Leveraging Sustainability Mindsets in Adult Climate Literacy Training and Education: A Brief Summary of Sustainability Mindsets in the Enhancing Capacity in Adult Climate Literacy (ECACL) Study

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Abstract:

Climate change poses significant challenges for emergency management professionals tasked with preparing and adapting communities to its impacts. This study aimed to understand how climate change education can meet the learning needs of emergency management professionals throughout the United States. This exploratory collective case study involved six certified emergency management professionals as key informants, along with a survey distributed to 56 emergency managers. The study initiated an essential needs assessment, combining their knowledge, beliefs, attitudes, and perceptions about climate change with effective engagement in adult learning. The findings carry national and global implications, offering insights into climate literacy programs' design and implementation. The study revealed that most emergency managers feel unprepared for climate impacts, but their sustainability mindsets, such as purpose and mindfulness, are strengths. However, areas for development were identified in long-term thinking, interconnectedness, and embracing both-and thinking and flow in cycles. The research has the potential to equip emergency managers with a deeper understanding of climate literacy, striving for a sustainable and resilient future.

Introduction

At the current crossroads of climate action or inaction, the adult learner is at the center of setting the course for the present as well as future generations of people and the planet. Applications for adult education pertaining to the challenges of climate change can no longer be left unaddressed. This paper draws upon the findings of a study that investigated the national and global implications for education and training for adults on how to design, evaluate and implement climate literacy programs at a vital crossroads. To achieve the research aims, the study investigated how climate change education can meet the learning needs of emergency management professionals to prepare and adapt to the impacts of climate change on communities throughout the United States. This exploratory collective case study involved the participation of six (N=6) certified emergency management (CEM) professionals currently

practicing in the United States as key informants. In addition to the six key informants, a survey was distributed to a larger sample (N=56) to collect broader information from additional emergency managers to complement the data collected from the key informant interviews. This study initiated applied research for an essential needs assessment of emergency managers that combined their knowledge, beliefs, attitudes, and perception about climate change with an investigation on how to effectively engage this critical profession in adult learning in an environment of uncertainty. The study findings are presently being used to inform future training and education program content and design to approach climate literacy as a process that combines climate science and the lived experiences of individuals. This paper will focus on the portion of the study that illuminated the training and education themes drawn that place emphasis on sustainability mindsets as a pedagogical framework to enhance capacity in adult climate literacy. Further, it leverages the experiences of emergency management professionals to facilitate a broader discussion on training and education needs for a sustainable future from those professionals navigating impacts on a regular basis to protect property and livelihoods.

Background

There are numerous segments of adult learners that will benefit from increased training and educational programming on climate literacy; some may argue an all-sector approach to training and education on climate literacy is warranted in the complex landscape of the present moment. This study decided to focus on one of many critical professions at the intersection of climate impacts and society. For this reason, the researcher focused on emergency managers. This profession might at first be seemingly unknown; however, one thing the researcher has learned from researching emergency managers is that when done well, emergency management goes unnoticed, as that signifies that plans, responses, and recoveries from disasters functioned well. Emergency managers in the U.S. and internationally are responsible for the mitigation, response, recovery, and preparedness of disaster events[1]. The emergency manager often operates in high-stakes disaster environments, typically on behalf of local, state, tribal, territorial, or federal emergency management agencies, where lives and economies are at risk with often limited resources in disaster response[2]. Emergency managers are commonly placed in situations where they must make decisions in the face of uncertainty. Therefore, constant training is required to address the challenges associated with the limitations of planning and preparedness tools when dealing with the emergent complexity of a given disaster event[3]. This study sought to achieve an increased understanding of how emergency managers learn about climate change to further prepare the United States and all its many communities for the direct impacts of changing climate and increased disaster events. Through its content and design, the research aimed to benefit most emergency managers by equipping them with an in-depth understanding of climate literacy in relation to their everyday responsibilities as well as emergent responsibilities at the front line of disasters and emergencies so that we can strive

[1] May, P. J. "FEMA's role in emergency management: examining recent experience." *Public Administration Review* 45 (1985): 40-48.
[2] Handmer, J., & Dovers, S. *Handbook of Disaster Policies and Institutions: Improving Emergency Management and Climate Change Adaptation*. Routledge, 2013
[3] Ibid.

toward a more sustainable and resilient future. Similar training needs and approaches can be observed across other professions.

Methods

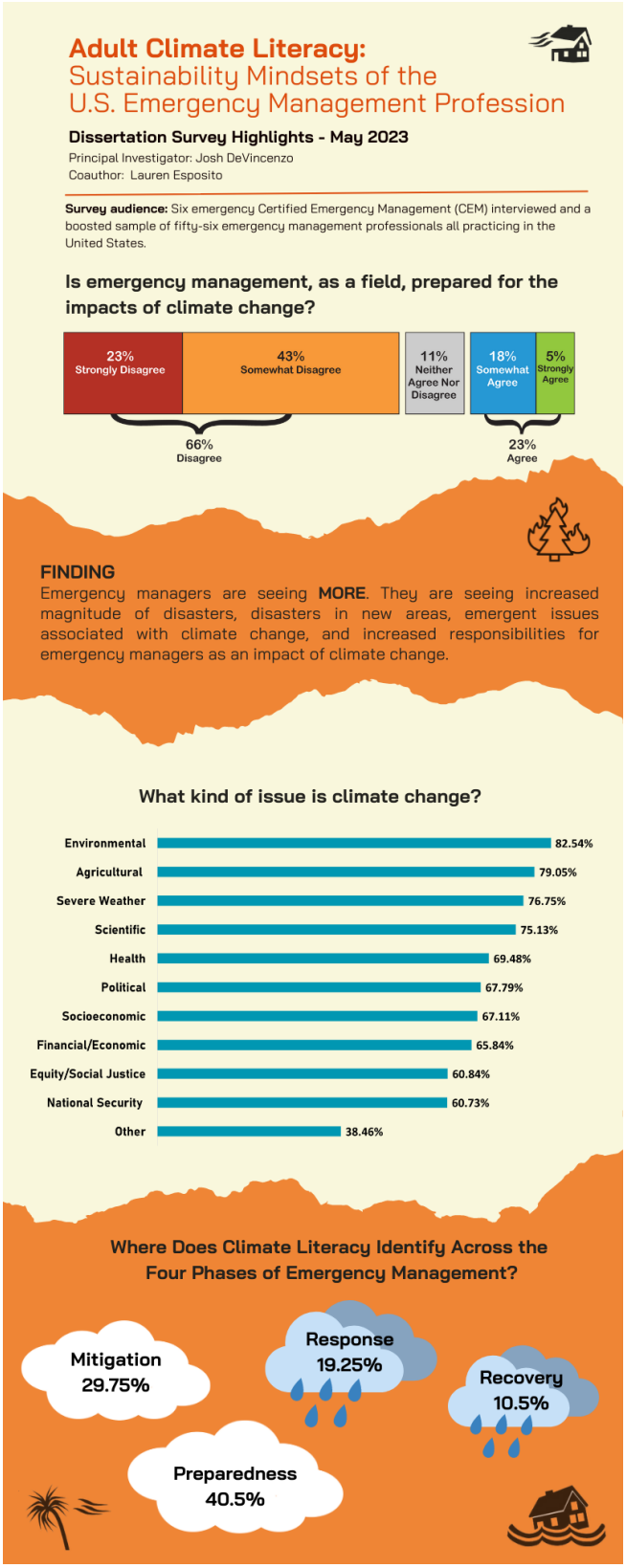
This paper will briefly summarize two approaches the researcher underwent to 1) understand the current state of knowledge, attitudes, beliefs, and perceptions of climate change in emergency management and 2) the current state of sustainability mindsets in the profession. To do so, the researcher administered a survey to both the sample of key informants as well as a larger sample. In addition to the preliminary survey, a Sustainability Mindset Indicator Assessment was administered to the key informant sample in the study.

Survey

The survey helped to collect factual information on attitudes, preferences, beliefs, opinions, and experiences[4]. The survey focused on three major study themes to address each research question: 1) Perception, 2) Learning from Experience, and 3) Training and Education. Brief demographic data were also collected at the beginning of the survey. The survey consisted of twenty-five multiple-choice and short-response questions. Surveys were administered at two distinct times in this study, first to each of the six key informants and second to a larger "boosted" sample. The survey initiated a preliminary understanding of how emergency managers presently think about themes of climate change. The data is valuable to educators and program designers as it illuminates entry points in which learning can be further facilitated, as well as highlights areas of potential resistance. Figure 1. highlights some of the key results from the survey that were analyzed alongside the Sustainability Mindset Indicator Assessment, which will be discussed in the next section.

[4] Weisberg, H. F., Krosnick, J. A., and Bowen, B. D. *An Introduction to Survey Research, Polling, and Data Analysis* (3rd edition). Sage, 1996

Figure 1. High-Level Summary of the ECACL Survey



Source: Author

The survey yielded a total of 62 responses from emergency managers that fit the selection criteria (U.S. based, over the age of 18, currently practices emergency management), in addition, only complete survey responses were accounted for in the analysis. From the survey, it was found that 68% of respondents do not feel that the emergency management profession is well prepared for the impacts of climate change. In addition, from a perception standpoint, it was found that most respondents are experiencing the impacts of climate change with more responsibilities, more severe events, and more resources. The survey also examined a taxonomy for what type of problem climate change is perceived to be from the emergency management perspective. The data ranked climate change the highest as an environmental issue, followed by an agricultural issue, and the lowest as an issue of national security and Equity/Social Justice issue. Finally, after a series of data collection and engagement with participants, it was identified that emergency managers were conceptualizing climate change in terms of preparedness, response, recovery, and mitigation, with the most emphasis on placing climate change in preparedness and mitigation activities.

Building upon the understanding of the current perception and challenges at the convergence of emergency management and climate change formed from the survey, it was next pertinent to study the mindsets of emergency managers in a manner that combines both internal cognitive processes as well as external factors influencing sustainable behavior and thought processes to better understand areas where enhancing capacity will be more the most beneficial and conducive to the different mindsets of the group.

Sustainability Mindset Framework in Action

Rimanoczy introduces the Sustainability Mindset Framework to build on an understanding of how an individual learns about sustainability by investigating coding mechanisms of different orientations towards sustainability comprising identity taxonomies, personal values, beliefs, and knowledge through combining elements of human development and sustainability education to offer the Sustainable Mindset and Principles (SMP). Rimanoczy and Hermes[5] note the importance of integrating “being” aspects beyond solely technical perspectives of sustainability education. In conceptualizing the sustainability mindset, Rimanoczy & Hermes[6] use a framework grounded in developmental psychology that further supports that simply knowing, in an instrumental sense, that planetary challenges are not necessarily adequate to shift behaviors and engage in sustainable actions. Kassel et al., describe the sustainability mindset as a way of thinking and being that stems from a holistic understanding of the ecosystem’s manifestations with consideration to the introspective focus on personal values and the expression of actions for the greater good of the whole[7]. The sustainability mindset consists of four key elements and

[5] Hermes, J., & Rimanoczy, I. "Deep Learning for a Sustainability Mindset." *The International Journal of Management Education*, vol. 16, no. 3, 2018, pp. 460-467.
[6] Ibid
[7] Kassel, K., Rimanoczy, I., and Mitchell, S. F. "The Sustainable Mindset: Connecting Being, Thinking, and Doing in Management Education." In *Academy of Management Proceedings*, Vol. 2016, No. 1, 16659. Briarcliff Manor, NY 10510: Academy of Management, 2016

content areas: (1) Ecological Worldview - the understanding of the state of the planet and how one feels about it; (2) Systems Perspective - the tendency to process information using a systematic lens; (3) Emotional Intelligence - introspective practices to increase self-awareness and exploration of personal values; and (4) Spiritual Intelligence - relating to purpose, transcendence, and oneness[8].

The researcher coordinated with the SMI organization to issue the assessment to each key informant. The Sustainability Mindset Indicator is a trademark-protected questionnaire for use only upon agreement between SMIndicator, LLC and the researcher. The Sustainable Mindset Indicator (SMI) consists of 36 bipolar statements that capture cognitive, behavioral, or affective aspects of a Sustainable Mindset Principle (SMP). One statement reflects the SMP, whereas the bipolar counterpart reflects disagreement with the SMP. Participants need to choose between the two statements. Based on the chosen statement, the participants receive their personalized reports. The assessment does not contain the actual answer chosen, so the report cannot be connected directly to the answers given. The researcher received an anonymous, aggregate report. The raw data is stored confidentially on the server of SMIndicator, LLC. Personal identifiers (name and email address) were removed. The raw data will be deleted after completion of the research project. SMIndicator, LLC distributed the instrument to each participant electronically. The SMI produced two reports. The first report was issued to the participant, and the second report was provided to the researcher with learning recommendations for the individual participant and the aggregate recommendations for the collective case. The report provided to the individual participant can only be accessed by the researcher with the permission of the individual participant. The SMI reports were analyzed as a collective case and provided insights into emergency managers' sustainability mindsets and mental models.

Results

This section presents a summary of the data collected from the six key informants participating in the Sustainability Mindset Indicator Assessment. Key Informants were given the following aliases: Kate, Marie, Michael, June, Wallace, and Kevin. The Sustainability Mindset Indicator Assessment was used to amplify and explore trends from a group of emergency managers. The researcher received an anonymous aggregate report that combined assessment results across Kate, Marie, Michael, June, Wallace, and Kevin to analyze. The following table reviews key definitions used in the Sustainability Mindset Indicator as well as a description of what is assessed within the assessment.

[8] Rimanoczy, I. *The Sustainability Mindset Principles: A Guide to Develop a Mindset for a Better World*. Routledge, 2020, pp. 20-21

Table 1. Key SMI Definitions and Assessment Criteria

Key Term	Definition	What is Assessed?
Ecological Worldview	The result of having an intellectual and affective broad understanding of the planetary challenges, how they are interrelated, and how we are contributing to them.	Ecoliteracy, My Contribution
Principle 1: Ecoliteracy	Understanding the state of the planet allows us to be more fully aware of the challenges, and the complexity of how they are linked to each other, and to explore what it means to us.	How we understand the environmental and social challenges, how we feel about them, and their impact on our behaviors.
Principle 2: My Contribution	When we identify the ways in which we are unintentionally contributing to the problems, we have a chance to do something about them. It also expands our consciousness and develops social sensitivity.	How we see the relation between individual decisions and planetary challenges, how we feel about them, and their impact on our personal behaviors.
Systems Perspective	Analyzing information and making decisions has a major impact on the sustainability of our actions.	Long-Term Thinking, Both-And Thinking, Flow in Cycles
Principle 3: Long-Term Thinking	Every action has consequences that are not immediately visible. Considering the long-term when analyzing situations and making decisions has a positive impact on global sustainability.	How we think about long-term impact when analyzing and making decisions, complementing short-term thinking; how we feel about it, and the impact on our behaviors.
Principle 4: Both-And Thinking	Both-And thinking allows us to understand paradoxes, and calls for creative solutions that are inclusive of all stakeholders.	How we think about and deal with ambiguity and paradoxes, how we recognize diversity, feel about it, and act towards it.
Principle 5: Flow in Cycles	There are no linear	How we balance our capacity

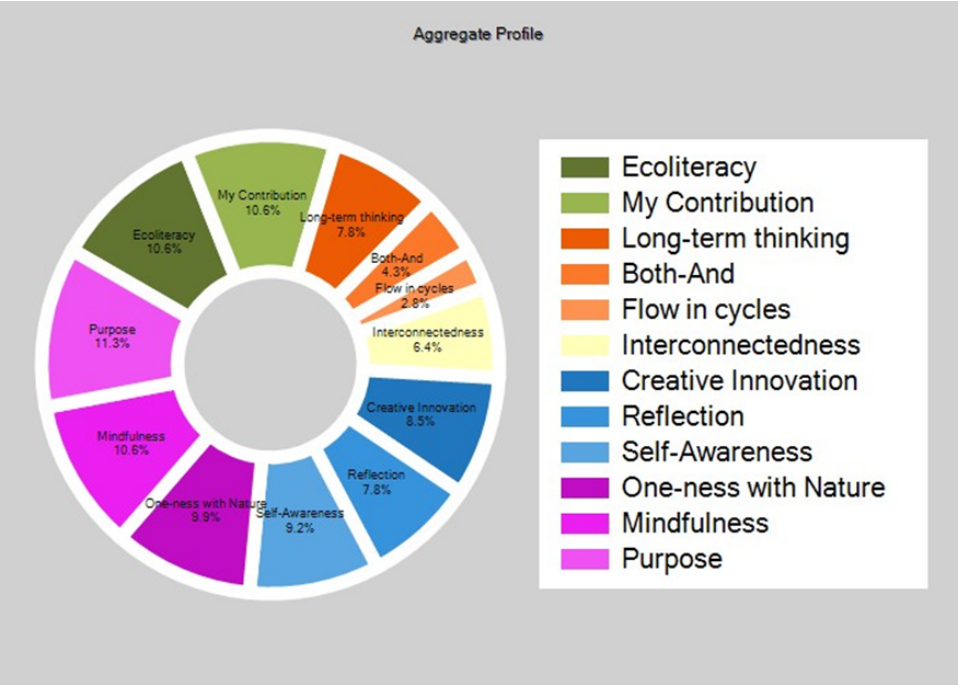
Key Term	Definition	What is Assessed?
	processes in Nature: Everything flows in cycles of birth, growth, death, and rebirth. Many aspects of human-made unsustainability of the planet are a result of the misconception that we are not governed by this law of Nature.	to analyze and plan with the understanding of natural cycles, and make them part of our mindset.
Principle 6: Interconnectedness	When we see interconnectedness, we understand the importance of diversity, and our decisions and actions become more inclusive, which contributes to the sustainability of the whole.	How we understand and experience interconnectedness, versus values like autonomy and independence.
Emotional Intelligence	Understanding ourselves through the anchors of our identity, the pace of our life, and how we consider our intuitive wisdom are key for a Sustainability Mindset.	Reflection, Self-Awareness, Creative Innovation
Principle 7: Reflection	Reflective practices help to pause, and to ponder the situation and its implications before jumping into action.	How we notice our own pace, and how we balance rapid response with making time to ponder and reflect before acting. And how this makes us feel.
Principle 8: Self-Awareness	When we explore our personal values, beliefs, assumptions and motivations, we gain greater control over our actions and we can see new alternative behaviors.	How aware we are about the anchors of our identity and our values; how we feel and act in consequence.
Principle 9: Creative Innovation	Resilience is based on constant creativity, innovation, and experimentation. When we neglect the non-rational wisdom we have in us, our solutions are missing critical	How we incorporate non-rational information, intuitive knowing, creativity, and imagination, in order to balance rational thinking, and how we feel about it.

Key Term	Definition	What is Assessed?
	information and may create negative impacts on the ecosystem and society.	
Spiritual Intelligence	The spiritual orientation to Nature, to ourselves, and to others are key factors for a Sustainability Mindset, as they impact the quality of our actions.	Oneness with Nature, Mindfulness, Purpose
Principle 10: Oneness with Nature	Understanding that we are one with Nature, a species within species, is a powerful spiritual experience that can shape behaviors leading to a more harmonious relationship with each other and all beings.	How we experience nature, how we understand the human relationship with nature, and our related feelings and behaviors.
Principle 11: Mindfulness	Mindfulness is being fully present, and experiencing connectedness with all that is. Mindfulness enhances awareness and compassion and predisposes to social and environmental actions.	How we think about the meaning, role, and value of mindfulness and its practice, and how we feel about it.
Principle 12: Purpose	Defining our purpose provides an unconscious compass, and when it is grounded in the values of our higher self, we actively shape a better world.	What we think about having a purpose in life, particularly something that is in service to others; how this fits our reality and how we feel about it.

The aggregate report provided the researcher with insights necessary to identify areas to tailor interventions and activities to the participant group in terms of climate literacy. The SMI data provided an assessment of which of the 12 sustainability mindset principles was the strongest amongst the group and which principles are areas for further development. Graphs provided in the assessment are aimed at visualizing how this group of emergency managers balances cognitive, behavioral, and affective dimensions as an aggregate. The following two visuals will provide an overall result of the sustainability mindset assessment. Following the overall result, more in-depth descriptions of the data are provided.

The group profile provided the weight of the different Sustainability Mindset Principles across all participants. The figure below depicts the group as a whole:

Figure 2. Aggregate Sustainability Mindset Indicator Profile



Source: Author & SMIndicator, LLC

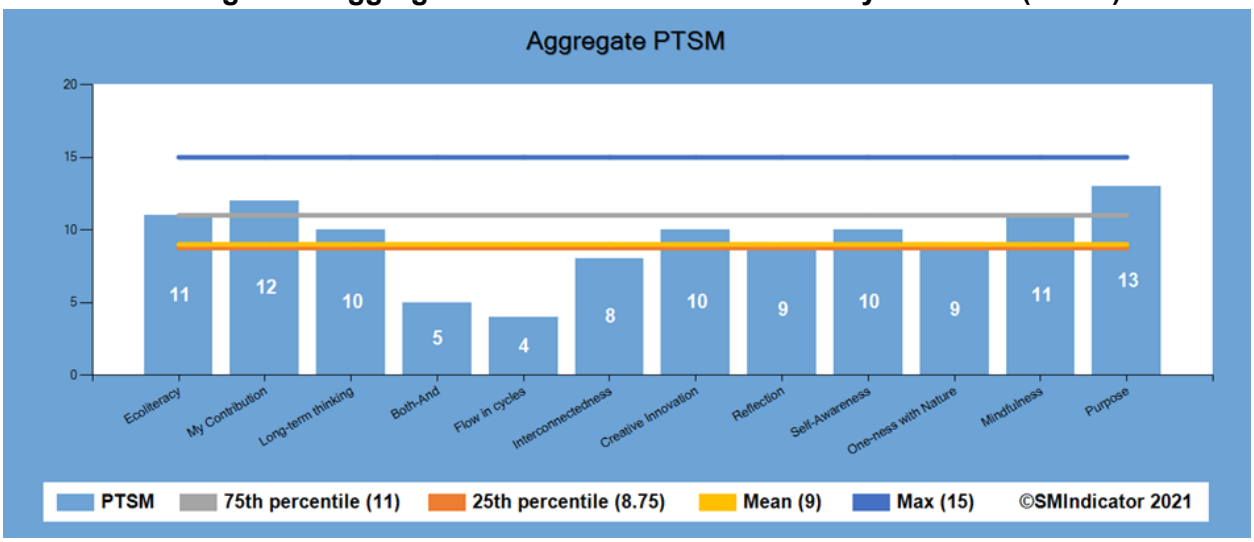
The table below shows the Aggregate Profile ordered by % Weight of the Sustainability Mindset Principle across participants.

Table 2. SMI Group Results as an Aggregate Profile Ordered by Weight

Sustainability Mindset Principle	% Weight Across Participants
Purpose	11.30%
Mindfulness	10.60%
My Contribution	10.60%
Ecoliteracy	10.60%
One-ness with Nature	9.90%
Self-Awareness	9.20%
Creative Innovation	8.50%
Reflection	7.80%
Long-Term Thinking	7.80%
Interconnectedness	6.40%
Both-And	4.30%
Flow in Cycles	2.80%

The following graph examines a quantitative view of the SMI, by introducing a key metric, Points Towards a Sustainability Mindset (PTSM). Importantly the maximum points in each sustainability mindset principle are 20, as portrayed on the Y-Axis.

Figure 3. Aggregate Points Toward Sustainability Mindsets (PTSM)



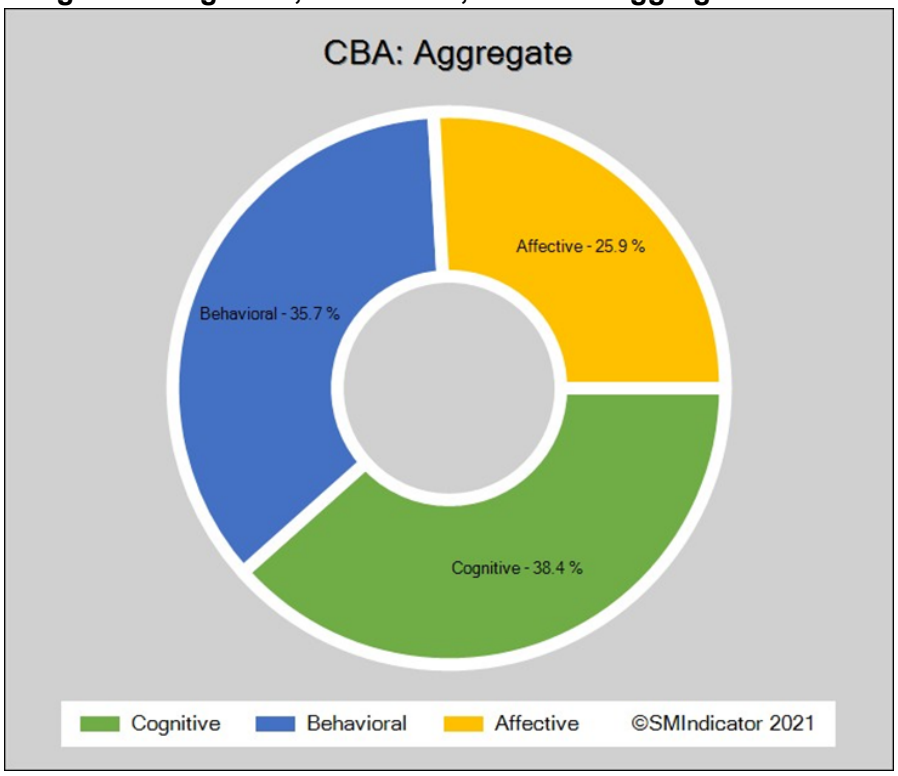
Source: Author & SMIndicator, LLC

This graph produced by the assessment offers areas where emergency managers exhibit above-average sustainability mindsets as well as gaps and areas to develop sustainability mindsets further. In addition to the mean PTSM, the graph also provides the 25th and 75th percentiles of PTSM. A principle below the 25th percentile should be assumed to be on the weaker end among the group and an area of development. Whereas a PTSM above the mean or even above the 75th percentile is considered well-developed. In the emergency manager data, several principles scored above the mean, including Ecoliteracy, My Contribution, Long-Term Thinking, Creative Innovation, Self-Awareness, Mindfulness, and Purpose. The following principles also scored above the 75th percentile, My Contribution, and Purpose. The following principles scored below the average: Both-And, Flow in Cycles, and Interconnectedness. Importantly, Both-And, Flow in Cycles, and Interconnectedness also scored below the 25th percentile. Two Principles were also right at the average, including Reflection and One-ness with Nature.

The SMI Assessment also allowed participants to select “neither” when responding to the 36 bipolar statements that captured the cognitive, behavioral, or affective aspects of a Sustainable Mindset Principle. Instances where a participant may select “neither” in the assessment may occur when the participant is in a transition of worldview, a lack of understanding of the statement, unwillingness to select one upon the other because “both” are equally important, or as a way to express discomfort with the need to make a selection, particularly among topics sensitive to the individual. Neither responses can also occur when the participant does not feel represented in the available statements.

The next graph depicted in the SMI assessment results examines the aggregate cognitive, behavioral, and affective dimensions of the group of emergency managers.

Figure 4. Cognitive, Behavioral, Affective Aggregate Results



Source: Author & SMIndicator, LLC

This graph is useful for examining the overall perspective of the sample of emergency managers. The ideal distribution of this graph would be an even distribution across the three dimensions, or 33.33% in each category. This graph shows that the sample of emergency managers has engaged in sustainability mindsets across their emotions (25.9%), cognition (38.4%), and behaviors (35.7%) with a nearly balanced distribution.

The SMI Assessment was valuable as an extension of the survey data due to the assesment's ability to capture data balancing cognitive, behavioral, and affective dimensions in a method that provides measurable and objective insights that may have been lost in solely survey data. The SMI Assessment provided a more empirical understanding of the collective case study and cross-check to the sustainability mindset framework.

Study Findings

The SMI and Survey Data helped in amplifying and extending themes from each key informant's experiences reflected in their interviews. The following section will revisit findings with supporting evidence from the SMI and Survey Data.

1. Climate Impacts

The Sustainability Mindset Indicator results support that key informants have an above-average understanding of "My Contribution," which assesses how participants view the relation between individual decisions and planetary challenges, how they feel about them, and their impact on our personal behaviors.

From the boosted survey, most participants reported being either somewhat sure (16.07%) or extremely sure (73.21%) that climate change is occurring. When asked to rank the range of issues related to climate change on a scale of 0-100, where 100 is the most pressing issue, and 0 is no issue at all, participants ranked environmental the highest issue at an average of 82.54%. Environmental challenges were also used to describe the impacts of climate change through increased severity, magnitude, scope, and the emergence of new challenges and responsibilities by the key informants. Importantly, in response to the emergent in scope and new responsibilities, The majority of participants (66.07%) either strongly disagree (23.21%) or somewhat disagree (42.86%) that emergency management as a field is prepared for the impacts of climate change.

2. Long-Term Thinking

The SMI results identified that "Long-Term Thinking" is an area where key informants can continue to develop. Long-Term Thinking was present throughout data collection methods with participants and was referred to as "foresight" challenges. The SMI was well positioned to examine and measure long-term thinking in relation to sustainability mindsets. Long-term thinking when it comes to climate change, and sustainability is an area of future research and innovation, as it seems the capability is both invaluable as well as complex. However, as climate change presents a slow and gradual complexity, learning must be designed to provide learners with situations and scenarios to practice and apply long-term thinking ranging from planning processes ahead of disasters to the long-term implications of disaster recovery.

3. *Emergency Management Sense of Purpose*

The SMI results found that “Purpose” was the most prominent sustainability mindset principle among key informants. In addition, the boosted survey also provided key insights into purpose and motivation themes from the study. Emergency managers that participated in the study reported having no issue taking charge of their own learning when training is unavailable, with over half (60.71%) strongly agreeing that they would approach learning this way. In addition, participants strongly disagreed (28.57%) or somewhat disagreed (33.93%) that they typically take training that is only directly related to their job roles and responsibilities. Most participants (67.86%) strongly agreed that they often investigate topics of interest even without a training requirement. Less than 5% of participants reported relying on their managers or organization to identify training opportunities. 83.93% (n=47) of participants strongly agreed that they feel motivated to learn about new topics. Regardless of beliefs and attitudes toward climate change, 100% of participants reported willingness to spend at least 1-2 hours learning about climate change in a given year.

4. *Emergency Management Frameworks*

The SMI identified “Both-And” and “Flow in Cycles” as the two sustainability mindset principles with the lowest averages. “Both-And Thinking” examines how one manages ambiguity and paradoxes, how one recognizes diversity, feels about it, and acts toward it. “Flow in Cycles” examines how one balances the capacity to analyze and plan with understanding natural cycles, and makes them part of one’s mindset. “Both-And” and “Flow in Cycles” may run in tandem or counter to existing emergency management frameworks depending on the context in which emergency management is being practiced or the emergency manager individually. Scores in each of these areas may also be lower due to the prominence of existing emergency management frameworks and the stringent lanes of operations. From the boosted survey, “emergency management frameworks” was the third most common theme for training.

5. *Emergency Management as a System of Stakeholders*

It is important to note that “interconnectedness” is also relatively low in the SMI results and is an area where emergency managers can develop their mental models. However, the SMI yielded results that supported that key informants collectively have balanced sustainability mindsets across cognitive, affective, and behavioral dimensions. With sustainability mindsets and the continuous development of sustainability mindset principles, emergency managers will be well-equipped to collaborate with adjacent fields.

Discussion

This paper furthers the discussion on working with adult learners on themes of climate literacy. Interestingly, the participants in this study exhibited a strong presence of sustainability mindsets across cognitive, behavioral, and affective dimensions. Therefore, a further onus on educators, workplaces, policymakers, and program designers to develop enriching climate literacy and sustainable education programs is heightened to leverage pre-existing sustainability mindsets and capacity. The findings carry national and global implications, offering insights into climate literacy programs' design and implementation. The study revealed that most emergency managers feel unprepared for climate impacts, but their sustainability mindsets, such as purpose and mindfulness, are strengths. However, areas for development were identified in long-term thinking, interconnectedness, and embracing both-and thinking and flow in cycles. The research has the potential to equip emergency managers with a deeper understanding of climate literacy, striving for a sustainable and resilient future. The study also highlighted vital considerations and questions that educators and researchers can take into account while working on climate literacy and sustainability education in their own contexts:

1. **Climate Impacts:** In what ways are your learners experiencing the impacts of climate change?
2. **Long-Term Thinking:** In what timeframes do your learners perceive climate and sustainable actions?
3. **Purpose:** Do your learners exhibit motivation and purpose to engage in climate literacy and sustainable education? If not, what are some of the potential barriers (behavioral, affective, and cognitive)
4. **Professional Frameworks:** What professional frameworks are hegemonic in your learner sample? Are climate literacy and sustainable education conducive to these frameworks, and how can these frameworks be positioned as a "frame" for learners to conceptualize content and relevancy?
5. **Systems of the Stakeholders:** What adjacent professions can best support your learner sample? Have these stakeholders been identified?

Although a brief synopsis of the Enhancing Capacity in Adult Climate Literacy study, this paper introduced foundational ideas to continue this work both in practice and in research. Undoubtedly, collaboration across levels of society will be warranted to enhance capacity in adult climate literacy writ large.

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