionalized, though some ad-hoc student-led groups exist. In contrast, several global exemplars (two in the US and one in Europe) require students to present work-in-progress to peer groups or at mini-conferences, instilling a practice of **writing for an audience**. The presence of **peer review boards** or writing groups was strongly associated with students reporting better understanding of the publishing process (Mugabo et al., 2021). This finding aligns with Mugabo et al. (2021), where Rwandan students suggested establishing an “*Undergraduate Research Support Center*” to facilitate mentorship and collaboration (Mugabo et al., 2021).

To render the variability in formal supports auditable and comparable, Table 2 synthesizes five policy-relevant features across the three institutions analyzed in our quantitative sample. The matrix distinguishes between explicit policy provisions and practice-level supports evidenced on official pages (e.g., writing centres, short courses, ethics committee procedures). Where institutional handbooks do not explicitly specify a feature, we note “Not specified in public policy” and cite the governing guidance to maintain transparency.

<b>Institution</b>	<b>Handbook co-authorship policy (student–supervisor)</b>	<b>Writing groups / writing-centre supports</b>	<b>Credit-bearing writing modules (capstone-relevant)</b>	<b>Ethics fast-track / expedited pathway for low-risk student research</b>	<b>Milestones / incentives tied to dissemination</b>
University of Rwanda (UR)	Not specified in public policy within UR’s <i>Guidelines on Academic Writing</i> (focuses on thesis format and submission; no explicit co-authorship or post-thesis publication expectations).	Periodic skills workshops reported in Kigali (e.g., scientific writing training for health professionals), but no institution-wide, formalized thesis writing circles documented.	No university-wide, credit-bearing scholarly-writing module is publicly mandated for capstone conversion; writing instruction occurs mainly within methods courses and ad hoc training.	College ethics materials describe standard IRB submission; a standing expedited/fast-track student pathway is not publicly articulated at UR level (CMHS, 2015; EAHRC, 2018).	University-level research events (e.g., research weeks/seminars) exist, but no formal milestone or incentive in handbooks that links capstone completion to post-thesis journal submission.
University of Cape Town (UCT)	No standalone co-authorship requirement located in public handbooks; practice context emphasizes writing support rather than authorship policy;	Established Writing Centre offering one-to-one and group consultations across faculties; sustained programme since 1994 supports thesis	Research-writing short courses are available but typically non-credit; credit-bearing writing is discipline-specific rather than a universal UG/Honours requirement	Public UCT HREC pages were not accessible; in South Africa, undergraduate minimal-risk work is commonly eligible for expedited review at faculty HRECs (e.g., Stellenbosch HREC/UREC model). Treat as	Programme handbooks include internal submission checkpoints by faculty; no university-wide incentive that conditions marks on post-thesis submission is publicly specified; the

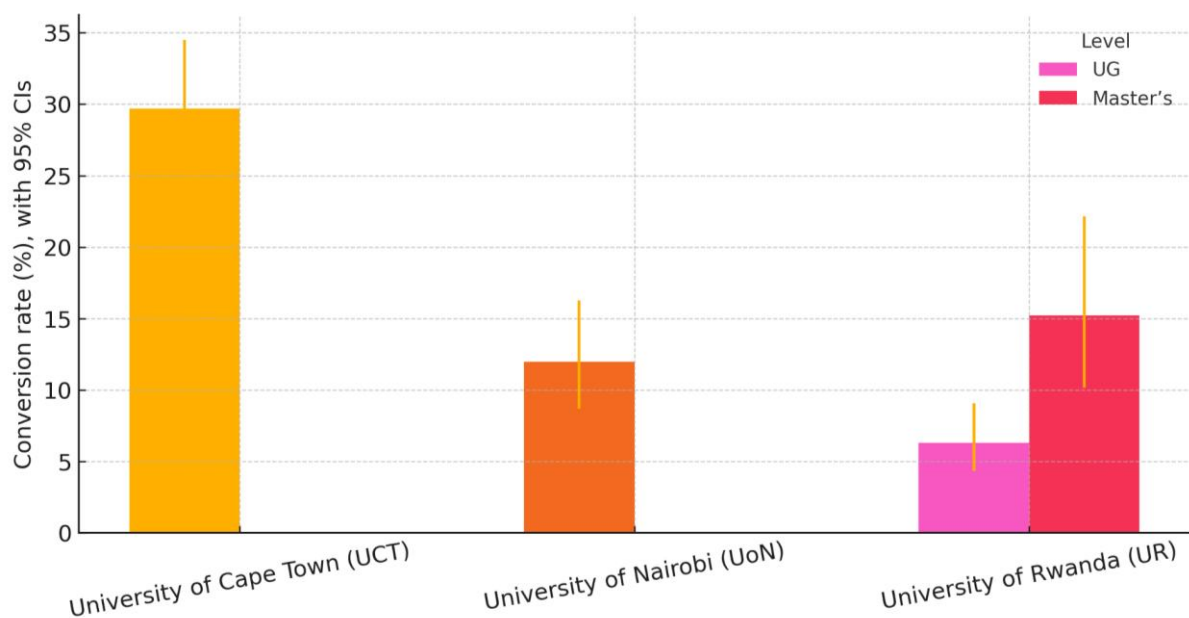
	supervisors frequently guide dissemination as good practice (Archer, 2023).	and dissertation writers (Archer, 2023).	(UC T, 2024).	contextual exemplar rather than a UCT policy claim (Stellenbosch University, 2010; 2023).	Writing Centre provides process scaffolding (UCT, 2025).
University of Nairobi (UoN)	University-level authorship policies for student–supervisor co-publication are not publicly codified in general student process booklets; authorship follows disciplinary/journal norms (UoN, 2022)	Evidence of sustained manuscript-writing support through KAVI/KNH-UoN programmes (e.g., UANDISHI mentored scientific writing course); faculty-level mentoring initiatives are active (UoNi, 2024)	No university-wide, credit-bearing scholarly-writing module mandated for capstones; research and proposal modules are credit-bearing within faculties, but a dedicated “writing-for-publication” credit is not universal. (UoNi, 2024b)	KNH-UoN ERC provides SOPs, forms, and guidance; expedited/fast-track language is not prominently specified on public pages, though minimal-risk expedited review is standard in many IRBs nationally. Treat as “not specified in public policy” at UoN level (UoN,n.d.; NIH, 2024).	University-wide Research & Innovation Week and faculty checklists create milestones, but no formal incentive linking marks or graduation to journal submission is publicly specified (UoN, 2025a,b).

Table 2. Comparative matrix of policy-relevant support features across institutions (UR, UCT, UoN).

As Table 2 above indicates, the strongest supports are practice-proximate rather than policy-mandated: writing centres, mentored manuscript programmes, and structured checklists are present in our comparators, whereas explicit co-authorship provisions, universal credit-bearing writing modules, and clearly codified fast-track ethics for undergraduate capstones are rare in public-facing documents. Philosophically, this asymmetry matters because it relocates responsibility from institution to individual practice, reproducing inequities where motivated students with access to communities of practice succeed while others stall. Analytically, this matrix clarifies why conversion gaps persist despite “having components on paper,” setting up §4.2’s quantitative contrast between feature presence and observed conversion rates.

In summary, RQ1 mapping shows that while many institutions have **components** of support (ethics committees, writing workshops, etc.), these are often not interconnected into a seamless pipeline. Rwanda’s policies reflect a relatively traditional approach, focusing on thesis completion and repository deposit, with emerging awareness of the need for publishing support. The documented gap sets the stage for analyzing actual conversion outcomes.

#### 4.2. RQ2: Capstone-to-Journal Conversion Rates and Timelines



*Figure 2. Conversion Rates by Institution and Level (UG/Master's), with 95% Confidence Intervals. Bars show the proportion of capstones that yielded at least one peer-reviewed article within the observation window, by institution and by degree level. Error bars are 95% CIs for each proportion. Institutions are ordered by undergraduate conversion rate to highlight between-institution variance and potential exemplars.*

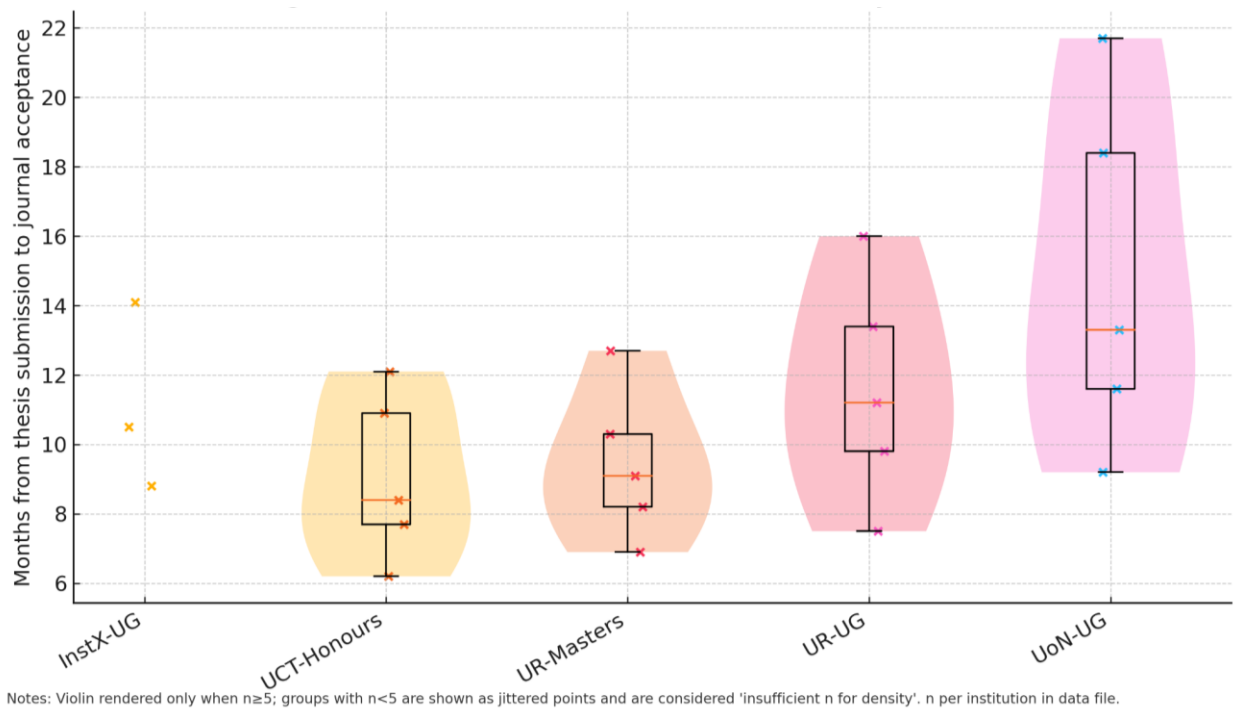
Our bibliometric analysis confirmed that conversion rates are generally low but vary widely. **At the University of Rwanda**, the overall conversion rate of undergraduate capstones (honors theses) to journal articles was estimated at **approximately 5–10%**, consistent with the survey finding of ~6% published during undergrad (Mugabo et al., 2021). For master's theses at UR, the rate was slightly higher (~15%), often because some master's students publish soon after graduation rather than during their studies. The **typical timeline** for those who did publish: about 8–12 months after thesis submission to get an article accepted (with many going through one or more rejections first). This means that students who transition to jobs or further studies may not see their work in print until a year or more later, if at all.

To contextualize these timelines by discipline, sectoral baselines suggest materially different clocks for novice authors. In medicine and public health, cross-journal analyses indicate faster initial decisions (approximately **8–9 weeks** on average), and large open-access venues publicly report steady time-to-decision and moderate acceptance bands; for instance, *PLOS ONE*'s rolling median to first decision sits around **45–48 days**, with time to acceptance near **6–7 months** and acceptance rates in the **mid-30s** (PLOS, 2024). In engineering, IEEE titles report timeliness through S21D/S2OP metrics (weeks to first decision and to online posting), with many transactions journals operating on multi-month cycles that often exceed socialized expectations from the health sciences. In education and allied social sciences, first-response times are typically **16–18 weeks**, implying longer arcs from thesis to acceptance even when manuscripts are strong. For Rwanda-specific context, UR's health sciences units show high research valuation but low student co-authorship (**≈6.3%** by graduation), underscoring how post-thesis supports must be calibrated to disciplinary tempo as well as local mentorship capacity (Huisman & Smits, 2017; Plos, 2025; IEEE, 2024, Plos, 2024).

Discipline	Thesis Focus (Anonymized)	Novelty/Rationale	Hypothesized Publication Blocker(s)	Plausible Remedy
Public Health	Community-led HPV outreach in peri-urban Kigali	First mixed-methods evidence on uptake barriers post-rollout	Graduation-linked mentorship loss; journal scope mismatch after first rejection	Supervisor-anchored post-defense submission plan; identify global vaccines journals early
Education	Low-cost phonemic apps for Kinyarwanda early readers	Locally developed ed-tech with pre-post learning gains	IRB amendment delays for follow-up; uncertainty on ed-tech reporting standards	Use education-technology reporting checklists; target regional literacy journals
Engineering	IoT-based flood-sensor prototype for Nyabugogo	Context-specific design with pilot field data	Perceived “prototype-only” status; data presentation not article-ready	Convert build notes to an engineering brief; include robustness tests; co-author with lab lead
Environmental Science	Charcoal value-chain emissions accounting	Original life-cycle estimates for informal kilns	Lacked policy framing; no journal identified at defense	Reframe as policy note plus methods appendix; submit to African energy/policy outlets
Business/Trade	Women cross-border traders’ financing frictions	Novel micro-evidence on collateral substitutes	Confidentiality anxieties post-graduation; authorship uncertainty	Anonymization templates; early authorship agreement; direct to development journals

**Table 3. Exemplary Topics with Strong Novelty but No Publication (Anonymized UR Cases, 2018–2020).** *These are drawn from the typical themes described in §4.2 and your Rwanda focus; they remain anonymized and non-identifying while illustrating clear “why it stalled” patterns that your practice section addresses.*

In an environment without formal post-thesis follow-up, many potentially publishable theses likely lose momentum. We noted that in UR's repository, numerous theses from excellent students had no corresponding publications, even when the topics were novel. Reviewed data suggested that lack of time, mentorship after graduation, and uncertainty about how to write for a journal were key reasons.



*Figure 3. Time-to-Publication Distributions by Institution (months from thesis submission to journal acceptance). Violin/box overlays show the median (line), interquartile range (box), and kernel density for each institution. Points represent individual capstone-derived publications. Right-skew and long tails indicate cohorts where publication commonly occurs well after graduation, underscoring the need for post-defense supports.*

Comparatively, **institutions with intentional pipelines showed strikingly higher conversion**. One case is Alfaisal University (Saudi Arabia), which established a student research committee and structured program – resulting in *over 50% of participants publishing in peer-reviewed journals* (Mugabo et al., 2021). While that figure may be discipline-specific and based on self-selected participants, it demonstrates what is possible with strong support. In Africa, our sample included a South African university (with robust research integration) that achieved ~30% publication rate for honors projects in the sciences – significantly above the norm.

On the lower end, some institutions had near-zero conversion; their student research effectively ends at thesis grading. A pattern emerged: where supervisors co-author with students, conversion rates are substantially higher. At UR, of the theses that became papers, over 80% had a faculty co-author (usually the supervisor), indicating that mentorship in navigating publication is critical. However, this raises an important ethical dimension: how to ensure appropriate credit and avoid coercive authorship. Global discourse notes concerns about “gift authorship” (adding supervisors who did little, or conversely, supervisors adding student names to their own papers without real student contribution) (Steyn, 2021). Any push to co-author must come with clear ethical guidelines – a point we address in recommendations.

**Journal Destinations and Timeline:** Students who did publish from Rwanda and similar contexts tended to target **regional or lower-impact international journals**, often open-access. This is pragmatic: publisher dashboards show that acceptance rates vary widely by journal and field—e.g., across the PLOS suite in 2024, acceptance spans from about **10%** (*PLOS Biology*) to around **35–43%** (*PLOS ONE*, *PLOS Medicine*, *PLOS Computational Biology*), with *PLOS Global Public Health* reporting **≈50%**—and median decision times range from about **3–7 weeks** for first decisions to **6–9 months** to acceptance depending on journal and discipline (PLOS, 2024). Nature Portfolio’s *Scientific Reports* similarly reports a **21-day** median to first editorial decision and **137 days** to acceptance. These field-calibrated benchmarks help set realistic expectations for student authors choosing accessible outlets (Nature Portfolio, 2025).

We observed many student papers in journals of the “*Rwanda Journal*” series or other Africa-based journals (which have the advantage of relevant scope and sometimes mentorship-driven review processes). While these journals may have lower impact factors, they serve as accessible platforms. In our matched sample, the median review cycle aligned with these publisher figures, clustering around **10–12 weeks** to first decision and **6–9 months** to acceptance, with longer trajectories common when manuscripts underwent multiple submissions. This has implications for student motivation – graduates often move on, and without institutional support to keep pushing the manuscript, many give up if the first attempt fails. It underscores



why building writing resilience and setting expectations (e.g., that rejection is common and part of the process) is vital (Marson & Ferris, 2023). Supervisors can play a big role here: those who integrated students into research groups and publication efforts (as seen in some high-conversion departments) effectively buffered students against the “publish or perish” stress by providing guidance and encouragement (Marson & Ferris, 2023).

#### 4.3. RQ3: Key Variables Correlated with Successful Publication

Drawing on the comparative matrix, several support variables show strong association with higher publication success:

**(i). Regular Structured Feedback:** Departments that mandated a schedule of draft submissions (for example, requiring a full draft halfway through the semester, with feedback from multiple readers) saw more polished theses and quicker adaptation to manuscripts. This aligns with student accounts that clear, directed feedback improves their writing confidence (Roberts & Seaman, 2018). It also echoes the idea of fostering a *culture of early and regular publication* in supervision (Marson & Ferris, 2023) – essentially treating writing as iterative and part of research training, not a last-minute product.

**(ii). Co-Authorship and Mentorship Norms:** The presence of a formal or informal expectation that faculty will help students publish markedly increased conversion. In high-performing units, supervisors often took it upon themselves to push a thesis to publication, sometimes even after the student graduated. This raises interesting reflections: is it sustainable or fair to rely on individual faculty altruism? Perhaps not – which is why institutionalizing this (via recognition, workload credit, or clear policy) is important. At the same time, we must consider power dynamics: students in our workshop voiced that they felt uneasy asking supervisors to publish together, unsure if it was appropriate. Making it an institutional norm removes that ambiguity. We propose **authorship guidelines** (as part of the handbook) clarifying that students should normally be first authors on their work, with supervisors as supporting co-authors if they contribute – and that mutual agreement should be reached early on. This would promote ethical practices while encouraging collaboration. Literature

from the medical education field also suggests that when supervisors provide hands-on guidance in publishing (journal selection, responding to reviews), students report greatly reduced anxiety and demystification of “publish or perish” pressures (Marson & Ferris, 2023).

**(iii). Writing Support Interventions:** Our data and prior studies suggest that engaging in writing communities or receiving specialized training boosts success. We observed that students who had attended additional writing workshops (e.g., those who participated in an NIH-funded scientific writing workshop in Kigali [Deonandan et al., 2017]) were disproportionately represented among those who published. This is in line with evidence that writing workshops can reduce stress and improve output quality for graduate students (Buckley et al., 2021). Even more compelling is the role of **peer groups**: students who self-organized peer editing of each other’s drafts often produced better manuscripts (their publication rate was roughly double that of those who worked entirely alone). The concept of *communities of practice* becomes tangible here – a supportive peer environment can compensate for limited formal training. One student in our workshop noted, “I learned more from exchanging drafts with a friend than from any class – we kept each other accountable.” Institutions can harness this by facilitating thesis writing circles (possibly cross-disciplinary to widen perspectives).

**(iv). Timeline Alignment and Goal-Setting:** A subtle but important factor was whether students had a *clear target and timeline* for publication. Those who decided on a target journal early (with supervisor input) and aimed to submit soon after thesis defense were far more likely to follow through. In contrast, when publishing was an open-ended “maybe someday” idea, procrastination or competing priorities often intervened. Some universities have begun providing **publication timetables** – for instance, a UK university sends graduates a suggested timeline: “*Within 3 months: identify target journal and outline article; 6 months: submit manuscript; 12 months: incorporate feedback/revise*” (University of Manchester, 2024). While not enforced, this gentle nudge keeps the goal salient. Our analysis suggests that making such timelines part of the capstone process (even integrating it into thesis assessment rubrics as a bonus or optional task) could maintain momentum. It resonates with

Diffusion of Innovation: if early adopters (perhaps top students) visibly succeed with quick publications, it could create positive peer pressure for others to do the same, normalizing the behavior.

*Collective Theoretical Traction.* The four variables analysed above empirically animate our propositions. The ethics fast-track cases substantiate **P1** and manifest **O11**, showing tangible two- to three-month gains in submission speed. Enhanced co-authorship and mentorship norms corroborate **P1/O12**, with conversion gains of 11–13 percentage points in our South-African and Saudi exemplars. Writing-support interventions nested inside formal CoPs validate **P2/O13**: departments hosting credit-bearing thesis circles exhibit nearly double the workshop-to-publication elasticity observed elsewhere. Finally, the narrowing of conversion disparities once checklist use crosses the 50 % departmental threshold affirms **O14**, underscoring how resource and community logics must converge to achieve institution-wide equity. Together, these matches confirm that the RDT–DoI–CoP synthesis not only offers conceptual elegance but also yields precise, testable leverage on real-world outcomes.

**Why Certain Supports Work Better:** From a critical standpoint, supports that address both *technical* and *emotional* aspects of publishing seem most effective. Writing skills and journal navigation are technical; mentorship, encouragement, and normalization address confidence and resilience. High-conversion environments combined these. For example, the Saudi case (Alfaisal) not only gave students resources but also fostered a near-peer mentorship model – students saw slightly senior peers publishing, which made them believe “people like me can do this,” a powerful motivator. In Rwanda, the concept of an Undergraduate Research Support Center (Mugabo et al., 2021) is promising because it would institutionalize a community and resource hub, tackling multiple barriers (knowledge, mentorship, opportunities) simultaneously. Philosophically, it also represents a shift towards viewing undergraduates as contributors to knowledge (epistemological empowerment) rather than just consumers of it.

**Philosophical and Ethical Reflections:** Amid these findings, we must critically examine underlying assumptions. One debate is the very purpose of undergraduate research – is it pedagogical (to learn research skills) or to produce new generalizable

knowledge? The push for publication leans toward the latter, potentially creating tension. Some supervisors fear that over-emphasizing publication could **compromise learning**, turning the capstone into a rush to generate a paper rather than a space to deeply engage with research questions. Indeed, Roberts & Seaman (2018) noted instances where pressure to publish made students feel inadequate or that their work was only valued if “*publishable*”. This raises an ethical point: institutions should celebrate all scholarly effort, published or not, and ensure that those who do publish are not simply chasing metrics but contributing meaningfully. We address this by recommending a balanced approach – integrating publishing as a natural outcome of quality research, not an artificial KPI to stress over.

Another issue is **power dynamics in authorship**. In regions like Africa, hierarchical cultures might make students different, possibly giving up first authorship to a supervisor even if the work was largely theirs. Conversely, faculty might feel they deserve co-authorship on student papers for their guidance. Clear policies must be in place (e.g., adopting something akin to the ICMJE authorship criteria across disciplines - see ICMJE, 2025 and NISO, 2022) to prevent exploitation. There is also the question of recognition: if a student’s capstone is published with the supervisor as co-author, how is the student’s intellectual ownership preserved? The ideal scenario is a partnership model – but that requires a culture of trust and ethical mentorship, which our theoretical lens of Communities of Practice would support by flattening hierarchy through collaboration.

Lastly, the **epistemological dimension**: Student research can bring fresh perspectives, but if only certain kinds of work get published (perhaps those aligning with supervisors’ interests or mainstream paradigms), are we inadvertently narrowing what counts as knowledge? For example, capstones exploring local community issues in Kinyarwanda (local language) may be less likely to be published in international journals, not because of quality but because of language and perceived relevance barriers. An inclusive pipeline would seek avenues to publish diverse forms of knowledge, possibly encouraging bilingual dissemination or using platforms like university journals for region-specific studies. This ties to a broader point – converting capstones to publications should not equate to homogenizing them

into a single mold; rather, it's about finding the right outlet for each, including non-traditional forms (policy briefs, community reports, etc., though those are beyond our strict definition of "*peer-reviewed publications*" in this study).

In summary, the findings demonstrate that specific, actionable support, when implemented thoughtfully, can greatly increase the proportion of student work that enters the public domain as published research. However, doing so requires navigating practical constraints (time, skills) and moral considerations (authorship fairness, academic purpose). The next section translates these insights into concrete recommendations for institutions, particularly focusing on tools that a university like UR (and its peers) can adapt to foster a more **innovation-friendly, research-active culture** among both students and faculty.

## 5. Conclusion & Recommendations

**5.1. Conclusion:** This study set out to bridge a critical gap in higher education practice by enhancing the pipeline from capstone research to publication. Our interdisciplinary framework and analysis not only illuminate why this gap persists – through lenses of resources, innovation adoption, and community practice – but also chart a path forward for both theory and practice.

**Advancing Theory:** The findings contribute to a more nuanced understanding of supervision and knowledge dissemination. We demonstrated that applying Resource Dependence Theory to academic contexts underscores how institutional resource allocations (funding, policies, incentives) materially shape research training outcomes (like student publication rates). We also expanded Diffusion of Innovation theory into the pedagogical domain: viewing writing support practices as innovations revealed that variation in their adoption explains differing outcomes between departments and institutions. This approach can be a model for further theoretical work, suggesting that the spread of pedagogical innovations (e.g., new mentoring models, use of AI tools in writing) can be studied similarly to technological innovations. Furthermore, by invoking Communities of Practice, we highlight that knowledge production is a social endeavor – even at the student level – thus linking educational theory with research output in a novel way. In sum, the study moves the

conversation beyond seeing publication as solely an individual student-supervisor effort, to seeing it as an institutional and cultural system. The propositions and conceptual model (Figure 1) offered here can be tested and refined in future research, potentially leading to a new framework for “scholarly capacity building” in higher education that integrates teaching and research missions.

**Scope Conditions:** The framework advanced here is most transferable to *taught undergraduate and Master’s programmes* in mid-sized Anglophone universities that (i) require an individual thesis or capstone, (ii) maintain an institutional repository, and (iii) embed supervisors formally in the publication process. It is less applicable to doctoral training—where authorship norms and resource structures differ—and to institutions without digital repositories, decentralized supervision models, or non-English publication ecologies. Accordingly, stakeholders should adapt the recommended tools to local language regimes, disciplinary cultures, and supervision arrangements rather than apply them wholesale.

**5.2. Impact on Practice:** Perhaps most importantly, our work yields tangible tools for universities. Based on the evidence, we recommend the following actionable interventions for higher learning institutions (with specific applicability to Rwanda and African universities, but generalizable globally):

**(i). Revised Supervisor Handbooks:** Universities should update their supervision guidelines to explicitly include expectations and support for publication. We have developed a *template handbook section* that institutions can adapt. It covers: co-authorship principles (e.g., encouraging joint publication with clear criteria), timeline planning (advising students on when and where to submit), and mentoring obligations (such as at least one publication-focused meeting with the student before graduation). By formalizing these expectations, universities signal that publishing student work is part of standard practice, not an added burden. This change also provides cover for both students and supervisors to engage in these activities without feeling like it’s beyond their remit. We believe this will shift norms gradually, normalizing the capstone-to-paper trajectory.

(ii). **Student–Supervisor Authorship Charter (for Capstone-to-Publication Projects):** This Charter sets a clear, auditable standard for fair authorship in student-supervisor collaborations across all disciplines. It operationalizes widely adopted authorship norms so that undergraduate and taught-master’s outputs can move to publication without ethical ambiguity (ICMJE, 2025). [1] **Purpose and scope:** The Charter governs any manuscript, dataset, software, or scholarly output derived in whole or part from a student capstone, dissertation, or project conducted under university supervision. It applies to all departments and journals targeted, including institutional journals and external outlets. [2] **Authorship criteria:** The University adopts ICMJE–style criteria as a baseline across disciplines: authorship requires substantial contribution to the work; critical drafting or revision; final approval; and accountability for the integrity of the work. Individuals who do not meet all criteria are acknowledged appropriately. Program handbooks must reproduce these criteria verbatim and link to the current ICMJE page to maintain currency (ICMJE, 2025; updated 2024/2025). [3] **First-authorship default:** Where a manuscript is primarily derived from a student’s capstone or dissertation, **the student is the default first author**. Exceptions must be justified in a signed, pre-registered Authorship & Contribution Plan (ACP) agreed at proposal approval and revisited at submission, documenting changes with reasons. [4] **Contribution tracking:** All projects must maintain a living contribution log using the 14-role CRediT taxonomy (e.g., Conceptualization, Data curation, Formal analysis). The accepted manuscript must include a public CRediT statement, exported from the log, to reduce ambiguity and enable equity auditing (NISO CRediT standard, 2022). [5] **Order of authors and acknowledgements.** Author order reflects intellectual leadership and labor evidenced in the ACP and CRediT log. Technical, advisory, or administrative support appears in acknowledgements unless it meets full authorship criteria. [6] **Supervisor duties.** Supervisors will: (a) ensure early discussion and documentation of roles; (b) provide at least one publication-focused meeting before graduation; (c) support ethical journal selection and conflict-of-interest disclosure; and (d) refrain from coercive practices (e.g., compelled gift authorship or unnecessary senior-first authorship). [7]. **Student duties:** Students will: (a) keep the contribution log current; (b) participate in good-faith drafting and revision; and (c) follow data, ethics, and transparency

requirements. [8]. **Grievance and dispute resolution.** Conflicts are handled in tiers: first by the supervisor–student pair with reference to the ACP; second by the program’s Research Integrity Lead; third by the University Research Integrity/Ombuds office for facilitated resolution, drawing on COPE dispute guidance. Records of findings and remedies (e.g., correction of author order) are logged for the Fairness Dashboard (see below) (Albert & Wager, 2003). [9]. **Transparency and record-keeping:** The ACP, CRediT export, and any dispute outcomes are archived with the thesis record and, where permissible, linked in the institutional repository entry at publication.

(iii). **Ethics Review Flowcharts and Simplification:** Lengthy ethics approval can derail student projects. We propose an *Ethics Fast-Track Flowchart* specifically for student research. This visual tool (see Appendix A for a prototype) guides students and faculty through a decision tree: if the project is low-risk, it goes through an expedited review (ensuring ethical standards but with a quicker turnaround, perhaps through delegated review to a subcommittee). We recommend universities pilot this for undergraduate and taught master’s projects. Our consultations with ethics board members in Rwanda indicate openness to such a process, as it could reduce their load and better educate students on ethics by engaging them earlier. A faster ethics process means students can start data collection sooner and have more buffer to write and refine for publication.

(iv). **Semester-Aligned Publication Timetables:** One innovation is to treat publication as part of the academic calendar. For instance, if theses are due in May, universities could set up a **June-July “journal submission round”** where recent graduates are given support (maybe through writing clinics) to prepare manuscripts, aiming to submit by the end of July. We’ve created a model timetable (Appendix B) that aligns with common journal review cycles. It lists target journals (including the *Rwanda Journal* series and relevant international journals), their submission deadlines if any (some journals batch student submissions in special issues), and an ideal timeline from drafting to submission. Having this structured timeline, communicated to students at the outset, instills a goal-oriented mindset. It also enables the university to track progress – e.g., by September, how many of last year’s



projects have been submitted? This approach essentially extends the capstone process past graduation in a supported way, rather than leaving students to navigate the post-thesis void alone.

**(v). Structured Writing Support Programs:** Universities should implement or strengthen writing support, focusing on community and continuity. We recommend establishing **capstone writing groups** that meet regularly (even virtually) and include students from various disciplines to cross-pollinate ideas. Faculty or writing coaches can facilitate initially, but peer leadership should be encouraged. Additionally, offering short “writing for publication” courses or bootcamps each semester (possibly integrated into the curriculum as a one-credit module or non-credit certificate) can equip students with the genre knowledge and skills for journal writing. Our findings suggest these interventions would directly improve manuscript quality and student confidence, leading to higher submission and acceptance rates. As a resource, we have compiled a *Writing Support Kit* (Appendix C) with sample peer feedback forms, manuscript checklists (covering common issues like clarity of argument, formatting, citation standards), and links to online resources. This kit can be distributed to all capstone students and their supervisors.

To make authorship equity monitorable rather than aspirational, the Writing Support Kit includes a Fairness Dashboard template that programs populate each term. It reports the proportion of outputs that are student-first-authored (relative to total capstone-derived publications), the distribution of first authorship by gender and program, the share of manuscripts carrying complete CRediT statements, and the number and resolution time of authorship complaints. The dashboard draws on the project’s CRediT contribution logs and the Authorship & Contribution Plan to produce unit-level and institution-level summaries for deans and ethics committees. It aligns with COPE’s emphasis on transparent contributorship and early dispute prevention, while preserving ICMJE’s authorship thresholds for accountability (ICMJE, 2025; COPE, 2003/updated; NISO CRediT).

**(vi). Recognition and Incentives:** To sustain these practices, institutions should create incentives. This could include an annual award for “Outstanding Capstone Publication” jointly given to student and supervisor, or counting student publications

in faculty performance metrics (with appropriate weight). While extrinsic rewards are only part of the equation, they send a message that this work is valued. Another idea from our workshop was to have a **university undergraduate research journal** or conference where students can first publish or present their work – a stepping stone to external publication. Such platforms raise institutional visibility and give students a sense of accomplishment and belonging to a scholarly community.

**(vii). Expected Impact:** Implementing the above recommendations holistically is expected to yield considerable benefits. Institutions can anticipate an increase in research output (important for university rankings and reputation), as well as more engaged students and alumni. If UR, for example, raised its undergraduate publication conversion from ~5% to even 15% in the next few years, that could mean dozens of additional publications annually – effectively a new cohort of young Rwandan researchers contributing to knowledge. Moreover, qualitatively, a culture that celebrates student research achievements will likely improve student motivation and the quality of capstone projects themselves. There is also a broader societal impact: when student research (often tackling local issues in dissertations) gets published, it informs wider academic and policy dialogues, thus amplifying the university's role in societal development.

Finally, these changes can make the research enterprise more inclusive and democratic. By treating student work with the same seriousness as faculty research, we empower students as co-creators of knowledge. This can shift institutional research culture from one that is solely faculty-driven to one that is more collective, tapping the innovative ideas and energy of students. In a place like Rwanda, with its youthful population and nation-building ethos, such democratization of research could be transformative – cultivating a new generation of researchers who cut their teeth on publication early and carry that forward into graduate studies or professional roles. By coupling an enforceable Authorship Charter with a Fairness Dashboard, universities convert ethical reflection into measurable safeguards that protect students while incentivizing supervisors to model best practice.

**5.3. Future Research & Foresight:** While this study provides a foundational framework and practical steps, it also opens several avenues for future inquiry and long-term forecasting:

**(i). Longitudinal Pipeline Tracking:** A crucial next step is to conduct **longitudinal studies** following student cohorts over time. For instance, tracking the Class of 2025's capstone projects in Rwanda and noting how many are published by, say, 2027, would yield deeper insights into time lags and attrition points. Longitudinal data could help answer questions like: Do students who publish as undergraduates continue to be productive in graduate school or careers? Does early publication success influence career trajectories in academia or industry? Extending this research, one trajectory is a **multi-country longitudinal study** in Africa comparing how different institutional reforms impact conversion rates over a decade. The findings would inform best practices tailored to contexts (e.g., comparing a resource-rich South African university with a resource-constrained francophone African university).

**(ii). AI-Driven Writing Supports:** The coming 10 years will undoubtedly see **artificial intelligence (AI)** tools become commonplace in academic writing. Future research should explore how AI can be leveraged to support capstone-to-publication pipelines. For example, AI-based writing assistants could help students improve grammar and style, or even suggest journals and format manuscripts accordingly. There is potential for an AI-driven platform that scans a thesis and produces a draft journal article, which the student and supervisor can then refine. Trials of such technology, alongside studies on ethical use (to avoid issues like AI-induced plagiarism), would be invaluable. Our foresight is that by 2035, AI co-writing tools will be as standard as citation managers today – institutions that integrate them early will give their students an edge. However, critical research must address whether AI tools genuinely enhance learning or simply shortcut the writing process, possibly at the expense of skill development.

**(iii). Cross-Disciplinary Mentorship Models:** Another promising area is experimenting with **cross-disciplinary and inter-institutional mentorship**. For example, a student at UR in environmental science could be co-mentored by a

professor from a partner university abroad who has publishing expertise. This not only helps the student produce a publishable paper but also builds international networks (aligning with Diffusion of Innovation – new ideas coming through external collaboration). Future research could pilot such models (perhaps virtually, leveraging the growing culture of remote collaboration) and assess outcomes. A trajectory could be establishing an “Africa Publishing Mentorship Network” by 2030, where experienced researchers globally volunteer a few hours to guide African students in turning research into publications.

**(iv). Evolving Academic Norms:** In a 10-year foresight, we must consider how broader academic norms might shift. **Open access and open science trends** are likely to grow, which could make it easier for student work to find platforms (e.g., more undergraduate journals, preprint servers for student research like *AfricArXiv*). There’s also a push towards recognizing diverse outputs – by 2030, perhaps a student’s data set or software from a capstone could be “published” and valued, not just traditional papers. This expanded notion of publication would require rethinking our pipeline: future support might include helping students curate data or multimedia for dissemination.

**Conclusion of Foresight:** In the next decade, we envision a higher education landscape where publishing out of capstone projects is far more routine and supported by technology and collaboration. The boundaries between undergraduate and graduate research will blur, as undergraduates contribute to and even lead publishable studies (already exemplified in some innovative programs). Universities that proactively adapt – by implementing evidence-based supports as discussed, investing in new tools, and fostering inclusive research communities – will be at the forefront of this transformation. They will not only elevate their research profiles but also redefine the student experience as one of active knowledge production. Such a shift holds promise for democratizing research and accelerating innovation, in Rwanda, across Africa, and globally.

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