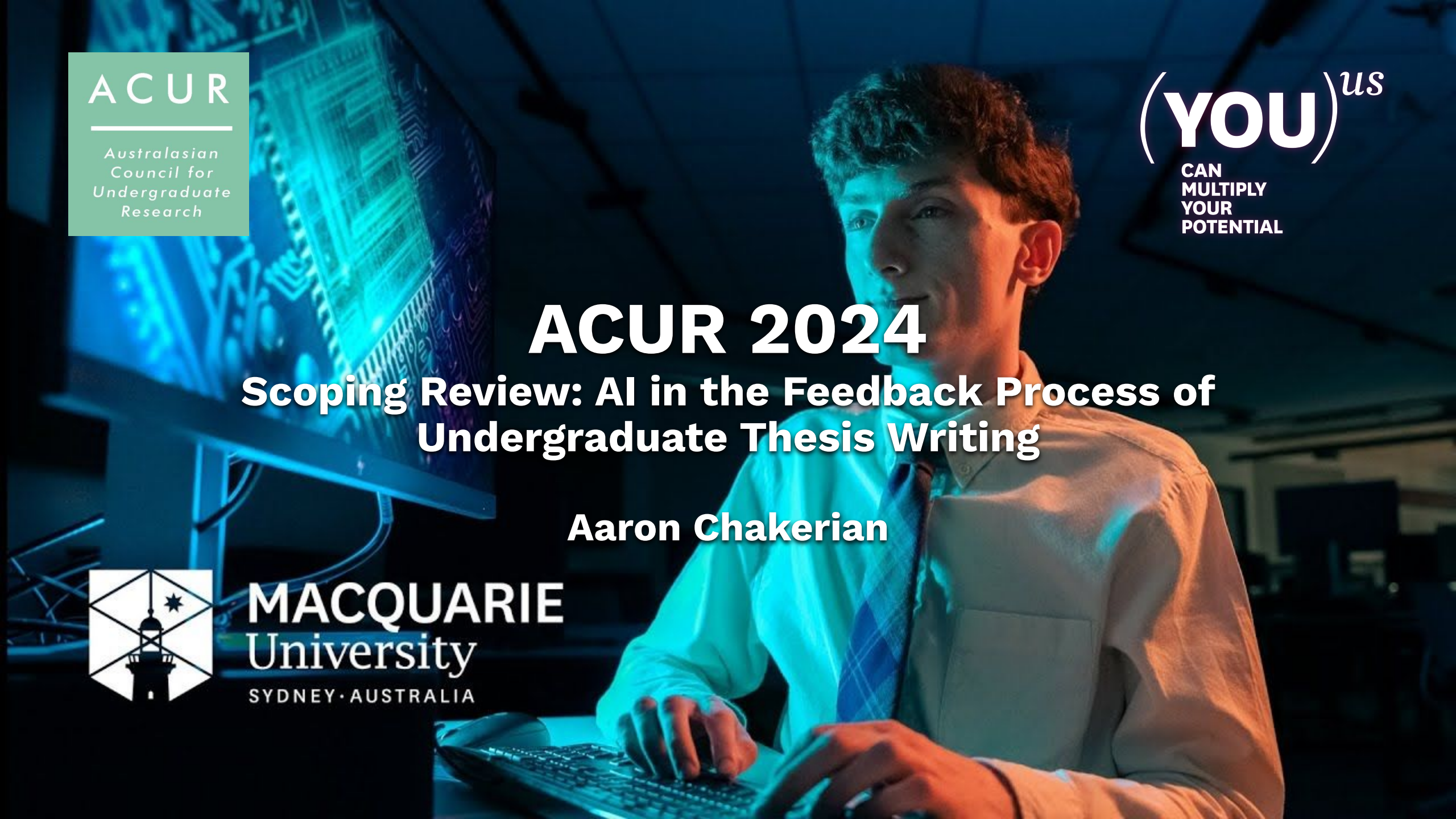
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ACUR 2024
Scoping Review: AI in the Feedback Process of Undergraduate Thesis Writing
Aaron Chakerian
MACQUARIE University
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Agenda

Scoping Review: AI in the Feedback Process of Undergraduate Thesis Writing

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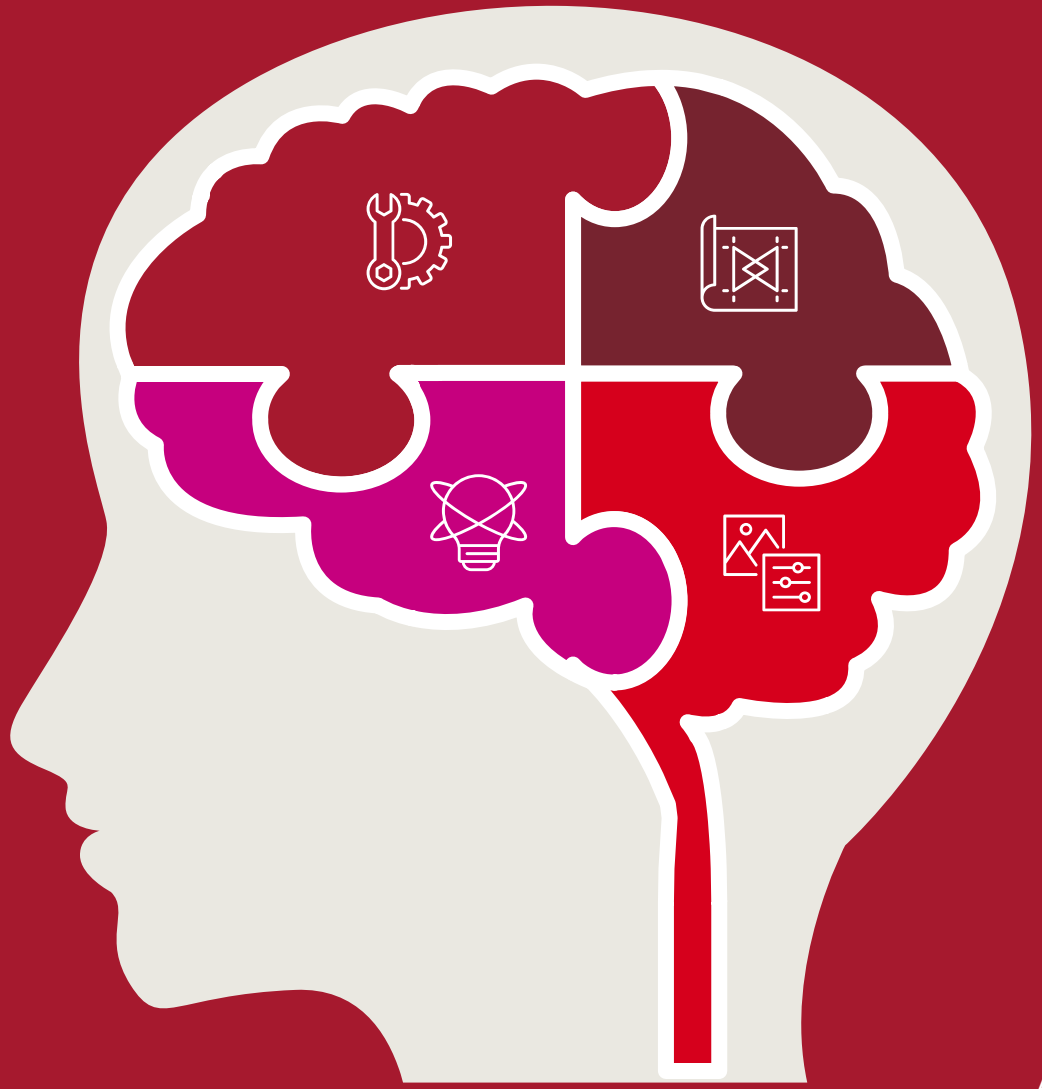
Introduction
Background
Literature Review

Research Focus
Questions
Objectives



Methodology
Identifying the Research Question

Selecting Studies

Reporting Results

Results & Discussion

Next Steps

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Scoping Review: What is it?

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A **scoping review** is a type of research synthesis that aims to map the existing literature on a particular topic or research area.

It is particularly useful when a research field is broad, complex, or not well-defined.

Scoping reviews help to clarify concepts, identify knowledge gaps, summarise evidence, and inform future research directions.

"A Scoping Review is somewhere between a literature review and a meta-review."

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Literature Review: AI System Qualities

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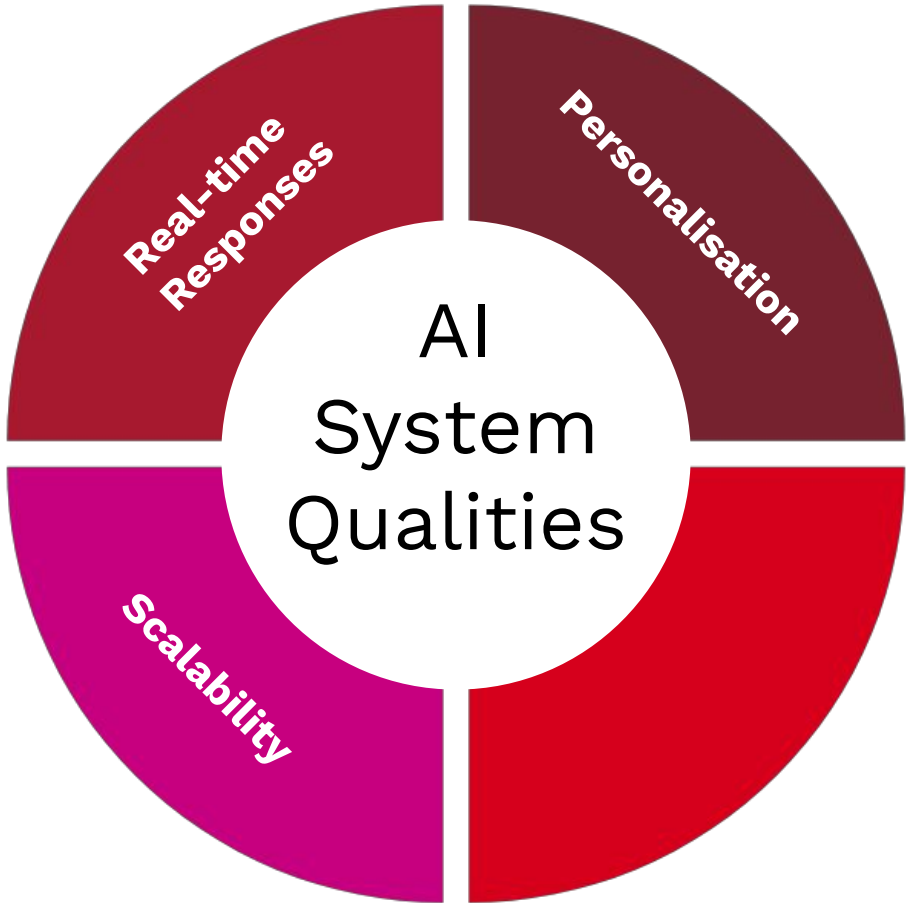
Ability to process inputs and produce outputs almost instantaneously

Ability to expand seamlessly, maintaining performance under increasing workloads.



Tailored responses based on user preferences, behaviours, or contextual information

(Murtaza, et al, 2022)

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Literature Review: UG Research Feedback

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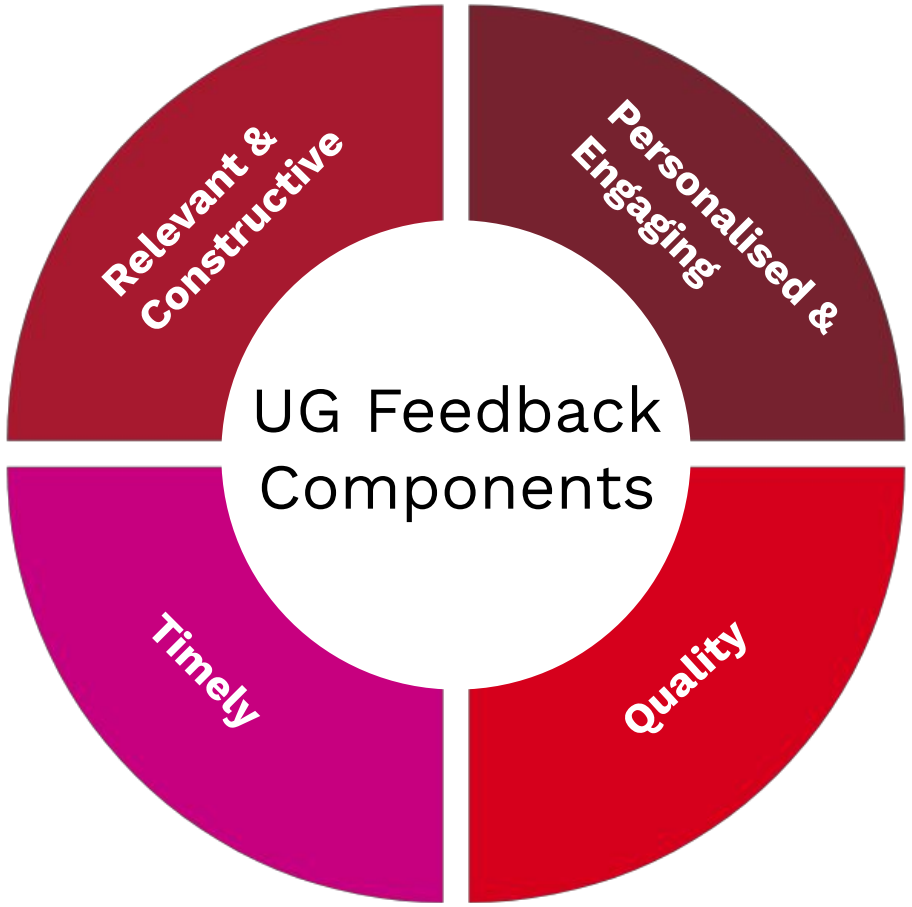
Highlight **strengths** alongside areas for **improvement**

Consistent and **timely** feedback throughout the thesis-writing process



Tailor feedback to the student's **skill level**, writing style, and **progress**

Clear, constructive, timely feedback fostering critical thinking and iterative improvement.

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Research Focus

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Research Questions

RQ1: What are the benefits and limitations of AI as a feedback tool in undergraduate thesis writing?

RQ2: Does AI-driven feedback improve personalisation, efficiency, and student engagement in the thesis writing process?

RQ3: How does real-time AI feedback influence the quality, clarity, and coherence of undergraduate writing?

RQ4: What does the literature reveal about AI's role in enhancing or hindering undergraduate research outcomes?

Research Objectives

Scope	Methodology	Evaluate	Communicate	Future
Determine the current state of research	Transparent, valid, reliable and reproducible study	Critically analyse and assess current research	Students, academics, policymakers	Identifying future research

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Methodology

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Formulating the Research Question

Research Question Criteria:

- Precise and well-defined
- Systematically answerable
- Developed through literature review

Conducting the Review

- Define Search Strategy
  - Predefined Keywords
  - Boolean operators (“AND”, “OR”, “NOT”)
- Define Databases Utilised
- Selection Process – Inclusion/Exclusion Criteria

Synthesis of Data

- Extract key information:
  - Author, year, type of study and RQ information
- Identifying Patterns: Highlights recurring themes, trends, and challenges

Collate, Summarise, and Report Results

- Thematic Analysis: Identify themes, trends, and knowledge gaps.

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Preliminary Results

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Initial analysis:

- Research screening total: 22
- Research findings using keywords: 62
- % Papers screened 22/62 = 35%

Number of Research papers meeting Inclusion/Exclusion criteria: 18

Research Title	Authors	Year	Research Focus	RQ1 (Benefits & Limitations)	RQ2 (Personalisation, Efficiency, Engagement)	RQ3 (Quality, Clarity, Coherence)	RQ4 (Literature Insights)	Future Work
Comparing ChatGPT's Correctio	Emmanuel Fokides, Eiri	2024	AI feedback in primary educa	Demonstrated strong performance in English	Offers efficient and detailed feedback.	Mixed results across clarity and correctness.	Highlights AI's potential in primary ec	Suggested improvements
EFL Teachers' Perceptions of the	Mashael Salem Alsalem	2024	AI in EFL grading	Supportive tool but not standalone.	Enhanced efficiency but personalisation concerns.	Limited in handling nuanced texts.	Recommends blending teacher-AI fee	Emphasises training for A
Promoting Students' Writing Cr	Chantika Nabilla	2024	Writing and critical thinking	Supports student creativity.	Immediate and personalised insights.	Improved clarity and argument structure.	Linked to enhanced analytical depth.	Suggests broader trials ar
Investigating the Efficiency of Us	Khaoula Chatti	2024	Idea generation in EFL	Boosts ideation but gaps in complex topics.	Engaged learners with diverse inputs.	Enhanced sentence structure.	Fostered EFL writing creativity.	Explores integration acro
Educational Innovation in the In	Jihene Mrabet, Robert S	2024	AI in hybrid learning	Accessible learning support.	Effective customisation.	Promotes task coherence.	Acknowledges gaps in pedagogy.	Advocates user-friendly A
ChatGPT, Bard, Bing Chat, and C	Saleh Obaidoon, Haipin	2024	AI in CFL education	Excels in grammar but lacks depth.	Moderate efficiency and engagement.	Strong surface-level feedback.	Calls for cultural and structural integr	Suggests advanced feedba
Intelligent English Grammar: AI S	Alba Infante Vera et al.	2024	Grammar enhancement	Strong rule-based support.	Moderate engagement, high efficiency.	Improves clarity via structure.	Foundation-building with AI gramma	Broader ESL integration r
Investigating the Effect of AI Wri	Pourya Borna et al.	2024	Tool comparison for EFL	Effective but varied tool strengths.	Grammarly showed better engagement.	Enhanced clarity and coherence.	Differentiates tool strengths.	Adaptive tool research.
The Impact of ChatGPT Feedback	Petra Polakova, Petra Iv	2024	Writing skill enhancement	Significant improvements in conciseness.	Personalised and engaging experience.	Positive effects on clarity and grammar.	Highlights AI's role in meeting Gen Z n	Proposes refinement in A
AI-Powered Pedagogy: Elevating	Ahmad Syafi'i et al.	2024	L2 writing feedback	Promotes affective and cognitive engagemen	Improves feedback uptake and motivation through integrated metho	Enhances coherence and revision quality.	Identifies gaps in engagement-focusec	Suggests broader testing
Exploring the Use of Artificial Int	Julia Venter et al.	2024	AI in large-scale feedback	Facilitates timely, scalable feedback but lacks	Efficient personalisation using tailored prompts.	Enhances clarity with consistent rubric-aligned inputs	Highlights alignment to feedback prin	Advocates transparent pr
Synergizing Collaborative Writin	Watcharapol Wiboolya	2024	Collaborative writing with A	Demonstrates significant proficiency improv	Combines personalisation with collaborative strategies.	Bolsters coherence and writing complexity.	Supports integration of AI in sociocul	Proposes integration into
Exploring the Feasibility and Effi	Irum Naz, Rodney Robe	2024	AI-based personalised feedba	Highlights real-time efficiency with some reli	Promotes autonomy and self-efficacy in learners.	Facilitates clarity but may hallucinate complex respor	Explores integration challenges and et	Suggests refining AI mode
Investigating the Usefulness of A	Meroua Aziz, Noudjoud	2024	Academic writing support	Benefits for drafting and revisions.	Reduced revision time, increased insights.	Strengthened clarity and argumentation.	Insights into AI tools fostering critical	Calls for diverse writing c
Using LLMs to Bring Evidence-Ba	Jennifer Meyer et al.	2024	Feedback in education	Noted increase in revision performance.	Enhanced motivation and positive emotions.	Strong revision-focused clarity improvements.	Importance of evidence-based AI feed	Suggests integrating mult
Transforming Higher Education	Ibrahim Krasniqi	2024	Higher education transforma	Boosts academic outcomes.	Engages students via AI-enhanced tools.	Supports personalised learning clarity.	Balances ethical considerations in AI.	Proposes ethical framew
Optimising the Effectiveness of C	Roque J. Hernández Bus	2024	ESL feedback optimisation	Rubric-based improvements in feedback.	Timely and tailored AI responses.	Improved student writing clarity.	Explores balanced AI integration.	Focuses on rubric-driven

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Preliminary Discussion: Benefits

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Scalability and Efficiency: Rapid and consistent feedback delivery supports large-scale educational needs.

Personalisation: AI tailors feedback to individual skill levels and progress, fostering targeted learning experiences.

Structured Improvement: Promotes iterative revisions.

Autonomy: Encourages self-directed learning and reflective practices, building student confidence.

Preliminary Discussion: Limitations

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Feedback Overload: Constant access to AI-generated suggestions might overwhelm students, causing decision fatigue or over-reliance on suggested changes.

Algorithmic Anchoring: Students might limit their thinking to AI-recommended solutions, narrowing their creative scope instead of expanding it.

Bias Amplification: AI may reinforce systemic biases in language or academic conventions, potentially disadvantaging underrepresented groups or alternative writing styles.

Authenticity Erosion: Overuse of AI-generated feedback might homogenise academic writing, eroding individual voice and creativity in thesis work.

What’s next then?

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Potential Future Research:

AI Feedback for Subjective and Creative Writing in Undergraduate Research

Improving Transparency and Explainability in AI Feedback

AI in Multimodal Research Assessments

Bias Mitigation Strategies

Educational Interventions:

Hybrid Feedback Models

Digital Literacy Training for Equitable Access

Ethical Framework Development

Adaptive Learning Systems with AI Feedback

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Inclusion Criteria

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Scope of Study: Articles and studies discussing AI-driven feedback mechanisms in academic writing, specifically for undergraduate or higher education settings. Research focused on adaptive feedback and its role in enhancing writing quality.

Benefits: Studies demonstrating improvements in writing outcomes, such as language precision, structure, coherence, and engagement.

Limitations: Discussions highlighting challenges such as fostering critical thinking, self-directed learning, and nuanced feedback.

Relevance to Context: Research conducted in educational settings that integrates AI technology in the feedback process.Studies addressing the intersection of AI and adaptive learning tools in higher education.

Publication Type: Peer-reviewed articles, conference papers, and academic reports published in credible educational or technological journals.

Timeframe: Studies published in 2024 only to ensure the inclusion of contemporary AI developments and applications.

Exclusion Criteria

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Non-AI Feedback Systems: Research that only discusses traditional feedback methods or tools that do not utilise AI technology.

Non-Educational Contexts: Articles exploring AI applications in other domains (e.g., business, healthcare) without a direct link to academic writing or feedback.

Theoretical Frameworks Without Data: Purely theoretical papers with no practical or empirical data on AI feedback systems in academic writing.

Outdated Technology: Research on AI tools or systems that are obsolete and no longer representative of current capabilities.

Non-English Publications: Exclude studies not available in English, unless translations are accessible.

Search Strategy

Scoping Review: AI in the Feedback Process of Undergraduate Thesis Writing

Focusing on RQ1:

27 results from - "AI feedback tools" AND ("higher education" OR "thesis writing") AND ("limitations" OR "benefits") AND (2024)

Focusing on RQ2:

37 results from - "AI-driven feedback" AND ("undergraduate thesis" OR "student writing") AND (personalization OR efficiency OR engagement) AND (quality OR clarity OR coherence) AND (2024)

Focusing on RQ3:

3 results from - "AI real-time feedback" AND (quality OR clarity OR coherence) AND ("academic writing" OR "student writing") AND (2024)

Preliminary Discussion: RQ1 Themes

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RQ1: What are the benefits and limitations of AI as a feedback tool in undergraduate thesis writing?

Benefits:

Enhanced efficiency and scalability of feedback delivery.

Improvements in technical accuracy and consistency in structured feedback.

Provides rapid and scalable solutions for large-scale educational settings.

Limitations:

Struggles with language and cultural nuances.

Requires teacher oversight to address gaps in context and pedagogy.

Limited in providing deeper analytical or creative insights.

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Preliminary Discussion: RQ2 Themes

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RQ2: Does AI-driven feedback improve personalisation, efficiency, and student engagement in the thesis writing process?

Benefits:

Supports personalised learning through tailored, student-specific feedback, enabling individualised educational experiences

Boosts student engagement and self-efficacy by fostering autonomy and confidence in learning

High efficiency in addressing large groups, saving educators significant time and effort

Limitations:

Difficulty in tailoring feedback to diverse learners with unique or complex needs.

Generic responses may cause disengagement, especially for students needing emotionally sensitive feedback.

Limited ability to address emotional and complex individual requirements, impacting engagement.

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Preliminary Discussion: RQ3 Themes

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RQ3: How does real-time AI feedback influence the quality, clarity, and coherence of undergraduate writing?

Benefits:

Enhances Clarity and Coherence in Structured and Rubric-Aligned Writing Tasks

Promotes Iterative Revision Through Targeted and Specific Feedback

Encourages Self-Assessment and Reflective Practices

Limitations:

Limited Effectiveness in Creative or Subjective Writing Tasks

Struggles to Provide Narrative or Contextual Depth

Inconsistent in Addressing Multifaceted or Ambiguous Feedback Needs

Preliminary Discussion: RQ4 Themes

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RQ4: What does the literature reveal about AI's role in enhancing or hindering undergraduate research outcomes?

Benefits:

Promotes Autonomy and Self-Directed Learning

Encourages Integration of AI into Hybrid and Traditional Teaching Models

Improves Accessibility and Feedback Delivery for Large-Scale Educational Settings

Limitations:

Ethical and Cultural Considerations Remain Unresolved

Overreliance on AI Tools Could Reduce Human Involvement in Pedagogy

Risks of Bias in AI-Generated Feedback

Types of Research

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01 **Experiments** test hypotheses by manipulating variables in controlled environments. Researchers design experiments to observe cause-and-effect relationships, collect data, and analyse results to confirm or refute their hypotheses.

02 **Evaluating a Tool** This research assesses the effectiveness, usability, and performance of a specific tool or system. It involves setting evaluation criteria, collecting data through feedback or metrics, and analysing results to determine if the tool meets its intended goals.

03 **Systematic Reviews:** synthesises existing studies on a specific topic to answer a research question. It involves a structured search of the literature, applying inclusion/exclusion criteria, and summarising findings, often through meta-analysis, to provide reliable, evidence-based conclusions.

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