# Transcript of Enhancing Digital Literacy in Qatar: A Framework for Personalized AI Educational Agents

**Presented by: Noora Alboinin, MSc**

**Artificial Intelligence Researcher | University of Essex**

**Student ID: 28234**

## Contents

Welcome to my presentation titled *Enhancing Digital Literacy in Qatar: A Framework for Personalized AI Educational Agents*.

## Slide 1 – Introduction

As a computer science teacher in Qatar, I've witnessed both the potential and the limitations of current digital literacy tools in classrooms. This experience has motivated me to explore how artificial intelligence can bridge these gaps and enhance learning quality on a national scale.

In recent years, Qatar has made significant investments in digital education. According to the National Cyber Security Agency (2024), over 140,000 students across 200 Qatari schools participated in national programmes for digital literacy and cybersecurity in 2023.

This impressive scale reflects the government's commitment to equipping young learners with 21st-century skills from an early age.

However, while these efforts have expanded access to ICT tools, they often fall short in personalisation and adaptability. The technologies used in classrooms are typically not responsive to individual differences—an issue raised in Luckin et al. (2016) and Beetham and Sharpe (2019).

This research addresses that gap. Specifically, it explores how gamified intelligent agents, powered by AI, can deliver tailored learning experiences that adjust dynamically to a student's pace, understanding, and motivation.

By aligning with Qatar's Vision 2030 (General Secretariat for Development Planning, 2008), which prioritises digital transformation and human capital development, this project proposes a theoretical framework for designing culturally relevant, ethical, and teaching-focused sound AI tools to support digital literacy in primary education.

## Slide 2 – Research Problem

This slide highlights the three core problems this research seeks to address.

First, we identify a *personalisation gap*. While Qatar has made significant strides in providing digital tools to schools, these tools are typically static and not adaptive. For instance, platforms like Microsoft Office or Scratch are widely used, but they do not adjust to a student's individual pace, prior knowledge, or motivation. As noted by Beetham and Sharpe (2019), effective digital teaching methods requires systems that respond to learner variability—something currently missing from Qatar's primary digital curriculum.

Second, there are significant *tool limitations*. Many platforms assume a one-size-fits-all model and do not support differentiated instruction. This results in a mismatch between learner needs and system functionality, particularly for students who struggle with foundational digital skills or who learn at different rates (Holmes, Bialik and Fadel, 2019).

Third, there is a *strategic alignment issue*. Although Qatar's Vision 2030 and the National ICT Framework emphasise the importance of personalised, lifelong learning, many current implementations in classrooms are not aligned with these long-term goals

(General Secretariat for Development Planning, 2008; Ministry of Education and Higher Education, 2017).

This research responds to these challenges by proposing an AI-powered educational agent framework that is both adaptive and culturally grounded, aiming to bridge the gap between current tool limitations and the national strategic vision.

While Qatar Vision 2030 and the MOEHE ICT Framework promote innovation and digital integration, critics argue that these policies remain high-level and technocratic, often overlooking micro-level implementation challenges in classrooms (Al-Ajlan and Al-Murbate, 2018). Teachers face limited training in personalised AI systems, and the structure for adaptive technologies varies significantly across public schools. This disconnect between strategic goals and ground-level realities must be addressed to ensure policy translates into tangible teaching methods benefits.

## Slide 3 – Research Questions

This study is driven by one overarching question:

*How can gamified, dual-language AI agents enhance digital literacy development among Grade 6 students in Qatar?*

To investigate this, I explore 2 sub-questions:

Gamification Integration – *Which gamification elements are most effective in increasing motivation and engagement in digital literacy learning?*

Teaching Strategies – *How can bilingual (Arabic-English) interface design influence the accessibility and cultural relevance of AI-supported learning in Qatari primary classrooms?*

## Slide 4 – Aims and Objectives

This research aims to design and critically evaluate a theoretical framework for implementing gamified, bilingual AI agents to support digital literacy in Grade 6 Qatari classrooms.

The project is conceptual and theoretical in nature, aiming to explore how Arabic-English language design and game-based learning can enhance student engagement and accessibility in Qatar's national digital literacy curriculum.

The focus is narrowed to two interrelated innovations: gamification and bilingual interface design—two areas that are currently underdeveloped in AI-powered educational tools in Qatar (Hamari et al., 2014; Voogt and Roblin, 2012).

## Slide 5 – Literature Overview

This framework draws on key strands of literature that inform the design of gamified, bilingual AI agents for digital literacy in Qatar.

First, Vygotsky's sociocultural theory (1978) emphasises the role of social interaction and cultural tools in learning. This foundation supports the use of AI agents as scaffolding tools within culturally shaped educational contexts.

In terms of gamification, Hamari et al. (2014) demonstrate that game elements such as points, badges, and feedback loops can significantly enhance motivation and engagement in educational settings. Domínguez et al. (2013) extend this by highlighting how gamification improves learning outcomes when thoughtfully integrated into instructional design.

With respect to bilingual learning, Voogt and Roblin (2012) and Passey (2019) argue for digital literacy frameworks that reflect linguistic diversity and 21st-century competencies. Their work underpins the need for AI systems to support Arabic-English dual-language environments, particularly in multilingual regions like Qatar.

The framework is also aligned with Qatar's national education strategy, as outlined by MOEHE (2017) and Qatar Vision 2030, both of which call for enhanced ICT integration and digital skill development. However, while these policies are ambitious, they do not yet address the role of AI agents or gamified learning models in formal curricula.

Collectively, these sources support the development of an AI-based educational tool that integrates motivational design and linguistic accessibility, while addressing the teaching methods and relative needs of Grade 6 Qatari learners.

Despite this growing body of literature, there remains a notable gap in applied frameworks that combine both gamified design and bilingual AI interaction specifically tailored to Gulf-based primary education settings.

While gamification is widely praised for its motivational benefits (Hamari et al., 2014), critics such as Deterding et al. (2011) argue that its effectiveness heavily depends on context and learner profiles. Overemphasis on extrinsic rewards like badges and points can lead to superficial engagement or dependency, particularly if not embedded in meaningful teaching methods goals.

Similarly, although bilingual interface design enhances inclusivity, it presents usability challenges. For example, users may experience cognitive load when switching between Arabic and English UI elements—especially if translations are inconsistent or not

culturally localised (Voogt and Roblin, 2012). These opposing perspectives underscore the need for careful design and user testing of bilingual AI agents in multilingual classrooms.

## Slide 6 – Methodology

This study adopts a Design Science Research (DSR) approach, as outlined by Hevner et al. (2004), to develop a theoretical framework for enhancing digital literacy through gamified, bilingual AI agents in Qatari primary education.

The methodology is structured into three phases:

Literature Review – A focused analysis of research on game-based learning and bilingual AI design to extract tea, motivational, and accessibility principles relevant to Qatar's context (Levy & Ellis, 2006; Hamari et al., 2014).

Framework Construction – Drawing on DSR, a conceptual model is designed that integrates gamification features (e.g. badges, levels, avatars) and dual-language interface elements tailored for Grade 6 learners in bilingual classrooms (Hevner et al., 2004).

FEDS Evaluation – The proposed model is evaluated using the Framework for Evaluation in Design Science (FEDS) by Venable et al. (2016), ensuring the framework meets descriptive relevance, design quality, and alignment with local educational needs.

Limitations

While this conceptual approach allows for strong theoretical development, it lacks classroom-based implementation or user testing. The absence of empirical validation

limits insights into real learner engagement. Additionally, while gamification strategies may motivate students, overreliance on extrinsic rewards can risk shallow engagement (Hamari et al., 2014). Finally, designing AI systems that effectively support Arabic-English language switching remains technically and teaching methods challenging. These limitations suggest the need for future empirical piloting, linguistic testing, and stakeholder feedback.

Another critical limitation is the reliance on a conceptual framework without stakeholder co-design. While design science enables theoretical exploration, excluding educators or learners from the early design stages may reduce contextual fit and usability (Venable, Pries-Heje and Baskerville, 2016). Classroom validation, pilot testing, and participatory design are essential future steps to ensure the framework reflects actual user needs, not just theoretical ideals.

## Slide 7 – Ethical Considerations

This framework integrates key ethical design principles alongside regional and international regulatory frameworks to ensure responsible AI implementation in education.

First, we prioritise data privacy by safeguarding student information with secure storage and clear consent protocols. This aligns with GDPR principles for transparency and the Qatar Data Privacy Law (Law No. 13 of 2016), ensuring local compliance and protection of learner rights.

Second, fairness addresses algorithmic bias. The aim is to provide equitable learning experiences across diverse backgrounds and abilities, a concern echoed in Porayska-

Pomsta et al.'s (2023) recommendations for culturally responsive AI systems in education.

Third, we emphasise child protection, implementing age-appropriate interactions and filters to prevent harmful content exposure. This includes regular ethical audits and active parental involvement in system governance.

To support these principles, we also recommend cultural sensitivity assessments, particularly relevant for Middle Eastern educational contexts where bilingual and contextual appropriateness are essential.

By grounding the framework in these ethical and legal standards, we ensure that AI-based personalisation supports safe, fair, and inclusive digital learning environments.

## Slide 8 – Proposed Artefact

This conceptual artefact proposes an AI-driven educational assistant tailored for Qatar's bilingual primary classrooms. It incorporates three key design features:

Gamification elements such as badges, avatars, and progress tracking foster motivation and sustained engagement (Hamari et al., 2014).

Adaptive feedback mechanisms allow AI agents to deliver personalised learning paths by analysing student performance trends and preferences, supporting differentiated instruction (Hevner et al., 2004).

Dual language support is provided through a fully integrated Arabic–English interface, ensuring accessibility and cultural relevance for linguistically diverse learners in Qatar.

Collectively, these features form a theoretical model that enhances digital literacy, promotes inclusive learning, and facilitates AI-assisted classroom interaction.

## Slide 9 – Timeline

The proposed project spans ten weeks.

Weeks 1–2 focus on a comprehensive literature review and gap analysis to identify opportunities for AI-enhanced digital literacy in bilingual classrooms.

Weeks 3–4 involve the development of the initial conceptual framework, drawing from Design Science Research principles to establish foundational design features.

Weeks 5–6 aim to align the framework with Qatar's cultural and educational context, ensuring local relevance and applicability.

Weeks 7–8 assess ethical considerations and responsible AI implementation, incorporating data privacy, fairness, and child protection guidelines.

Week 9 is dedicated to framework refinement and documentation, ensuring conceptual clarity and usability.

Week 10 concludes the project with final review and submission of the completed research artefact.

## Slide 10 – Conclusion

In conclusion, this conceptual proposal introduces a culturally responsive and ethically grounded framework for implementing AI-driven educational agents in Qatari primary classrooms.

It delivers three core contributions:

A theoretical contribution that addresses current gaps in context-aware AI learning design by proposing a personalised, gamified, and linguistically inclusive framework (Hevner et al., 2004; Hamari et al., 2014).

National alignment with Qatar Vision 2030 by enhancing digital literacy and fostering innovative, technology-enhanced teaching methods practices (General Secretariat for Development Planning, 2008).

A strong emphasis on ethical awareness, establishing child-centred guidelines that prioritise privacy, safety, and cultural appropriateness in educational AI systems (Porayska-Pomsta et al., 2023; European Commission, 2019).

Though conceptual, the framework sets a clear foundation for future empirical research, ethical implementation, and stakeholder-driven development in bilingual, culturally diverse learning environments

Thank you for your time and attention. As a computer science educator in Qatar, this research reflects both my academic inquiry and my personal commitment to improving the quality of digital learning for young learners. I believe that with thoughtful design, ethical implementation, and cultural relevance, AI-powered educational agents can play a vital role in shaping the future of inclusive and effective digital literacy education in our region.

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