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# Maintaining Connection: Using Emotionally Engaged Thinking to Enhance Artificial Intelligence Initiatives in Agricultural Domains

N. Stedman[1]

## Abstract

In today's changing landscape of artificial intelligence, agricultural leaders and professionals need to be equipped with strategies to help them navigate the adoption and implementation of these tools. Understanding the technical implications of AI is critical to how one communicates and engages with others; however, it is but a piece of the puzzle when considering the complex nature of working with people. In order to be truly effective, agricultural leaders and professionals also need to be prepared to use behaviors of emotional intelligence and critical thinking to help mitigate concerns people may have about the impacts of AI in their work. Through emotionally engaged thinking, agricultural leaders can be ready to address the human-centered concerns about the adoption and implementation of AI tools.

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## Introduction and Problem Statement

As Gardner (2006) postulated about intelligence and the notion that our human minds were wired to think differently dependent on a number of preferences, he did not estimate the influence of artificial intelligence (AI) and the role it would play in challenging our existing norms of intelligence. This challenge has brought new ways of working, efficiency, bigger data capabilities, and pushing creative boundaries, but it has also challenged how we maintain an ability to cultivate human insight.

While there are impacts far and wide of AI in specific fields and industries, agriculture is particularly susceptible to AI's advances (Spleiss, 2025). AI has brought to agriculture the ability to better predict farm yields, weather and climate variations, obstacles in the food chain, and automated production models (Sood et al., 2021). Further, AI has the ability to "optimize agricultural processes by food system resilience increases" (de Oliveira, & de Souza e Silva,

1. Nicole L. P. Stedman, Dean and Associate Provost, University of Florida, 106 Grinter Hall, PO Box 115500, Gainesville, FL 32611, nstedman@ufl.edu, https://orcid.org/0000-0001-7970-1798

2023, p. 1). Largely, the literature has focused on key agricultural domains including crop prediction, crop classification, disease and pest management, soil management, fertirrigation (use of irrigation for fertilizer), water management, and crop management (de Oliveira, & de Souza e Silva, 2023). AI and machine learning have established smart farming tools which are designed to optimize agricultural production. Processes like smart sensing and monitoring, smart analysis and planning, smart control, and big data cloud tools have cut across livestock, horticulture, fisheries, and traditional production agriculture (Wolfert et al., 2017). The anticipated changes identified by Wolfert et al. (2017) included such language as, "…Big Data will also cause major shifts in power relationships between the different players in the Big Data farming stakeholder network" (p. 78). The notion that these Big Data systems will not only change the way we work, but how we work together from a personal perspective, is concerning. Most of the recommendations in AI in farming recognize this issue, but lack direction and clarity on how to proceed, so that this issue does not impact the quality of adoption and implementation of these tools.

Researchers have focused AI studies on one of three concepts applications of cognitive science, robotic applications, or natural interface applications. While most of the challenges associated with these tools in an agricultural context were related to their technological adoption (de Oliveira, & de Souza e Silva, 2023), none of the articles synthesized addressed the human condition as part of the adoption and implementation process. Given the growing and expanding nature of the influence of AI it is important that professionals are prepared with tools that will help them manage the affective elements of innovation, but also those which can complement analytical and reasoning processes.

## Theoretical Frameworks

### Emotional Intelligence

An individual must be able to self-reflect, create awareness, and act in one-on-one situations with authenticity, especially when there are concerns that an individual may be replaced with AI integrated technology (Kambur, 2021). Returning to Gardner (2006), he outlined types of intelligences, but long before his interpretation, Thorndike (1920) challenged perspectives of intelligence concluding that the ability to understand and manage people was equally important as understanding and managing ideas, as well as the concrete objects of the physical world, in this context AI tools. Others have since defined social intelligence bringing depth and meaning to how it is used. Authors like Salovey and Mayer (1990) encouraged further discussion by introducing language related to emotional intelligence, even challenging if it was a contradiction. At the time of their seminal article they wrote, "the value of adding emotion to computers so as to prioritize and direct their processing" further illustrating the unique connection between artificial and emotional intelligence (p. 186).

Goleman who was inspired by much of this early work wrote Emotional Intelligence (1995) followed by Working with Emotional Intelligence (1998). In his 2012, 25th Anniversary Edition,

he described the influence of Big Data on health care and that EI was of growing importance, as a bot could not replace the bed-side manner and human interaction needed when delivering health diagnoses. Both books have become the standard for how we define and use EI in a number of settings. Goleman and Boyatzis (2017) wrote of the four domains and twelve competencies that comprised EI and what leaders need to work on to be emotionally intelligent leaders. These included: self-Awareness: emotional self-awareness; self-Management: emotional self-control, adaptability achievement orientation, and positive outlook; social Awareness: empathy and organizational awareness; and relationship management: influence, coach and mentor, conflict management, teamwork, and inspirational leadership.

The goal with each of these is two-fold, identify and regulate. Utilizing awareness to assess physiological cues, body language, climate/energy, etc. allows for individuals to identify the best strategy for regulation. How well one is attuned to these internal and external indicators the better the response. An example that illustrates the importance of these indicators can be seen in the smart watches that many wear. These advanced tools are equipped to provide real-time data about our heart health, sleep patterns, activity, and stress. If we do not actively pay attention to these alerts, we may miss valuable cues about our health. Emotions are sometimes like that, cues and signals help us discern what we need to be ready for, both for ourselves and with others. With change initiatives, these cues are very important. If we are unable to accurately assess why someone might be resistant to change or having concerns about an innovation (AI) then we may not be able to create a positive path forward. Beck and Libert (2017, p. 4) wrote that, “Skills like persuasion, social understanding, and empathy are going to become differentiators as artificial intelligence and machine learning take over our other tasks.”

## Critical Thinking

When we think about how one regulates emotion we must also consider critical thinking. For Paul and Elder (2014) these emotional intelligence and critical thinking are tied together through intellectual empathy an essential intellectual trait of critical thinking. However, a critical thinking definition has long eluded the best scholars, often resulting in a perspective that critical thinking is less about a definition and more about a group of behaviors/skills and dispositions/traits (Facione, 2000; Paul & Elder, 2006). Paul and Elder (2014) have provided a broad perspective, in that critical thinking is, “the art of analyzing and evaluating thinking with a view to improving it” (p. 2). Paul and Elder continued that it is more about the result of said actions, analyzing and evaluating, that makes one a critical thinker (2014). There is some discourse that critical thinking may be an important path for how humans approach AI (Kenedy, 2024; Spector & Ma, 2019).

Critical thinking has both dispositional and skill-based characteristics (Facione, 1990). The dispositions are those which are inherent in an individual, a natural way of existing. Capacity for these dispositions can be developed through the skill practice, but the presence of dispositions does not ultimately make for a critical thinker (Facione, 2011). As Facione stated, “…just because she or he has these cognitive skills, however important they may be, because what if they just do not bother to apply them? (2011, p. 10). Facione (1990) described six skills that

include interpretation, analysis, inference, evaluation, explanation, and self-regulation. The six skills have specific behaviors associated with each: interpretation: categorize, decode significance, clarify meaning; analysis: examine ideas, identify arguments, identify reasons and claims; inference: query evidence, conjecture alternatives, draw conclusions; evaluation: assess credibility of claims, assess quality of arguments; explanation: state results, justify procedures, present arguments; self-regulation: self-monitor/examine, self-correct/regulate (Facione, 2011). For the purposes of moving toward emotionally engaged thinking it is important to recognize that these six skills frames how we can interact with information, be that from an external source (media) or internal source (emotion) (Stedman & Andenoro, 2015).

Khalabuzar and Shymanovych (2024, p. 506) wrote, “Critical thinking is not just a ‘nice to have’ skill in the 21st century; it is crucial because we live in an informational society that has deepened its fingertips into the AI universe.” Yet, the much of the literature is focused on the educational strategies one can use to develop critical thinking through the use of AI, not how to think about it nor how to think about the information we interact with in our world.

Rahmanto et al. (2024) completed a systematic review of literature in critical thinking and AI and found that challenges included “excessive dependence reduces critical thinking and problem-solving” (p. 249) among others. Kenedy (2024) specifically called out “unprecedented education” at the cost of critical thinking (p. 20). He also addresses concerns that education is not teaching for the transferability of these skills as they relate to life skills, employability, including those impacted by AI (Kenedy, 2024). The International Food Policy Research Institute (IFPRI) has provided series of blogs addressing pressing issues in AI. When discussing genAI research through CGIAR, Jones-Garcia (2025) wrote that these tools can lead to a reduction in independent thinking, leaving researchers to, “accept outputs uncritically” (para. 10). The emphasis on soft skills to encourage not just adoption, but human-centered adoption included critical thinking, collaboration, and adaptability (Jones-Garcia, 2025).

## Purpose

Agriculture has long been in the innovation space; some innovations being adopted at much higher rates than others. As Rogers (2003) outlined aspects of the diffusion of innovations, agricultural innovation was fraught with non-adopters, experimental crops like hybrid corn thought too risky for traditional farmers. Rogers (2003) provided a guide on strategies to describe innovations, processes to encourage adoption, and even characteristics that make individuals adopt, or not. AI is a technological innovation that seems to be working, in that it is becoming more widely adopted and changing the landscape of agricultural production in several domains (Sood et al., 2021). Even though Rogers 2003 version was his last, he had long identified characteristics like empathy, understanding, and decision-making as central to guiding individuals through the adoption of new technology (Rogers, 1995).

Sood et al. (2021) also presented challenges with AI, including social challenges and opportunities, including ethical and social. Hasteer et al. (2024) reviewed challenges with the

implementation of AI in the agricultural sector, and while the challenges included a lack of skilled workforce and reluctance in the implementation of advanced technology, among others, solutions were focused on technical training and preparation. While these challenges and opportunities are presented from a technical aspect, how we are promoting the adoption of AI and how we are using technology safely, there are bigger challenges that should be discussed, including how do we maintain the human insight while optimizing our use of artificial intelligence?

The focus of this article is to introduce a framework, which results in one's ability to affectively understand the nature of emotions on decision-making. As a result of this emotionally engaged thinking leaders are better able to moderate issues related to emotion, thereby increasing the quality of decisions made. To accomplish this, both emotional intelligence and critical thinking are integrated to create the model of emotionally engaged thinking presented in context of the introduction of AI in agricultural domains.

## Emotionally Engaged Thinking

Emotionally engaged thinking (EET) was first conceived after years of data collection examining the relationship between emotional intelligence and critical thinking, specifically the role of regulation (Stedman & Andenoro, 2007, 2015). Through a series of disussions and mind-mapping activities the basic structure of EET was designed, providing a new way of conceptualizing how these two disparate concepts could be combined.

Emotional intelligence and critical thinking have largely been presented as relational, but not dependent. Emotionally engaged thinking (EET) can be put to use when a leader is making decisions around emotionally charged topics, including those associated with concerns about AI adoption. Because many of the decisions we make are often influenced by emotion, often without our recognition, EET introduces strategies that allow for emotions to be considered early on in a decision-making process. In 2003, Lowenstein and Lerner introduced a model that illustrated the role of emotion on decision-making. In that model, concepts like immediate emotion (how I feel right now) are critical to concepts like expected emotion (how I anticipate feeling later). How these two are linked are through actions like decision-making and identifying consequences (inference in the critical thinking literature). In EET, leaders are equipped with steps through the FACE Method (Stedman & Andenoro, 2015), which prompt them through a series of questions, so that emotions are considered alongside decision-making.

The FACE Method includes four steps foundational awareness; authentic engagement; connective analysis; and empowerment and change. Foundational awareness immediately shifts awareness to those immediate emotions – what fears do I have about AI, what excites me about AI, does the thought of implementing AI make me anxious? And while in our best moments we can attempt to isolate those feelings from our decisions, it can often be impossible, leading to concerns about the quality of decisions one is making. Once an awareness is established, authentic engagement promotes a recognition of agency (Bandura,

2006), control. Questions like, what is my role in this decision, and do I have authority to act, can I act on behalf of others, provide some grounding in one's place within the scope of the decision. Once we recognize the emotional cues and our ability to enact behavior/control, then it is reasonable to consider what cues and control others may have through connective analysis. It is in this perspective taking, that critical thinking skills like inference, analysis, and evaluation are demonstrated (Facione, 2011), which ties what we are experiencing emotionally with empathy and promotes empowerment and change. This final step is where action is the result of recognizing one's own emotions, our power to act, and the role and perspectives of others. By bringing these pieces together we have effectively practiced emotional intelligence and critical thinking, emotionally engaged thinking. But how do we create intentional mechanisms to accomplish this?

## Preparation of Agricultural Leaders

As we approach a time when AI is being integrated into our world, how we live, how we work, and how we grow food it is increasingly important to think through how we can best prepare individuals to be emotionally engaged thinkers. Challenges about how we prepare individuals for work in this space, beyond technical preparation, will continue to arise if there are not intentional strategies developed for how one can practice emotionally engaged thinking in an AI world. It is becoming increasingly common that leadership development programs have become a place for professionals to obtain training in these tools.

Ulvenblad and Björklund (2018) purported that agricultural entrepreneurs specifically needed leadership development to meet the needs of a rapidly changing agricultural environment. Further, they wrote that actions like diffusion and knowledge transfer can enhance agricultural producers' leadership competencies. Windon et al. (2025) shared that farmers need both professional and personal skill development. That when both of these are addressed motivation is higher and that it is important to promote having the necessary skills to succeed in an "ever-changing agricultural environment" (Windon et al., 2025, p. 67).

Tabata et al. (2025) recognized the challenges of AI tools, like Generative AI, in how we think through issues of ethics, decision-making, as well as risks and opportunities. As they identified these challenges they also worked to present frameworks and tools that strengthen how leaders can be prepared to tackle these challenges in their industries. They continued to write that, "there is a demand for leadership approaches that can navigate both technical and social dimensions" (p. 44). The model they presented includes concepts related to Adaptive Leadership, Sociotechnical Systems Theory, Organizational Learning, and Ethics, which include aspects of emotional intelligence, and they then argued for the preservation of critical thinking.

Jenkins et al. (2025) pointed out that the leaders implementing AI in order to maximize efficiencies, also must be aware of conflicts related to job security for staff members. Ultimately, they argued for strategic leadership approaches that, "balance technical innovation with ethical considerations, regulatory compliance, and organizational effectiveness…" (Jenkins

et al., 2025, p. 47). Further they recommend a number of tools to strengthen how leaders implement AI in their organizations including, personalized development that focuses on tailored leadership training and adaptive learning tools. In their concluding statements, Jenkins et al. (2025) emphasized the importance of leaders guiding their employees through upskilling and bridging generational gaps. Leadership development programs must be prepared to integrate topics related to emotional intelligence and critical thinking to build capacity of leaders to more effectively practice diffusion of innovation and adaptive leadership behaviors in AI contexts.

## Conclusions, Discussion, and Recommendations

In the literature reviewed for this manuscript, it was difficult to identify research that directly addressed the need for agricultural leaders to be equipped with soft skills and how best to develop those capacities within them, specifically to how they lead through AI. While the literature points to key aspects of diffusion of innovation (Rogers, 2003) and adaptive leadership (Heifetz et al., 2009), the explicit call for agricultural leaders to be prepared for aspects of emotional intelligence and critical thinking were slim (Jones-Garcia, 2025).

Before there is a discussion of recommendations, consider what would happen if agricultural leaders were not prepared to manage the implementation and adoption of AI in their businesses. Imagine a business, in which the leader is constantly stressed, managing a farm, family, all while balancing the calls of sales pitches to purchase new AI tech that will change the way the farm operates with larger profits, loss reduction, and more efficiency. It is not an uncommon scene to conceptualize. The stressors that have been identified for those in the agricultural industry, especially those at the farm-level are varied, including those affiliated with mental health (Skaczkowski et al., 2023; Windon et al., 2025). Without the tools shared and discussed below, this agricultural leader is faced to make decisions that seem rash, a quick fix, or not been made in full consideration of the implications for their farm, nor employees. Their employees may not feel comfortable sharing their concerns about job security or being able up-skill in order to be successful with new AI technology. The decision could be made unilaterally, and without the opportunity to discuss a process that would allow for the new technology to be integrated as a value-add and not a value-replace, employees may opt to leave, choosing elsewhere to use the skills they do have. Ultimately, this results in more stress. When we are unable to recognize our own emotions and resulting stress, coping behaviors fail. Remember the smart watch metaphor? Using these approaches help create frameworks to navigate these difficult scenarios.

Given the challenges that are presented throughout this manuscript, it is clear that for agricultural leaders, to be truly prepared for leading in a time of artificial intelligence, must not just be taught in the ways of technology, but in the strategies to help them overcome the human challenges, fear of job loss, insecurity in skill set, generational norms and gaps, buy-in and engagement, and trust. By intentionally integrating emotionally engaged thinking into

leadership curricula with the focus on using these tools to discuss, implement, and adopt AI, there can lead to stronger feelings of acceptance, understanding, and empathy.

Shared experiences allow for learning and understanding to take place and agricultural leadership programs should take advantage of these opportunities. Because of the affective relationship between emotional intelligence and critical thinking, coaching the brain to build out the specific skills can be done so with similar approaches. Through specifically designed scenarios using the FACE Method that address these unique challenges, agricultural leaders can think through responses, strategies, and plans that will help them be more effective for their employees and better prepared for AI in their agricultural domain. Highlighting cases of success and failure can further develop these capacities by allowing agricultural leaders to navigate barriers and obstacles to adoption. Yet, in order for either of these strategies to truly work, one must be prepared to ask questions and utilize tools that complement both emotional intelligence and critical thinking, like building self-awareness and regulation (Stedman & Andenoro, 2015). This further emphasizes the need for learning to take place in a setting where safety and vulnerability are addressed, where learners feel compelled to share and listen. Providing environments that promote these behaviors and skills will increase the likelihood that both emotional intelligence and critical thinking will be developed.

In a day and age where AI is making strong impacts in how we work, how we feed our world, and how we live it is of ever-growing importance that our agricultural leaders be prepared to address challenges and risks with adopting new technologies. This means having a strong understanding of the AI technology, its intended use, perceived issues, and impacts to the workforce. However, it also means being prepared to address the human-centered issues, those associated with fear and concern, through tools like emotionally engaged thinking agricultural leaders can be better equipped to lead successful AI initiatives.

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