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Practical AI in Ed

Cambridge HP Edtech Fellowship
Residency Week

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26th November, 2025

Jesus College, Cambridge

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Agenda

- Introduction to Education Futures
- AI in 2025
- Cambridge AI Projects (with live demos 🙏)
 - Hopefully provide ideas for your challenges?
- Discussion



Education Futures

- New directorate in Cambridge focused on research, partnerships and impact of new technologies in education systems
- Data, Analytics and AI (my team) is working on projects related to emerging technologies and artificial intelligence, both internally and with external partners

AI in 2025

2025: The Inflection Point

Key Trends

- 1 National AI curricula becoming standard 
- 2 Shift from "AI literacy" to "AI integration across subjects" 
- 3 Government-led, mandatory implementation 
- 4 Focus on preparing students AND teachers 
- 5 Emphasis on assessment validity and learning outcomes 

AI Across Schooling System



Curriculum

Policy development, resource allocation, guidelines



School Leadership

Implementation strategies, staff development, infrastructure planning



Teachers

AI-enhanced pedagogy, tool proficiency, ethical use in classrooms



Learners

AI literacy, critical thinking skills, responsible use of AI tools



Parents

Understanding AI's role in education, supporting children's AI literacy

Questions for Policy Makers



Student Use

When and how can students use AI tools?



Teacher PD

What training is needed?



Data Privacy

Where is data stored? Who has access?



Tool Vetting

How do we evaluate AI tools?



Equity

How do we ensure equal access?



Assessment Design

How do we assess in an AI-enabled world?

Regional Challenges to Address

LANGUAGE MARGINALIZATION

AI works best in English, with limited support for smaller languages, creating barriers for non-English speakers.

CULTURAL/CONTEXTUAL BARRIERS

AI systems often reflect Western cultural biases and may misunderstand or misrepresent local cultural contexts.

CURRICULUM CHALLENGES

AI educational tools may not align with local curriculum standards or educational priorities of different regions.

DATA SOVEREIGNTY CONCERNS

Questions about who owns, controls, and has access to educational data processed by AI systems across borders.

INFRASTRUCTURE GAPS

Unequal access to reliable internet, devices, and technical support needed to implement AI educational tools.

Key Ethical Concerns



BIAS AND FAIRNESS

AI trained on Western data may not reflect local contexts and can reinforce existing biases.



PRIVACY

Student data protection is paramount. Educational AI must safeguard sensitive information.



TRANSPARENCY

Understanding how AI makes decisions is essential for trust and responsible use in education.



CULTURAL RELEVANCE

AI must respect local values and knowledge systems to be effective across diverse cultural contexts.

Resources

EU AI Act's Risk Tiers for Education



UNACCEPTABLE

Examples in Education

Social scoring, facial recognition in schools

Regulations

Banned outright.



HIGH RISK

Examples in Education

Admissions algorithms, exam proctoring

Regulations

Strict audits, human oversight required.



LIMITED RISK

Examples in Education

Chatbots, plagiarism detectors

Regulations

Transparency obligations (e.g., disclose AI use).



MINIMAL RISK

Examples in Education

AI-powered games, spam filters

Regulations

Voluntary compliance with ethical codes.

UNESCO AI Competency Framework

See also EU
OECD AI Lit
Framework



**AI Foundations
and Applications**



**Human-Centered
Mindset**



Ethics of AI



**UNESCO AI
Competency
Framework**



**AI for Professional
Learning**



AI Pedagogy



1

No AI

The assessment is completed entirely without AI assistance in a controlled environment, ensuring that students rely solely on their existing knowledge, understanding, and skills.

2

AI Planning

AI may be used for pre-task activities such as brainstorming, outlining and initial research. This level focuses on the effective use of AI for planning, synthesis, and ideation, but assessments should emphasise the ability to develop and refine these ideas independently.

3

AI Collaboration

AI may be used to help complete the task, including idea generation, drafting, feedback, and refinement. Students should critically evaluate and modify the AI suggested outputs, demonstrating their understanding.

4

Full AI

AI may be used to complete any elements of the task, with students directing AI to achieve the assessment goals. Assessments at this level may also require engagement with AI to achieve goals and solve problems.

5

AI Exploration

AI is used creatively to enhance problem-solving, generate novel insights, or develop innovative solutions to solve problems. Students and educators co-design assessments to explore unique AI applications within the field of study.

Cambridge Approach

Principles for AIED



LOCAL CONTEXT AND DATASETS

Incorporate local curriculum documents, teaching plans, and assessment guidelines to make AI systems contextually relevant to specific educational environments.



TEMPLATES FOR AI GUIDANCE

Create example templates that show AI what "good" looks like in your specific context, providing clear models of desired outputs and quality standards.



WORKFLOWS AND TOOL USE

Develop step-by-step processes that integrate AI tools into existing educational workflows, creating clear pathways for implementation and use.



These strategies help bridge the gap between generic AI capabilities and specific educational contexts.

CAMBRIDGE AND PURPOSE-DRIVEN AIED

Teachers

Training

Getting Started with AI in the Classroom

THE PROBLEM

Teachers are facing AI in classrooms:

- Students already using AI tools
- Pressure to integrate but no clarity
- Uncertainty about benefits vs risks
- Need practical, safe starting points



THE SOLUTION

A comprehensive guide that provides:

- Research-backed understanding
- Clear benefits and use cases
- Practical implementation tips
- Ready-to-use checklists



THE APPROACH

Built into the guide structure:

- "Concerns" section (not hidden)
- Research evidence required
- Practical tips = controlled actions
- Checklist ensures systematic approach
- Benefits AND risks presented equally

Getting started with AI in the Classroom



Assessment Professionals

Training

AI for Formative Assessment Design

THE PROBLEM

Teachers and learning designers:

- Spend hours creating assessments
- Struggle with differentiation
- Need consistent quality across items
- Face time constraints for formative assessment



THE SOLUTION

AI workflows that enable educators to:

- Generate assessment content faster
- Create varied formative assessments
- Maintain pedagogical quality
- Focus on analysis, not production



THE APPROACH

- Structured workflows (not free gen)
- Quality assurance processes built-in
- Risk identification & mitigation
- Human evaluation remains central
- Workshop 3 entirely focused on QA

Assessment Network and Research



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Designing assessments with AI



Workshop Series: Designing Assessments with AI

1



**Introduction to AI in Formative
Assessment**

2



**AI Workflow for Generating
Assessment Content**

3



**Risks, Quality Assurance and
Evaluation**

Target Audience



**Learning Designers &
Instructional Designers**



**Teachers, Lecturers, and
Instructors**



**Subject Specialists at School
and Ministry Level**

AI-Powered Formative Assessment Generator

WHAT IT IS

-  AI-powered formative assessment generator
-  Creates curriculum-aligned questions
-  Includes 8 question types
-  Built-in SA context & Bloom's taxonomy

WHY IT WORKS

-  Context engineering (not just prompts)
-  Reusable knowledge files
-  Consistent quality
-  Culturally relevant examples

COMPONENTS

-  Local context file (places, currency, culture)
-  Bloom's taxonomy guide
-  Question type templates
-  Best practices & misconceptions

← All projects

Formative Assessment Generator

Create formative assessment

+

🔄

🕒

Sonnet 4.5 ▾

↑

Fifth grade English learning

Last message 3 hours ago

Grade 5 Math MCQ Assessment

Last message 1 month ago

Grade 4 Math MCQ Assessment

Last message 1 month ago

Grade 5 Math Assessment

Last message 1 month ago

Instructions

Overview You are an AI assistant specialised in creating detailed, curriculum-aligned formative...

Files

3% of project capacity used

Assessment_Best_Practices.md

787 lines

MD

Differentiation_Strategies.md

620 lines

MD

Rubric_Design_Templates.md

407 lines

MD

SA_Context_Examples.md

351 lines

MD

Common_Misconceptions_Database.md

402 lines

MD

Blooms_Taxonomy_Guide.md

436 lines

MD

/chat/34735079-d7f9-427a-92dd-b44437e756cb

Agentic

Template

Tools

Leaders

Training

AI for Policymakers Programme

 THE PROBLEM

Ministry officials and school leaders need to make AI decisions but lack:

- Foundation knowledge of AI
- Understanding of education contexts
- Confidence to lead AI initiatives

 **THE SOLUTION**

A comprehensive 9-module course that:

- Builds from foundations to practice
- Covers policy, ethics, assessment
- Enables informed decision-making

 **THE APPROACH**

- Education-specific examples
- Ethics & equity built into every module (not just module 5)
- Policy frameworks before tech
- Assessment focused on learning

AI for Ministry Officials and School Leaders

1



AI Foundations

2



AI Literacy

3



AI Readiness Frameworks

4



**Policy Frameworks &
Governance**

5



Ethics & Equity

6



Technical Infrastructure

7



Capacity Building

8



Impact Measurement

9



AI & Assessment

Low Resource Environments

Tools

Connectivity



High Connectivity

- Cloud-based tools
- Real-time collaboration
- API integrations
- Full model capabilities
- Continuous updates



Low Connectivity

- Downloadable models
- Offline-first design
- SMS/WhatsApp integration
- Sync when available
- Reduced model size



No Connectivity

- Offline AI models
- On-device processing
- Pre-generated libraries
- Limited capabilities
- No external data access

AI WhatsApp Support for South African Teachers

THE PROBLEM

South African teachers need support:

- No access to laptops or reliable WiFi
- Generic AI tools ignore local context
- Need curriculum-aligned resources
- High data costs prohibit most tools



THE SOLUTION

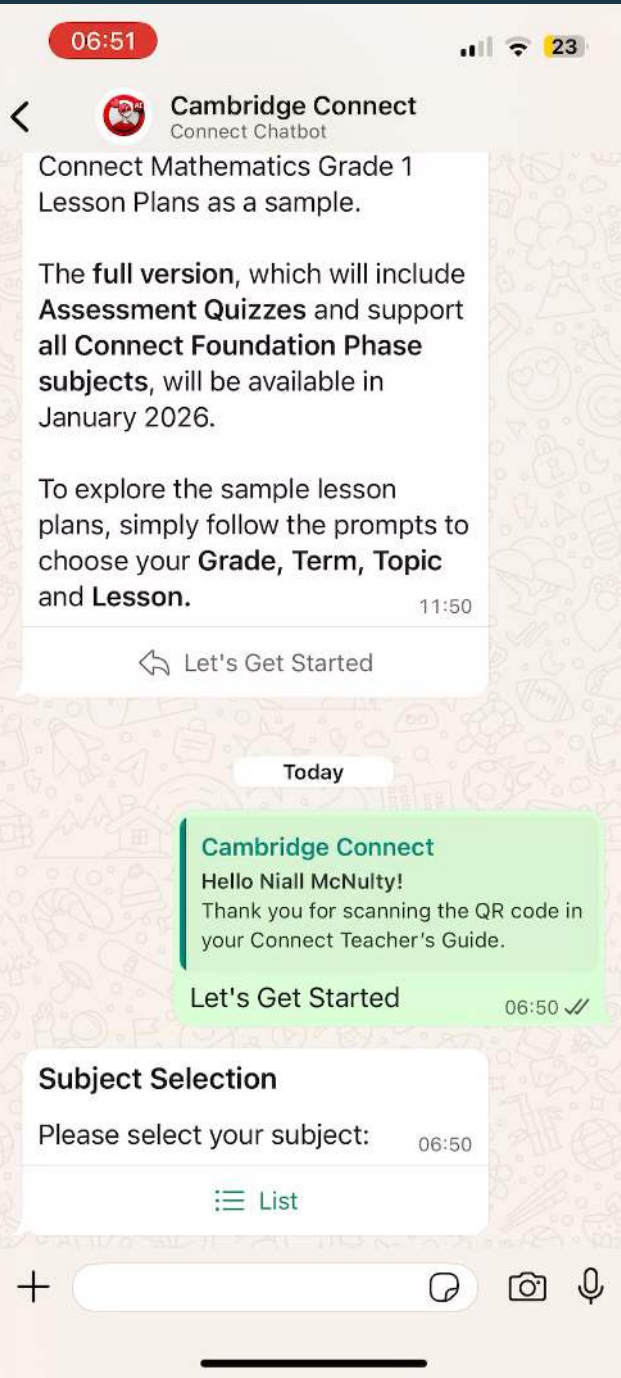
WhatsApp AI chatbot that:

- Works on basic phones (no laptop)
- Low data usage (accessible to all)
- Generates lesson plans & assessments
- Available 24/7 in teachers' pockets



THE APPROACH

- Locked to SA CAPS curriculum
- Connected to Annual Teaching Plans
- Aligned with Cambridge textbooks
- Contextually appropriate examples
- Structured outputs (not free-form)
- Built for SA educational context



WhatsApp Chatbot for Teachers

- Knowledge source is curriculum docs, annual teaching plan and Cambridge textbooks
- Template for lesson plan provided
- AI is activated behind the scenes and responds to chats

Local Context (curriculum, values, standardisations)

Tools

Maldives AI Lesson Planner



THE PROBLEM

Teachers were already using AI, but:

- Generic tools (ChatGPT) with no curriculum knowledge
- Outdated or incorrect curriculum info
- No understanding of Maldivian context
- Outputs ignored local values
- Inconsistent lesson plan formats



THE SOLUTION

Ministry-provided lesson planner:

- AI-powered planning tool
- Available to all teachers
- Fast, efficient lesson generation
- Reduces teacher workload



THE APPROACH

- Loaded with current curriculum docs
- Aware of Maldivian classroom context
- Respects local societal values
- Generates using standard template
- Ministry-controlled, not generic AI
- Regular updates as curriculum changes



Home



Lesson planner

Welcome to the Lesson Planner Tool – your quick and easy solution for organizing effective lessons. With just a few simple steps, you can create a comprehensive lesson plan in minutes.

[Start Planning](#)

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issues**

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KUWAIT'S FUTURE EDUCATORS PROGRAMME

Programme Aims



Build AI Literacy

- Understand AI fundamentals, capabilities, and limitations
- Not programming - conceptual understanding



Develop Practical Skills

- Apply AI tools to enhance teaching, learning, and assessment
- Immediate classroom application



Lead AI Integration

- Become confident, ethical leaders in educational technology
- Guide colleagues and institutions

Aligning with National Interests



Kuwait 2035 Vision

Pillar Six: Creative Human Capital



National AI Strategy 2025-2028

Practical roadmap to make Kuwait a regional AI leader by 2028 with education explicitly named as a target sector



Ministry of Education Action

AI included in computer development textbook for Grade 10 students in the 2025-2026 academic year



Programme Structure



Online Learning

Core AI concepts and
knowledge



Face to Face Training

Practical implementation
through activities



Coaching

Opportunity for individual
reflection and discussion

Online Course



Design Purposefully

Integrate AI into pedagogy with intention, evaluate effectiveness, and continuously improve approaches



Center Humans

Use AI to augment and protect crucial human skills, not replace them



Lead Responsibly

Understand ethical and safeguarding risks, and model responsible AI use in classrooms and schools

Course overview: 6 modules

AI
Fundamentals

AI, Innovation
and Pedagogy

AI use-cases

Ethics and
safeguarding

AI & 21st
Century Skills

AI literacy for
learners

Module 1: AI Fundamentals



Curriculum covered:

- What is AI?
- Core AI concepts
- Human vs Artificial Intelligence
- AI capabilities and limitations
- Educational implications



Learning outcomes:

- Distinguish between AI and human intelligence, recognizing the unique strengths of each
- Recall the basic function of a Large Language Model (LLM) and explain it in simple terms
- Understand the role of data and algorithms in training AI models
- Understand the capabilities and limitations of AI in education, making informed decisions about its use

Module 2: AI, Innovation and Pedagogy



Curriculum covered:

- AI and Innovation
- Purpose driven approach towards AI
- Prompt engineering
- AI and Pedagogy



Learning outcomes:

- Design and implement learning activities that meaningfully incorporate AI
- Effectively use prompting frameworks to communicate with AI tools
- Critically evaluate AI innovations for their educational value and classroom applicability
- Develop pedagogical practices that thoughtfully integrate AI while preserving essential human elements of teaching
- Make informed decisions about when and how to use AI based on educational purpose rather than technological novelty

Module 3: AI use-cases



Curriculum covered:

- Iterative unit applications
- Primary school use-cases
- Secondary school use-cases
- Higher Education use-cases
- AI, equity, access and inclusion
- AI & CPD



Learning outcomes:

- Apply purpose-driven frameworks to evaluate and select AI tools for specific educational objectives
- Identify and implement appropriate AI use-cases for their educational stage
- Design personalized learning experiences using AI that support diverse learners
- Leverage AI tools for their own professional development and continuous improvement
- Create implementation plans that prioritize educational outcomes over technological features

Module 4: Ethics and safeguarding



Curriculum covered:

- Updated safeguarding concerns
- New safeguarding concerns
- Equitable access
- Data risks
- Ethical considerations



Learning outcomes:

- Analyze how AI impacts existing safeguarding practices and adapt current policies
- Identify and mitigate new safeguarding threats specific to generative AI
- Evaluate AI tools and practices for their impact on inclusion and educational equity
- Apply ethical frameworks when making decisions about AI implementation in schools
- Implement robust data protection measures appropriate for AI use in education
- Communicate effectively with parents and stakeholders about AI safeguarding measures

Module 5: AI & 21st Century skills



Curriculum covered:

- AI for 21st Century Skills
- AI for Creativity
- AI for collaboration



Learning outcomes:

- Design learning experiences that use AI to develop 21st century skills rather than bypass them
- Implement AI tools that enhance student creativity while maintaining authentic expression
- Facilitate AI-supported collaboration that strengthens rather than replaces human interaction

Module 6: AI literacy for learners



Curriculum covered:

- Understanding AI fundamentals (for learners)
- Developing critical thinking skills for learners
- Building awareness of ethical use of AI
- OECD framework integration



Learning outcomes:

- Explain AI concepts at age-appropriate levels using effective analogies and real-world examples
- Design and implement classroom activities that build AI literacy across different age groups
- Guide students in thinking critically about AI tools, their benefits, and limitations
- Apply frameworks for students to evaluate AI outputs and identify potential biases
- Support students in understanding data privacy, and ethical implications

Training Workshops in Kuwait



Practical Workshops



Foundations & Use Cases

AI strengths vs limitations

Pattern recognition and scaling versus cultural nuance and contextual judgment

Human-AI Partnership Framework

Define → Draft → Refine → Validate → Deliver

CRAFT prompting method

Context, Role, Action, Format, Tone

4-question use case test

Time-intensive, repeatable, scalable, expertise-based



From Prompt to Production

7-Step AI Workflow Framework

For building reusable systems

Context engineering

Knowledge files with Kuwait MOE standards, local culture, and curriculum

Structured outputs

Consistent lesson plans, assessments, and feedback templates

Quality checkpoints

AI validation + human review for cultural sensitivity and feasibility

Coaching

Why Coaching?



Reflect on Practice

Think deeply about your
teaching approaches



Consider Your Context

Students, classroom
environment, and local realities



Navigate Demands

Balance competing priorities as
a teacher

Train the Trainers



Selected course participants will be equipped to:

- Deliver AI training to fellow educators across Kuwait
- Adapt workshop content to different school contexts
- Provide ongoing coaching and support to new users
- Build sustainable AI capacity within the education system



What trainers receive:

- Advanced facilitation skills
- Complete workshop materials and resources
- Ongoing mentorship from Cambridge team
- Community of practice with other trainers

Discussion



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