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Beyond Awareness: Using Generative Artificial Intelligence (AI) to Bridge the Career Interest Gap in Agricultural Education—A Conceptual Framework Based on a Systematic Scoping Review

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Abstract

This study aimed to: (1) explore how generative artificial intelligence (AI) can be leveraged to create engaging educational content that modernizes the image of agriculture, and (2) identify narrative-based strategies to reframe student perceptions of the field from a traditional practice to a high-tech "Agri-Tech" sector. A systematic scoping review was conducted, synthesizing foundational literature to establish a robust proof-of-concept. The analysis highlights a critical perception gap, reflecting trends in the Thai context, such as a documented 90% lack of career interest among students at Benchama Maharat School despite moderate awareness. Generative AI was characterized as a pedagogical tool capable of producing personalized learning pathways and immersive simulations. Thematic analysis underscored Narrative Transportation Theory as a key persuasive framework for shifting beliefs by reducing counterargument and fostering emotional engagement. Synthesizing these insights, the study proposes a conceptual framework that positions generative AI as a "machine of narrative transportation," capable of immersing students in authentic Agri-Tech case studies. These findings support a transformative model for agricultural education and recommend the implementation of pilot programs, curriculum reform, and strategic policy support.

Keywords: Generative AI, Education, Narrative Transportation, Bridge the Career Interest Gap, Agri-Tech Perception, Youth Engagement

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Introduction

A critical challenge shaping the trajectory of global food security is the widening gap between agricultural awareness and career interest among youth populations. Recent data indicate a troubling paradox: although students exhibit moderate familiarity with agricultural principles, a vast majority report no intention of pursuing a career in the sector. This pattern is localized in studies like that at Benchama Maharat School, Thailand (Agravante and Yap, 2025), where over 90 percent of students report no intention of entering the field. It must be clarified that while this institution provides critical data on student disinterest, the application of Generative AI is a proposed intervention designed to address this specific gap, rather than an existing practice currently implemented at the school. The prevailing challenge is not a cognitive deficit or a lack of exposure, but a persistent perception crisis wherein the field is viewed as professionally unappealing.

This perception is reinforced by dominant societal narratives that depict agriculture as outdated, physically demanding, and economically limited, especially when contrasted with more prestigious disciplines such as technology, business, engineering, and medicine (Esters, 2007; Henning et al., 2022). Henning et al. (2022), in a South African case study, confirmed that even well-informed students tend to maintain low aspirations for agricultural careers, largely due to the influence of negative stereotypes and restricted exposure to innovation. These narratives are further exacerbated by structural constraints such as restricted access to land, limited financial resources, and heightened risk aversion among young people, factors documented consistently in both global and regional scholarship (Bezu and Holden, 2014; Heifer International, 2021; Njeru et al., 2015). Specific to the Thai context, programs attempting to create "New Farmers" often face significant hurdles related to these structural barriers and the need for modernized support systems (Kaewkhata, 2025; Tikum and Ahmad, 2024). The cumulative effect of these conditions is a declining interest in agricultural professions, even among informed students, resulting in a societal vulnerability as talent shifts away from a sector critical to sustainable development (Agravante and Yap, 2025).

The emergence of generative artificial intelligence (AI) offers a novel opportunity to revitalize agricultural education and shift prevailing perceptions of the field (Baidoo-Anu and Owusu Ansah, 2023). Unlike traditional methods, generative AI has the capacity to produce original text, visual media, and interactive simulations that reposition agriculture as a technologically advanced domain. By facilitating engaging, contextually relevant, and individualized learning experiences, AI-based systems can align agricultural education with SDG 4 (Quality Education) and SDG 9 (Industry, Innovation, and Infrastructure), directly addressing the perception barriers that hinder progress toward SDG 2 (Zero Hunger) (United Nations General Assembly, 2015).

Guided by this framing, the study investigates the intersection of generative AI and narrative strategy as a means to reorient youth perceptions of agriculture. To address these challenges, the research is guided by two core questions:

1) In what ways can generative AI be utilized to design educational content that is engaging, modernized, and reflective of the scientific and technological dimensions of agriculture?
2) What narrative and communication strategies, grounded in educational and marketing literature, can effectively reposition agriculture as a cutting-edge and innovation-driven "Agri-Tech" sector among youth audiences?

Research Methodology

This study employed a systematic scoping review design, a form of qualitative secondary data analysis, to synthesize existing knowledge and establish a foundational proof-of-concept. Unlike a traditional systematic review, which often aggregates quantitative outcomes, a scoping review is designed to map key concepts within a research area and clarify working definitions, making it the appropriate methodology for examining the nascent and rapidly evolving intersection of Generative AI and agricultural perception (Techasermwattanakul and Suwannatthachote, 2025).

Data Collection and Selection

The data collection process employed an AI-assisted discovery strategy to identify potential sources within academic databases, specifically Google Scholar and ERIC. This approach utilized AI algorithms to scan for semantic relevance across broad keyword sets. Following this initial retrieval, every AI-suggested reference underwent manual verification and full-text review by the researcher. This human-in-the-loop validation process ensured that all included sources met the study's inclusion criteria for accuracy, academic rigor, and thematic relevance, thereby mitigating the risk of AI hallucination or irrelevance. Targeted searches of institutional websites (FAO, World Bank, ETDA) were also conducted manually to supplement the academic literature.

It is acknowledged that this review utilized a targeted search strategy focused on Google Scholar and ERIC, rather than a comprehensive search of subscription-based indexes like Scopus or Web of Science. This decision aligns with the foundational and scoping nature of the study, which aims to establish a theoretical proof-of-concept rather than an exhaustive bibliometric analysis.

Search terms included combinations of keywords such as "generative AI," "educational technology," "student engagement," "agricultural education," "youth perception," "Agri-Tech," "narrative marketing," and "Gen Z." Inclusion criteria prioritized peer-reviewed journal articles, high-impact conference proceedings, and official reports

published within the last decade. A total of thirty high-quality sources were selected for final analysis.

Data Analysis

The data were synthesized using a thematic analysis approach. Key concepts were extracted and coded thematically to identify recurring patterns such as personalization, simulation, and narrative persuasion. To ensure the rigor and traceability of findings, data extraction was documented in a thematic coding matrix, linking identifying codes directly to source literature and following established protocols for AI-assisted thematic analysis (Naeem et al., 2025).

To further ensure analytical rigor, a methodological triangulation strategy was employed, as visualized in Figure 1. This structure ensures that findings are validated through three converging perspectives:

- Source Triangulation: The integration of distinct data types, cross-referencing findings from peer-reviewed academic articles with institutional reports from bodies like the FAO and World Bank to ensure trends are robust across different literature types.
- Theoretical Triangulation: The synthesis of disparate disciplinary frameworks, specifically combining Educational Technology (AI capabilities) with Psychology (Narrative Transportation Theory) to validate the "persuasive" mechanism of the proposed framework.
- Contextual Triangulation: The anchoring of broad global insights (SDGs, food security) within the specific, localized data realities of the Thai educational context (Benchama Maharat School), ensuring the global solution fits the local problem.

Operational Definitions

To ensure clarity and consistency, the following operational definitions are established:

- Generative AI: Artificial intelligence systems capable of generating new content, including text, images, and simulations, in response to user prompts.
- Narrative Transportation: A state of immersion where a reader or viewer becomes absorbed in a story, leading to reduced counter-arguing and increased susceptibility to belief change.
- Agri-Tech: The application of technology and digital innovation to improve efficiency and output in agriculture.

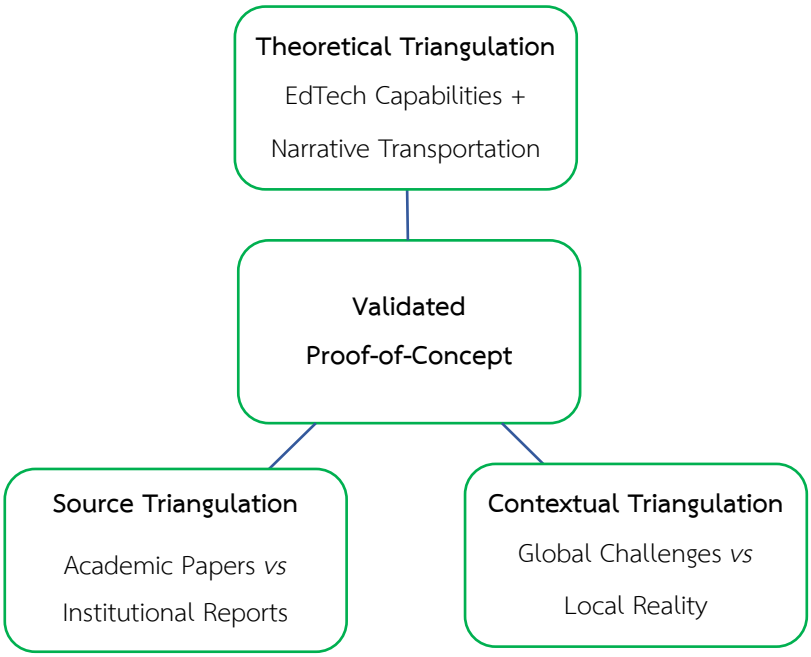

Figure 1. Visual Representation of Methodological Triangulation demonstrating the convergence of Sources, Theories, and Contexts.

Conceptual Framework

To guide the investigation and synthesize the findings, this study established a conceptual framework (Figure 2) that visualizes the theoretical mechanism by which Generative AI can influence student perception. This model positions Generative AI not merely as a content tool, but as a "Narrative Engine."

- Input: Contextual data (policy anchors, local agricultural challenges).
- Process: The AI generates adaptive, personalized simulations that utilize Narrative Transportation.
- Output: A reframed perception of agriculture among students.

Results

Thematic analysis generated substantial insights across the intersecting domains of educational technology and strategic communication. The following findings provide the theoretical and empirical grounding for the components of the framework presented in Figure 2.

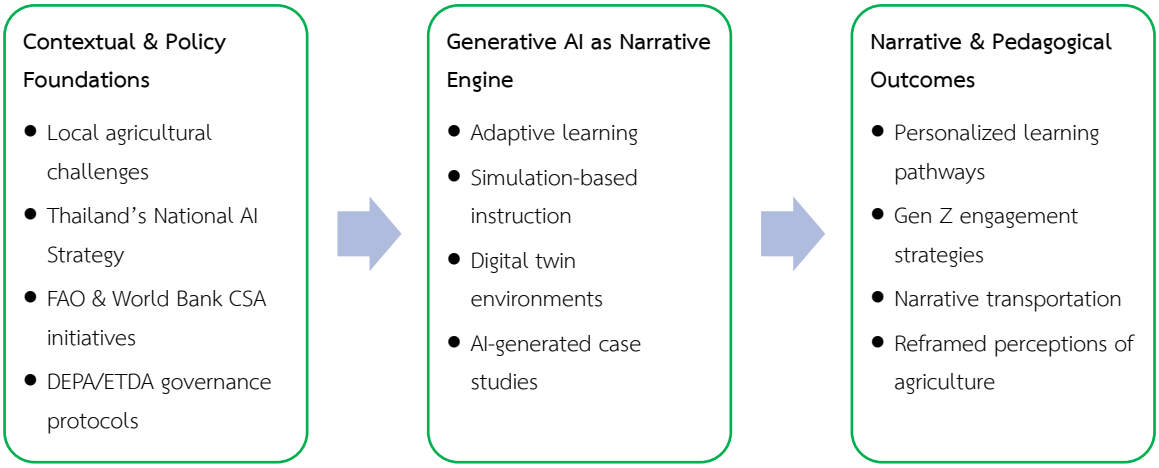

Figure 2. Conceptual framework positioning generative AI as a narrative engine linking contextual anchors to pedagogical and narrative outcomes.

Leveraging Generative AI for Engaging Agricultural Education Content

The literature supports the integration of generative AI into agricultural pedagogy to transform conventional approaches.

- Personalized and Adaptive Learning: Generative AI enhances personalization by adjusting content, format, and pacing to meet learners' individual needs (Hwang et al., 2020; Xie et al., 2019). It allows educators to create multiple versions of a lesson tailored to different learning preferences (Pesovski et al., 2024). Adaptive platforms modify learning difficulty in real-time, helping remediate complex topics (Akavova et al., 2023).
- Dynamic Content Creation and Simulation: Generative AI is capable of producing immersive simulations and "digital twins" that replicate real-world environments (Chen et al., 2024). Students can engage in complex scenarios—such as managing precision farming operations—within risk-free virtual settings (Hnatiienko et al., 2024; Stenard et al., 2024).

Strategies for Reframing the Perception of Agriculture

The second dimension examines how storytelling can shift negative perceptions.

- Narrative Transportation as a Persuasive Mechanism: Narrative Transportation Theory posits that immersion in compelling stories leads to belief and attitude changes by reducing counter-

arguments and fostering emotional engagement (Chen et al., 2024; Green and Brock, 2000; Thomas and Grigsby, 2024).

- Tailoring Narratives for Generation Z: Effective engagement requires aligning with Gen Z's digital habits. This includes visual delivery via platforms like TikTok and Instagram (Imran and Ferdous, 2025; Theocharis et al., 2025) and, crucially, authenticity. For example, the commercial success of a Gen Z-focused rebranding campaign for Chickita underscores the potential of digital, relatable content to achieve high organic reach, suggesting similar strategies could be adapted for educational marketing (Rice Content & Media, 2025).

Table 1. Summary of Thematic Analysis Results

Thematic Cluster	Core Themes	Representative Sources
1. Pedagogical Affordances of Generative AI	- Personalized and adaptive learning - Simulation-based instruction - Digital twin technologies - AI-generated curriculum design - Scenario-based problem solving	Xie et al. (2019); Hwang et al. (2020); Pesovski et al. (2024); Akavova et al. (2023); Baidoo-Anu and Owusu Ansah (2023); Kasneci et al. (2023); Chen et al. (2024); Hnatiienko et al. (2024); Stenard et al. (2024)
2. Narrative Strategies for Reframing Perceptions	- Narrative Transportation Theory - Emotional engagement and authenticity - Role model representation - Gen Z media habits (TikTok, Instagram) - Innovation and sustainability framing	Green and Brock (2000); van Laer et al. (2014); Thomas and Grigsby (2024); Coker et al. (2021); Imran and Ferdous (2025); Rice Content & Media (2025); Theocharis et al. (2025)

Note: Table 1 includes sources contributing to mechanisms.

Table 2. Contextual and Policy Anchors

Source	Role in Framework
Agravante and Yap (2025)	Local perception data (Thailand)
FAO (2021, 2022)	Climate-smart agriculture case studies and Thai initiatives
World Bank (2022, 2024)	Youth engagement and CSA implementation
DEPA (2023); Electronic Transactions Development Agency (2024)	Thai digital infrastructure and AI governance
Piyatumrong (2024)	Thailand's National AI Strategy
Tikum and Ahmad (2024); Kaewkhata (2025)	Youth career pathways and structural constraints

Note: Table 2 lists sources providing the localized and policy context for the framework's application.

Discussion

The findings suggest a promising synergy between generative AI and narrative design. By enabling students to simulate roles such as high-tech farm managers, AI creates experiential touchpoints that reinforce a modern image of the sector (Coker et al., 2021).

Pedagogical and Narrative Synergy

Authenticity remains a critical factor. Instructional content must be rooted in real-world case studies, such as the FAO's climate-smart agriculture (CSA) initiatives. In Thailand, programs like SCALA illustrate localized strategies (FAO, 2022). Through generative AI, educators can prompt systems to convert these technical reports into immersive, first-person narratives, allowing students to "experience" the success of innovation firsthand.

Ethical Implications: Attribution and Transparency

A critical dimension of this framework is the ethics of persuasion. While Narrative Transportation is effective, the use of AI to generate these stories raises concerns regarding Algorithmic Transparency and AI Attribution (Al-Kfairy et al., 2024; UNESCO, 2023). Transparency is vital, particularly in communication contexts where the source of information influences its credibility (Messingschlager and Appel, 2022). If a student believes they are reading a human testimonial when it is synthetic, the persuasive outcome may be deemed deceptive. Therefore, to preserve ethical integrity and maintain trust, the framework must mandate explicit AI attribution for all generated narratives. Furthermore, educators must be vigilant against algorithmic bias, as seemingly neutral algorithms can inadvertently reinforce societal inequalities and biases against low-status professions (O'Neil, 2016), ensuring that AI models do not reproduce outdated stereotypes about rural

life but instead reflect diverse, modern agricultural realities (Kasneci et al., 2023).

Limitations

This study acknowledges several limitations. First, as a scoping review, the search strategy was targeted (Google Scholar, ERIC) rather than exhaustive, which may exclude some sources available in paid indices. Second, this is a conceptual framework based on secondary data; the "Machine of Narrative Transportation" has not yet been empirically tested in a classroom setting to measure the durability of belief shifts.

Future Research Directions and Policy Implications

Importantly, narrative and technology alone cannot dismantle structural barriers. Issues related to land ownership, financial accessibility, and aging rural demographics continue to constrain youth participation in agriculture. Long-term transformation requires integrated educational strategies and policy reforms targeting these persistent inequities (Agravante and Yap, 2025; Kaewkhata, 2025; Njeru et al., 2015; Obisesan, 2019; Tikum and Ahmad, 2024). Future research should specifically investigate how AI-driven narratives can be coupled with structural support programs to provide a holistic pathway for youth entry into the sector.

Conclusion

This study directly addressed the critical issue of declining youth interest in agricultural careers. By positioning GenAI as a "machine of narrative transportation," the study concludes that its true efficacy lies in its adaptive system capability. This capability allows for continuous profiling and evaluation of student affective states, enabling the machine to dynamically adjust the narrative variables (e.g., protagonist similarity, plot complexity) in real-time, thereby maximizing emotional engagement and belief shift toward Agri-Tech careers.

However, technology alone is insufficient. The framework relies on the integration of localized content and robust ethical guardrails. Ultimately, this research offers a foundational model for cultivating the next generation of agricultural innovators, moving beyond mere awareness toward deep, narrative-driven vocational engagement.

Recommendations

To translate this conceptual framework into practice, the following actionable recommendations are proposed:

1. **Educator Training on Accessible AI Tools and Prompt Engineering:** Rather than general AI literacy, professional development must focus on "Prompt Engineering for Narrative Transportation" using accessible, low-cost, or open-source Generative AI models. This ensures that resource-constrained institutions can implement the framework without prohibitive software costs. Educators need specific training on how to instruct these accessible models to generate stories that

contain high emotional resonance, relatable protagonists, and accurate Agri-Tech details.

2. **Establishment of an Ethical AI Content Repository:** To mitigate the risks of hallucination and bias, institutions should collaborate to create a "National Agri-Tech Narrative Repository." This database would contain ethically vetted, AI-generated scenarios that are fact-checked against FAO and World Bank data. Crucially, this repository must adhere to the principle of AI Attribution, ensuring all content is clearly labeled as AI-assisted to maintain student trust.
3. **Mandate for Longitudinal Pilot Studies:** Policy makers should fund a longitudinal pilot study specifically designed to measure the post-intervention retention of career interest. Unlike one-off awareness campaigns, this study should utilize established psychological scales for narrative transportation (Slater and Rouner, 2002) and track student career choices over 1–2 years to validate the long-term impact of the framework.

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