DESIGNING A MULTI-STAKEHOLDER THESIS SUPPORT ASSISTANT FOR IT BACHELOR PROGRAMMES

J. Leoste, K. Marmor, K. Kikkas, A. Käver, D. Mironov, J. Pöial

Tallinn University of Technology (ESTONIA)

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THE CHALLENGE: FRAGMENTATION IN THESIS COMPLETION

Thesis completion is shaped less by writing alone than by fragmentation across actors, documents, and procedures.

– Students navigate a complex ecosystem of rules, templates, and e-mail instructions within a fixed time frame.

– Institutional information is distributed across multiple platforms, leading to recurring confusion.

– Repetitive administrative work stems from answering the same procedural questions across different cohorts.

– The core difficulty is navigating the institutional workflow rather than the act of academic writing.

RESEARCH OBJECTIVES AND QUESTIONS

RQ1 What specific bottlenecks do programme directors identify within the existing thesis process?

RQ2 What structured question map should the assistant address for different stakeholder groups?

RQ3 How can these findings inform the design of a Retrieval-Augmented Generation (RAG) architecture and its evaluation?

Moving beyond generic chatbots toward process-oriented, grounded institutional support.

METHODOLOGY: DOUBLE DIAMOND APPROACH

Discover Phase

— Six interviews with IT programme directors to surface systemic failure points and recurring bottlenecks.

Define Phase

— Design Thinking workshop with 25 staff and collaborative mapping of stakeholder questions across roles.

Bridging educational needs analysis and technical implementation requirements.

KEY INSIGHT: A WORKFLOW COORDINATION PROBLEM

Thesis support is primarily an information-access problem: Procedural clarity is required before writing-level feedback becomes effective.

— Avoidable delays stem from students not knowing "what to do next" or "whom to ask."

— Uncertainty is most prevalent in topic selection and supervisor alignment.

— Reframes the assistant as a process-oriented tool rather than a simple writing aid.

— Addresses the systemic friction embedded in the current institutional structure.

STAKEHOLDER-SPECIFIC SUPPORT NEEDS

Stakeholder	Main Support Needs	Representative Questions
Students	Navigation, timing, role clarity, formal requirements	How do I choose a topic? What is expected next?
Supervisors	Expectation alignment, repeated guidance, milestone support	What should be checked at each stage?
Directors	Process oversight, bottleneck visibility, consistency	Where do students fail most often?
Reviewers	Transparent evaluation support	What should a review focus on?
Admin Staff	Procedural clarity, submission logistics	Which documents are required?
Committee	Assessment and defence procedure support	What criteria apply during the defence?

TRANSLATING NEEDS INTO RAG ARCHITECTURE

Question Property	Implication for Retrieval	Implication for Generation
Role-Specific	Role tags in metadata; role-aware filtering	Role-conditioned prompts; enforced boundaries
Process-Oriented	Stage metadata; index procedure docs	Step-by-step outputs; clear hand-offs
High-Stakes	Prioritise authoritative sources	Require citation/versioning; refuse if unclear
Prog-Specific	Per-program index partitions	Programme-scoped generation logic
Multilingual	Cross-lingual retrieval models	Respond in user's preferred language

TECHNICAL RELIABILITY AND HUMAN ESCALATION

Authoritative Grounding

— Prioritizes official regulations and guides over FAQs to ensure factual accuracy.

Confidence Thresholds

— Low-confidence retrieval scores trigger a refusal to answer, preventing hallucinations.

Human Escalation

— Questions requiring academic judgement are routed to the named responsible human actor.

Traceability

— Every response includes a mandatory citation to the source document and its version date.

PLANNED PILOT: 2026/2027 ACADEMIC YEAR

Scale and Scope

— Targeting at least 200 students across three IT programmes.

— Involvement of 30+ academic staff members.

Implementation Goal

— Deploying the multi-stakeholder RAG assistant in a live environment.

— Transitioning from needs analysis to grounded, real-world evaluation.

The first large-scale test of the process-oriented support model at Tallinn University of Technology.

COMPREHENSIVE EVALUATION FRAMEWORK

RAG Component Metrics

— Context Relevance & Recall
— Faithfulness (Groundedness)
— Answer Relevance

Adoption & Workflow

— Usage logs & session frequency
— Human escalation rates
— Changes in staff workload

Perceived Impact

— Perceived usefulness & trust
— Post-pilot survey instruments

Ground Truth Testing

— 150 stakeholder-tagged questions
— Validated by programme directors

Separating retrieval quality, generation quality, and institutional adoption effects.

DISCUSSION: AI FOR SOCIO-TECHNICAL COORDINATION

Reframing AI support from individual student regulation to institutional workflow coordination across the entire thesis ecosystem.

Grounded Immediacy

— Addresses "where am I going" and "where to next" questions before writing feedback becomes useful.

Practical RAG Integration

— Provides a transparent path for integrating AI into high-stakes educational environments.

Multi-Stakeholder Lens

— Supports the wider socio-technical system, reducing friction for supervisors and administrative staff.

Preserving Responsibility

— Ensures human academic judgement remains central by routing complex queries to responsible roles.

CONCLUSION AND FUTURE WORK

Key Contributions

— A replicable path from institutional needs analysis to grounded RAG design.

— A stakeholder question map covering six roles and five process stages.

Future Directions

— Full-scale pilot evaluation in the 2026/2027 academic year.

— Refinement of role-sensitive retrieval and multilingual models.

Contact: J. Leoste Tallinn University of Technology https://cm.taltech.ee