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AI Literacy Readiness in Sindh's Secondary English Curriculum: A Qualitative Document Analysis

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Abstract

This study examines the alignment between Sindh's secondary English curriculum and the competencies necessary for artificial intelligence (AI) preparedness, emphasizing critical thinking (CT) and digital literacy (DL). This research employs a qualitative document analysis framework to investigate the policy objectives of the Directorate of Curriculum, Assessment & Research (DCAR), the instructional resources of the Sindh Textbook Board (STBB), and the evaluation methodologies of the Board of Secondary Education Karachi (BSEK).Findings reveal a profound misalignment between the visionary policies promoting higher-order thinking and the classroom realities that remain dominated by rote learning. Approximately 92% of examined comprehension questions were recall-based, with negligible emphasis on analytical or evaluative skills. Moreover, digital literacy concepts were virtually absent, suggesting an outdated curricular model unfit for the cognitive demands of the AI era. The study concludes that the systemic gap termed the "AI Preparedness Gap" stems from structural disconnection among policy, pedagogy, and assessment. Recommendations include immediate examination reform to embed higher-order questions, medium-term teacher training in digital pedagogy, and long-term policy synchronization between DCAR and STBB. This study underscores the urgent need for curriculum reform to equip learners with the cognitive and digital competencies essential for thriving in an AI-driven society.

Keywords: AI literacy, critical thinking, digital literacy, curriculum analysis, Sindh education, Bloom's taxonomy

Introduction

The dawn of the Fourth Industrial Revolution has transformed what it means to be literate in the 21st century. Literacy is no longer limited to reading, writing, and arithmetic it now includes the ability to think critically, question information, and interact meaningfully with intelligent systems that shape our daily lives (Schwab, 2017; UNESCO, 2023). The rise of Generative AI tools such as ChatGPT, Gemini, and Claude has accelerated this shift, moving the human role from one of simple information retrieval to interpretation, creativity, and ethical decision-making (Floridi, 2022). In this new landscape, literacy is a multidimensional skill: individuals must not only access and understand information but also evaluate the reliability of AI-generated content and use it responsibly.For developing nations like Pakistan and particularly the province of Sindh this transformation presents both an opportunity and a challenge. It requires a fundamental rethinking of what education should accomplish. While the Sindh Directorate of

Curriculum, Assessment & Research (DCAR) has formally recognized the importance of critical thinking, communication, and digital literacy in its policy frameworks, these ideals are rarely realized in classrooms. The Sindh Textbook Board (STBB), which shapes the day-to-day instructional experience, continues to emphasize rote memorization over reasoning or inquiry. This study identifies this systemic disconnect as the **AI Literacy Readiness Gap** a structural deficiency that limits students' ability to develop the linguistic, analytical, and ethical competencies needed to navigate, evaluate, and collaborate with AI technologies. The current work, therefore, examines the extent to which Sindh's secondary English curriculum prepares learners for AI literacy through a qualitative document analysis of policy, textbooks, and assessment practices.

Research Questions

1. To what extent do Sindh's secondary English textbooks integrate Critical Thinking and Digital Literacy competencies?
2. How aligned are the textbook activities and assessments with DCAR's stated curriculum goals?
3. What systemic factors contribute to the AI Preparedness Gap in Sindh's education system?

Literature Review

Critical Thinking in Education

Critical Thinking (CT) is widely recognized as one of the cornerstones of 21st-century education and a fundamental prerequisite for preparing learners to participate effectively in modern knowledge economies (Facione, 2011). The ability to think critically allows students not only to recall facts but to interpret, analyze, and evaluate information from multiple perspectives. Bloom's Revised Taxonomy (Anderson &Krathwohl, 2001) provides a structured hierarchy of thinking skills that educators can use to cultivate deeper learning moving from lower-order tasks such as remembering and understanding to higher-order skills such as analyzing, evaluating, and creating. Research across developing contexts has consistently shown that educational systems which prioritize high-stakes testing and rote memorization often hinder the development of CT (Shah &Ud Din, 2021; Niazi et al., 2022). In Pakistan, classroom practices remain heavily influenced by examination-driven policies, where success is measured by the ability to reproduce content rather than by the demonstration of reasoning or inquiry (Khan & Qureshi, 2023). Teachers, operating under institutional pressure to produce high pass rates, often neglect activities that promote open discussion, argumentation, or creative problem-solving. Consequently, students become passive recipients of information instead of active constructors of knowledge. This stagnation not only limits academic achievement but also undermines students' readiness to engage with the dynamic, problem-based learning environments that AI-driven societies demand.

Digital Literacy and Curriculum Reform

Digital literacy (DL), as defined by UNESCO (2021, 2023), encompasses a wide range of cognitive and social skills required to access, evaluate, create, and ethically use digital information. It extends beyond technical proficiency to include the critical awareness necessary for navigating online spaces responsibly. In modern educational discourse, DL has emerged as a core life skill, directly linked to employability, social inclusion, and democratic participation (OECD, 2022). In many developing countries, however, digital literacy remains a peripheral concern in formal schooling. Research from South Asia (Ahmed & Malik, 2022) highlights that despite the growing availability of digital tools, students rarely receive structured guidance on evaluating online sources or identifying misinformation. As a result, learners develop surface-level familiarity with technology capable of using social media or mobile apps but often lack the analytical ability to distinguish between credible and false digital content. In Pakistan, particularly in public sector schools, the absence of integrated DL instruction perpetuates a digital divide where

students from privileged backgrounds acquire these skills informally, while others remain digitally illiterate in an educational sense. Integrating DL within the English language curriculum could bridge this gap by combining language learning with critical engagement with digital texts, fostering both linguistic and informational competence.

AI Literacy as the Next Frontier

Artificial Intelligence (AI) literacy has recently been recognized as a vital dimension of educational preparedness. It expands upon digital literacy by emphasizing understanding how AI systems work, how to evaluate their outputs, and how to use them responsibly and ethically (Long &Magerko, 2020; Han et al., 2022). As AI applications increasingly influence communication, creativity, and decision-making, students must learn to question the biases, limitations, and social implications of algorithmic systems. Global educational organizations such as Digital Promise (2023) advocate for embedding AI literacy into school curricula to ensure that learners are not merely users of AI but informed participants in shaping its ethical and practical applications. In the context of Sindh, AI literacy remains largely absent from curriculum discourse, even though students are frequently exposed to AI-powered tools in their everyday digital lives. Without guided instruction on how these technologies function and how to interpret or challenge AI-generated information, learners risk becoming passive consumers of algorithmic knowledge. For Pakistan to move toward AI readiness, AI literacy must be introduced not as a technical specialty but as a cross-disciplinary competency embedded within subjects like English, where communication, reasoning, and ethical reflection intersect.

Pakistan's Educational Context

Pakistan's education system has long been characterized by a persistent gap between policy aspirations and classroom realities. Several studies have documented the challenges of translating progressive curricular reforms into effective practice (Niazi et al., 2022; Shah &Ud Din, 2021). The fragmentation between the Directorate of Curriculum, Assessment & Research (DCAR) and the Sindh Textbook Board (STBB) often leads to inconsistencies between intended learning outcomes and the actual instructional materials available to teachers. Additionally, professional development opportunities for educators remain limited, leaving many without the pedagogical tools or digital competence necessary to implement new frameworks (Khan & Qureshi, 2023). The reliance on outdated textbooks and exam-centered teaching perpetuates a culture of rote memorization, constraining both teachers and students. In such a context, even well-designed policies emphasizing 21st-century skills struggle to make an impact at the classroom level. Addressing these systemic barriers requires a holistic approach that synchronizes curriculum development, textbook production, teacher training, and assessment reform. Understanding these challenges within the broader framework of AI literacy readiness provides a timely opportunity to reimagine English education in Sindh as a platform for cultivating critical, creative, and technologically literate citizens.

Theoretical Framework

This study proposes a **Cognitive Resistance Model**, integrating three frameworks: Bloom's Revised Taxonomy (Anderson &Krathwohl, 2001), UNESCO's Digital Literacy Framework (2021), and the AI Literacy Framework (Han et al., 2022). The model assumes that AI literacy depends on the foundational acquisition of CT and DL.

- **Critical Thinking (CT)**: the ability to analyze, evaluate, and create knowledge rather than memorize it (Facione, 2011).
- **Digital Literacy (DL)**: the competence to access, evaluate, and ethically use online information (UNESCO, 2023).

- **AI Literacy**: understanding how AI works, evaluating its outputs, and using it responsibly (Long &Magerko, 2020).

These layers are interdependent students cannot develop AI literacy without CT and DL. The Sindh education system's neglect of CT and DL therefore blocks the development of AI readiness.

Methodology

Research Design

A **Qualitative Document Analysis** approach (Bowen, 2009) was employed to examine three artifacts: DCAR English Curriculum (Grades IX–X, 2024), STBB English Textbooks (Grades 9 and 10), and BSEK examination papers (2021–2023). These documents represent the policy, instructional, and assessment levels of the educational system.

Sampling and Data Collection

Purposive sampling ensured depth over breadth. Documents were obtained from official DCAR and STBB repositories, and verified for authenticity. Data collection spanned January–August 2024.

Data Analysis

Four stages of coding were followed:

1. **Curriculum-Textbook Mapping:** Each curriculum learning outcome was checked for representation in textbooks.
2. **Cognitive Demand Coding:** 125 comprehension questions were coded according to Bloom's Revised Taxonomy.
3. **DL and AI Literacy Coding:** Content was scanned for digital/AI literacy keywords and activities.
4. **Thematic Synthesis:** Emerging themes on policy-practice gaps and assessment influence were derived.

Reliability and Validity

Reliability was enhanced through double-coding by two independent reviewers (Cohen's $\kappa = 0.82$). Validity was ensured by triangulating data across the three document types and maintaining an audit trail of coding decisions (Lincoln &Guba, 1985). Limitations include the exclusion of classroom observation and teacher interviews.

Findings

Policy Alignment

The DCAR English Curriculum (2024) articulates progressive goals consistent with global standards, emphasizing analytical reading, digital engagement, and ethical communication (DCAR, 2024). However, these goals are not operationalized in textbooks.

Textbook Analysis

Analysis revealed that **92%** of comprehension questions targeted lower-order thinking (Remember/Understand), **8%** mid-level (Apply/Analyze), and **0%** high-level (Evaluate/Create). No digital literacy activities (e.g., online research, evaluating web sources) were identified. Textbooks depict communication as print-based, ignoring contemporary digital forms such as blogs or emails.

Assessment Practices

BSEK examination papers mirrored textbook content, reinforcing rote learning. This "assessments washback" effect compels teachers to teach to the test, perpetuating the AI Preparedness Gap.

Discussion

The findings indicate that Sindh's secondary English curriculum cultivates what this study terms the **Dependent Mind** students conditioned to recall rather than to question, echoing Freire's (1970) critique of the "banking model" of education. Learners shaped by such a system remain cognitively unprepared for AI-mediated environments that demand interpretation, evaluation, and ethical decision-making. When students are rewarded for memorization instead of inquiry, they are less capable of identifying algorithmic bias, verifying AI-generated outputs, or engaging critically with digital information. The widespread assumption that today's youth are inherently "digital natives" (Kirschner & De Bruyckere, 2017) further obscures the depth of this problem. Access to technology does not translate to digital literacy or critical engagement. In Sindh, students may use smartphones daily but often lack the cognitive strategies to evaluate online information or to distinguish between human and algorithmic authorship.These patterns are consistent with evidence from other low-resource educational contexts, where exam-oriented systems suppress higher-order thinking and reinforce dependency (Shah & Ud Din, 2021; Niazi et al., 2022). The persistent structural disconnect between policy and implementation particularly between the Directorate of Curriculum, Assessment & Research (DCAR) and the Sindh Textbook Board (STBB)—intensifies the AI Literacy Readiness Gap. Addressing this requires not only curriculum alignment but also targeted teacher development programs that promote inquiry-based and digitally enhanced pedagogy. Ultimately, cultivating independent, critically aware learners is essential if Sindh's education system is to move beyond rote instruction and prepare students for responsible participation in an AI-driven world.

Recommendations

Phase	Recommendation	Responsible Body	Expected Outcome
Immediate	Introduce source-based questions in English exams to trigger assessment reform	BSEK/ DCAR	Encourage teaching of source evaluation and bias detection
Medium-Term	Implement digital pedagogy training with AKU-IED and ASER partnerships	STEDA/NGOs	Build teacher capacity in inquiry-based learning
Long-Term	Establish a Tripartite Review Committee (DCAR, STBB, AI experts) to ensure curriculum-textbook alignment	DCAR / STBB	Institutionalize AI literacy and digital competence

Conclusion

This study finds that Sindh's secondary English curriculum remains rooted in a 19th-century pedagogical model that prioritizes rote learning over reasoning, despite policy efforts by the Directorate of Curriculum, Assessment & Research (DCAR) to promote critical thinking and digital literacy. The qualitative document analysis revealed a pronounced **AI Literacy Readiness Gap** a structural disconnection between progressive curriculum intentions and outdated instructional and assessment practices. The evidence suggests that this gap stems not from a lack of policy innovation but from weak implementation mechanisms. Textbooks fail to cultivate analytical or ethical engagement with information, and teachers, constrained by exam-oriented systems, rarely employ digital or inquiry-based pedagogy. Consequently, students are ill-equipped to evaluate AI-generated content or to use technology critically and responsibly. Addressing this gap requires coherent reform across the educational system. Assessments should incorporate higher-order, source-based questions; teacher training must emphasize digital pedagogy and

critical inquiry; and curriculum development should integrate **Critical Thinking (CT)**, **Digital Literacy (DL)**, and **AI Literacy** as interdependent competencies.

In essence, preparing Sindh's learners for an AI-driven world means transforming education from the transmission of static knowledge to the cultivation of adaptable, ethical, and independent thinkers capable of navigating and shaping intelligent technologies for societal progress.

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