Future-proofing Assessments

AI-Powered Design for Vocational Education

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Setting the scene

The scale of AI Assessment Innovation

1000+

Assessments generated

~30K

Questions generated

~20M

Tokens used

Where it all start

Why this project?

Micro-credentials are growing, but assessment design lags behind.

Manual development is **slow**, inconsistent, and **inequitable**.

Educators are stretched thin.

Learners are diverse – but our assessments often aren't.

What if AI could help – but safely, and with integrity?

Our Development Pillars.

- Human-Centred
- Assessment Journey
- AI Safety & Ethics First
- Quality Assurance

Research questions

01

Can AI generate valid and moderation-ready assessments for VET?

02

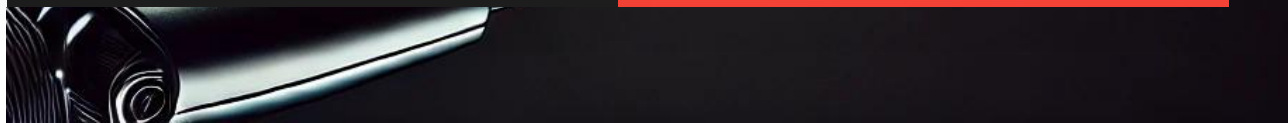
Using prompt engineering, can we apply cognitive science principles to enhance assessments?

03

What are the ethical considerations in using AI in assessment design?

04

Can AI-generated assessments be personalised for learner accessibility and inclusion?



Risks and Mitigations

RISK	MITIGATION
AI hallucinations	Structured prompt design, human review
Cultural bias	Ethical Framework
Privacy	No learner data used, and data sovereignty principles respected

The Approach

Phase 1:
Base Assessment

01 Select the best AI model

02 Develop prompt engineering workflows

03 SME review and development process

04 Submit for moderation

Phase 2:
Personalisation

01 Create Personas

02 Develop prompt engineering workflows

03 SME review and development process

04 Expert Feedback

Claude

comprehensive assessment plan for a specific component of the Trade Essentials Micro-credential that fully meets all NZQA requirements and frameworks.

First, review these key pieces of information:

1. Micro-credential Component Details:
<micro_credential_details>
{{MICRO_CREDENTIAL_DETAILS}}
</micro_credential_details>

2. Example Questions:
<example_questions>
{{EXAMPLE_QUESTIONS}}
</example_questions>

3. Assessment Guidelines:
<assessment_guidelines>
{{ASSESSMENT_GUIDELINES}}
</assessment_guidelines>

Your goal is to produce a detailed planning analysis for the assessment. Follow these steps, wrapping your thought process in <planning_process> tags for each major section:

1. Learning Outcomes:
<planning_process>
- List the key components you need to consider for this section
- List and number each learning outcome
- For each learning outcome, create a table with these columns:
a. Indicative Content (numbered)
b. Brief Summary of Indicative Content
c. Appropriate Question Types
d. Potential Challenges in Assessment
e. Specific Question Ideas (2 per indicative content, linked to the content)
f. Relevant Assessment Criteria
- For each question idea, explicitly state how it relates to the indicative content and assessment criteria
- After creating the table, provide a step-by-step approach for question development, considering the information in the table
</planning_process>

Prompt Engineering

→ Developed a 2 stage method

→ Stage 1 – Analysing, Planning, Scaffolding

```
  </planning_process>

2. Assessment Level:
  <planning_process>
  - List the key components you need to consider for this
section
  - Identify the specific level and its implications for question
difficulty
  - Explain how this level affects question types and cognitive
skills required
  - Provide examples of question stems or structures
appropriate for this level
  </planning_process>

3. Assessment Structure:
  <planning_process>
  - List the key components you need to consider for this
section
  - Determine the total number of questions needed
  - Specify the types of questions to be used
  - Justify the question type distribution in relation to
Assessment Unit Level
  - Create a textual description of a visual representation (e.g.,
pie chart) of the question type distribution
  - Provide a step-by-step process for creating the
distribution of question types
  </planning_process>

4. Adult Learner Considerations:
  <planning_process>
  - List the key components you need to consider for this
```

→ Chain of thought Prompting

→ Use of variables

→ Example Questions
Assessment Guidelines

</planning_process>

5. Assessment Criteria:
<planning_process>
- List the key components you need to consider for this section
- List all assessment criteria
- For each criterion, note how it relates to specific learning outcomes and indicative content
- Create a matrix showing the relationships between criteria, outcomes, and content
</planning_process>

6. Final Review:
<planning_process>
- List the key components you need to consider for this section
- Summarize how the planned assessment covers all aspects of the micro-credential component
- Confirm that all learning outcomes, indicative content, and assessment criteria have been addressed
- Verify that the assessment plan aligns with NZQA guidelines and best practices
- Identify any potential gaps or areas needing further attention
</planning_process>

Present your final planning analysis within <assessment_plan> tags, clearly organizing each section with appropriate subheadings. Ensure that your analysis is comprehensive, covering all aspects mentioned above, and adheres to the NZQA framework and adult learning principles. It's OK for this section to be quite long.

→ Using the plan, we can create
Batches of 5 – 10 assessments at a time

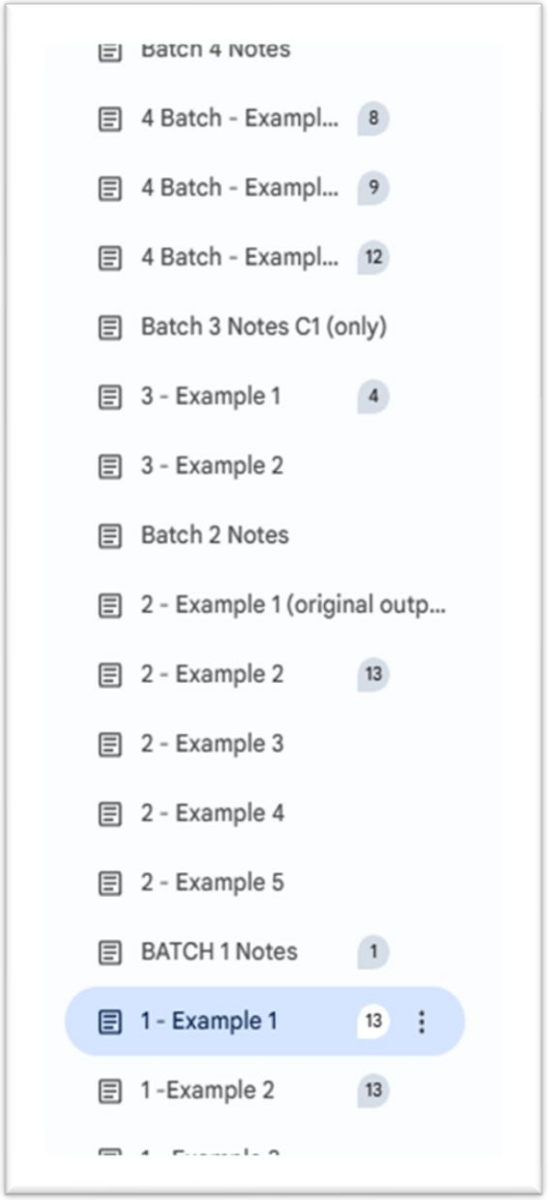
Development Loop (Original)

→ Create an Assessment

→ Send out for review

→ Collect feedback and update

Development Loop (New)



→ Seek rapid initial feedback for a **“Go or No Go”** before a full review.

→ **Flipping feedback:** it’s not what's wrong with it now; it’s what's good about it

Question Examples

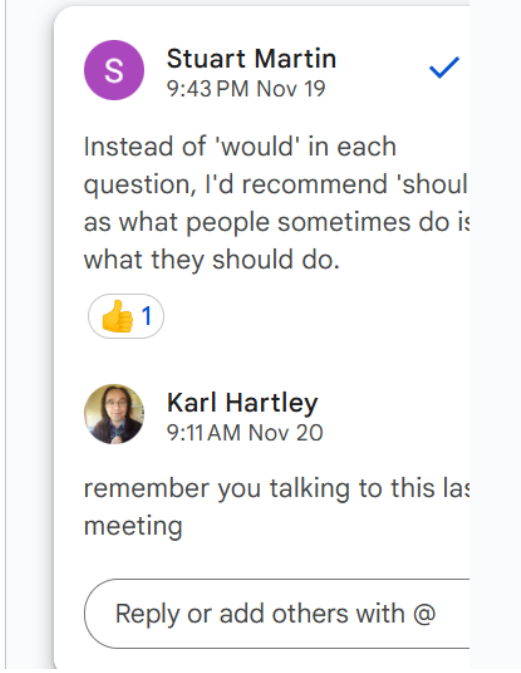
Batch one

Question 1

[Communication in Construction and Engineering Trades] [LO1] [IC1.1] [Scenario-based question]
You are working on a construction site, and a colleague appears unsure about the safety requirements for working at heights. Describe **three specific communication techniques** you would use to ensure they clearly understand the safety requirements and explain **why each technique would be effective**.

Reasoning:

- **Type of question**: Scenario-based question allows learners to demonstrate their understanding of clear communication techniques in a realistic workplace context.
- **NZQA**: Matches Level 2 requirements by requiring learners to describe and apply knowledge in a familiar context. Uses the verb **"describe"**, aligning with Level 2 descriptors.
- **Learning Outcome**: Directly addresses **LO1** regarding effective communication within a team.
- **Indicative Content**: Clear and concise communication techniques; Clarifying information to ensure tasks will be carried out as instructed.
- **Unit Standard**: **US 9677**
- **Unit Name**: **Communicate in a team or group that has an objective**



The Base Assessment was created

→ The Planning Stage was inconsistent, and we used a human-made structure as the scaffold.

→ Unfortunately, failed moderation.

→ Generally positive feedback on the questions.

Personalisation

We developed detailed learner personas to create personalised assessments, focusing on ESL and Autism Level 2.

English as a second language (ESL)

LEARNER PROFILE: KAIA TAUMALOLO

Personal Background

- 20-year-old female from Hamilton, Waikato Region
- Mixed Pacific Islander (Tongan) and Māori (Tainui) heritage
- English as second language (first languages: Tongan and Te Reo Māori)
- Completed NCEA Level 2 with ESOL support
- Strong practical skills developed through cultural traditions and family responsibilities
- Lives with extended family including grandparents who influence her learning approach
- Cousin works as a plumber, which inspired her interest in skilled trades
- Motivated by desire to support family financially and gain stable employment

ESL-Specific Characteristics

- Intermediate English proficiency with stronger listening comprehension than speaking fluency
- Confident in everyday conversational English but struggles with technical terminology
- May require additional processing time when encountering new trade-specific vocabulary
- Sometimes hesitant to ask questions in large groups due to cultural respect for instructors
- Code-switches between languages when explaining concepts to family
- May need visual supports to bridge language gaps in technical instruction
- Occasionally experiences word-finding difficulties under pressure
- Strong non-verbal communication skills and ability to read practical demonstrations

Construction and Engineering Trades Assessment

Personalised for Kaia Taumalolo

ASSESSOR INSTRUCTIONS

Before the Assessment

- Review the personalisation summary to understand Kaia's ESL background (Tongan/Te Reo Māori first languages) and learning needs
- Prepare visual aids for each task: diagrams, picture cards for technical vocabulary, and written task cards
- Have multilingual glossaries available (English-Tongan-Te Reo Māori) for key technical terms
- Ensure printed copies of all verbal instructions are available
- Allow extra time for language processing (approximately 30% additional time per task)
- Prepare demonstration materials for practical tasks

During the Assessment

- Speak clearly and at a moderate pace, pausing between key points
- Use visual demonstrations alongside verbal explanations
- Check understanding frequently using supportive, non-threatening methods
- Allow Kaia to use her preferred language when clarifying understanding
- Provide written backup for all verbal instructions
- Use concrete examples and avoid idioms or abstract language
- Watch for signs of language-related anxiety and offer support
- Accept code-switching between languages as evidence of understanding
- Recognise that hesitation may be language processing, not lack of knowledge

Accommodations Available

- Extended time for verbal responses (up to 50% additional)
- Option to demonstrate understanding through practical demonstration if verbal explanation is challenging
- Access to multilingual technical glossaries throughout assessment
- Small group or one-on-one settings for verbal tasks to reduce language anxiety
- Visual aids and diagrams available for all tasks

Unexpected Find

This was a hallucination

PERSONALISATION SUMMARY

This assessment has been personalised for **Kaia Taumalolo**, an ESL learner with Tongan and Māori heritage, while maintaining full NZQA compliance and assessment integrity.

Specific Personalisation Examples and Changes:

Task 1 - Understanding and Clarifying Instructions:

- Added specific guidance: "Allow Kaia to use her preferred language when clarifying understanding"
- Extended time provision: "Allow extra time for language processing (approximately 30% additional time per task)"
- Language support: "Provide written backup for all verbal instructions"
- Cultural accommodation: "Accept code-switching between languages as evidence of understanding"

Task 2 - Team Contribution:

- Modified instruction format: "This can be from your workplace, training environment, or another relevant context" - broadened to include training scenarios where Kaia may have more experience
- Added option for demonstration rather than purely written response to accommodate different learning styles

Task 3 - Professional Conflict Resolution:

- Simplified language structure while maintaining complexity of content
- Added provision for visual scenario cards to support comprehension
- Cultural consideration: Acknowledges that conflict resolution approaches may vary culturally

Insights

Only minor changes were made to the assessment questions.

It was the assessor's guidance that made the difference

Personalisation was a massive success

- → Overwhelmingly positive feedback
- → Suggestion for personalisation to include the assessors
- → Workplace personalisation, perfect for apprenticeships
- → Opportunities for additional research in RLP.

Challenges

- AI technology is constantly evolving
- AI models have been heavily trained with US assessments and are bias
- AI makes mistakes eventually

What the AI can do GREAT.

Assessment Development

- When prompted, right produces great questions.
- Can contextualise questions by trade/experience
- Great tool to assist in developing assessments

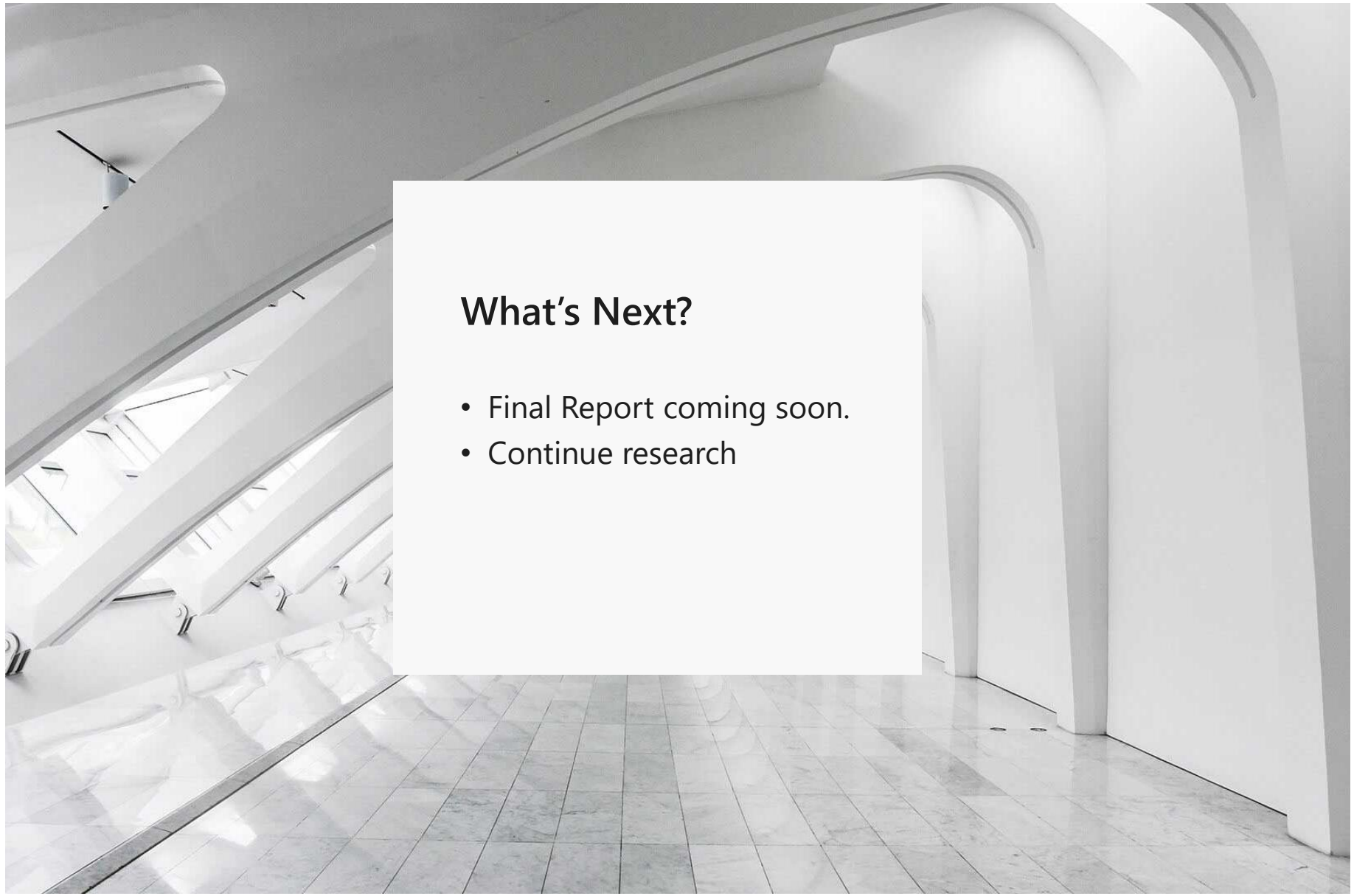
Personalisation Features

- Literacy-adjusted versions
- Industry-specific variations
- Support for neurodiverse learners
- Unlimited possibilities.

Sector Implications & Final Thoughts

- Demonstrates **viable use** of AI in assessment design
- Establishes **moderation-aligned** proof-of-concept that can be improved.
- Builds foundation for **personalisation** at scale
- Aligns with system transformation and **Te Tiriti** obligations

- AI is a tool, **not** a replacement
- Human educators remain **central**
- Equity and ethics must **lead** innovation
- **Change is coming**—let's shape it together



What’s Next?

- Final Report coming soon.
- Continue research

Thank you.

Karl Hartley

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