Entrepreneurial Mindset & Innovative Thinking Skills

Abstract

The fields of science, technology, engineering, and mathematics (STEM) are constantly evolving and advancing, and an entrepreneurial mindset is essential for success in these fields. The term "entrepreneurial mindset" refers to attitudes and behaviors that promote creativity, problem-solving, and an openness to take risks and explore new ideas. These attitudes and behaviors are important for fostering innovation and entrepreneurship, particularly in STEM fields. This paper will begin by defining an Entrepreneurial Mindset (EM) based on emerging literature on the topic and focus on highlighting the key characteristics and skills associated with this concept. Then, this paper introduces a new scale, called Comprehensive Entrepreneurial Mindset Scale (CEMS), to assess students' EM development and the preliminary results for its statistical reliability. Through an empirical study utilizing student surveys, this paper also suggests how the CEMS can be used to follow students' development EM throughout their academic life and how this relates to academic performance and student engagement in school. The paper concludes by discussing the findings' implications and suggests future research directions.

Keywords: Entrepreneurial Mindset, Comprehensive Entrepreneurial Mindset Scale, innovative thinking skills, academic performance

Introduction

The number of entrepreneurship curricular or extracurricular programs for STEM students has tremendously increased in the last two decades. With the increased emphasis on entrepreneurship and innovation, the term "entrepreneurial mindset" has been a buzzword, as many of these programs list fostering an entrepreneurial mindset in engineering students in their program objectives. In the broader definition, a mindset refers to an established set of attitudes, behaviors, beliefs, and dispositions. By this definition, the Entrepreneurial Mindset (EM) is associated with characteristics and attitudes entrepreneurs commonly exhibit. In the literature, the most common characteristics and attributes associated with entrepreneurs include opportunity seeking, need for achievement, adaptability, tolerance of risk and risk management, creativity, perseverance under setbacks, understanding the needs of people, and lifelong learning (see [1] for a review). The research also suggests that the general characteristics of entrepreneurs are very diverse as they come from different backgrounds and personalities. Regardless of their differences, all entrepreneurs go through a similar process to create significant value for others: identify an opportunity/or need in the market, take some calculated risk and act on the opportunity, identify and organize resources, motivate others to achieve a common goal, and design new products or

services. Over the years, scholars have examined various aspects of the EM. However, the different perspectives have led to diverse definitions [1-3]. The EM is defined as “the ability to rapidly sense, act, and mobilize, even under uncertain conditions.”[4] Zappe et al. [5] mentioned the definition by McGrath and MacMillan [6] as the most widely accepted definition, which is "a growth-oriented perspective through which individuals promote flexibility, creativity, continuous innovation, and renewal." The Kern Entrepreneurial Engineering Network (KEEN) defined EM as a set of characteristics and skills, including “3Cs”: curiosity, connections, and creating value [7]. Furthermore, according to the KEEN, when EM defined with 3Cs is combined with engineering skillsets (by adding opportunity and impact to design), the outcome becomes entrepreneurially minded learning. In examining the literature, Kuratko et al. [2] found that three distinct aspects have arisen through the years. These aspects are “(i) the entrepreneurial cognitive aspect—how entrepreneurs use mental models to think; (ii) the entrepreneurial behavioral aspect—how entrepreneurs engage or act for opportunities; and (iii) the entrepreneurial emotional aspects—what entrepreneurs feel in entrepreneurship.” EM attributes were listed as business skills, character traits, communication, creativity, innovation, problem-solving, and responsibility [8, 9]. Through their study, Jackson et al. [9] concluded that providing multiple opportunities for students to develop EM is essential since students in this study cited multiple experiences when reflecting on their EM development.

This paper introduces a new scale to assess students’ EM development and the preliminary results for its statistical reliability. Similar to the current scales, such as Entrepreneurial Self-Efficacy Scale [10], EM Attitude Orientation (EAO) Scale [11], and the Entrepreneurial Attitude Orientation Scale [12], the EM Scale relies on student’s self-reported, subjective responses to assess EM. Building upon these earlier scales and others, the EM Scale evaluates EM in eleven dimensions, providing a more comprehensive view of EM than earlier ones. Therefore, this new scale is called Comprehensive Entrepreneurial Mindset Scale (CEMS).

Description of the CEMS and its Statistical Reliability Validation

This section introduces the CEMS and preliminary results for its initial reliability. Table 1 presents the scale dimensions and their statistics in preliminary empirical analysis. Each dimension is measured by multiple items operationalized using five-level Likert scales (1-Strongly Agree to 5-Strongly Disagree). As we introduce below, items are related to students' self-efficacy in performing entrepreneurial tasks or self-reported beliefs about their abilities.

The average scores of a dimension’s items are used to evaluate how students scored in the dimension. Table 1 also presents the average, median, and standard deviation of 99 students who participated in the scale validation. In the following section, we describe the conceptual definitions of the dimension constructs, their relevance to EM, and statistical evidence of their reliability based on a Confirmatory Factor Analysis using the preliminary empirical study. This study used the survey method to gather responses from students from a large public university in the Northeastern United States. The objective of the empirical study was to validate the internal reliability of the CEMS items.

Table 1. Preliminary results for the reliability of the Comprehensive Entrepreneurial Mindset Scale (CEMS) (1-Strongly Agree, 2-Agree, 3-Neutral, 4-Disagree, 5-Strongly Disagree)

Dimension	Cronbach's Alpha	Mean	Median	Standard Deviation
Task Ambiguity	0.73	1.48	1.33	0.58
Risk Acceptance	0.52	2.85	2.75	0.72
Opportunity Seeking	0.73	2.03	2.00	0.74
Action Orientation	0.87	1.82	1.75	0.61
Passion For Business	0.90	2.32	2.25	1.19
Resourcefulness	0.77	1.96	2.00	0.62
Need for Achievement	0.87	1.79	1.73	0.59
Personal Growth	0.77	2.01	2.00	0.67
Creativity	0.93	2.08	2.00	0.77
Awareness	0.87	2.31	2.20	0.90
Teamwork	0.87	1.70	1.75	0.53
Networking	0.85	1.98	1.80	0.77
Financial Literacy	0.91	2.74	2.80	0.97

Tolerance for Ambiguity and Risk Acceptance

Tolerance for Ambiguity and Risk Acceptance can be defined as being comfortable with ambiguity and taking calculated risks to make informed decisions.

Risk attitudes interest researchers in many fields as they play a crucial role in our day-to-day decision-making [13]. Finding innovative solutions to today's complex problems requires taking uncharted paths and adapting unconventional approaches. Therefore, dealing with uncertainty and performing effectively in ambiguous tasks are essential skills to master for bringing innovative ideas into reality. In addition, risk assessment is an important component of all EM frameworks. It should be noted that entrepreneurs are usually unfairly portrayed as risk-takers. Research shows that entrepreneurs are, in fact, average risk-takers who can weigh the potential risks and benefits of their decisions and navigate uncertainty. In other words, entrepreneurs make informed decisions in the presence of uncertainty.

In [14], six entrepreneurial characteristics were identified during the focus group interviews, including risk-taking propensity, self-confidence, need for achievement, innovativeness, tolerance of ambiguity, and locus of control. These elements are used to define the entrepreneurial profile of students utilizing the trait model of entrepreneurship as a basis of the proposed research [14].

In the CEMS, some questions were reversed to capture the participants' attention in the survey and marked with (R) below. The standardized factor loadings are given in parenthesis next to each item.

The items to measure *Tolerance for Ambiguity and Risk Acceptance* are grouped into two dimensions:

Tolerances for Task Ambiguity items include the following (the standardized factor loadings):

- I want to know what exactly my responsibilities are (R)(0.925).
- I would like to be certain about how much authority I have (R)(0.605).
- I prefer clear, planned goals and objectives for my job (R)(0.569).

Risk Acceptance items include the following:

- I am comfortable working on subjects I do not know well (0.950).
- I enjoy going against the rules and doing things I am not supposed to do (0.583).
- I am comfortable taking action without the knowledge/approval of my superiors (0.567).
- I am comfortable with ambiguity in job assignments (0.437).

Opportunity Seeking

Successful entrepreneurs can seize opportunities [15]. This ability may occur in three different ways: (i) opportunity recognition, which involves identifying an existing opportunity and exploiting it by connecting a known solution with existing demand; (ii) opportunity discovery, which involves starting with a solution and searching for demand, or starting with a known demand and searching for a solution; (iii) opportunity creation, which involves taking entrepreneurial action with any existing solution or need [16]. Researchers demonstrated that entrepreneurship education positively and significantly affects opportunity-seeking and alertness behavior in students [17].

The items for *Opportunity Seeking* are given as follows:

- I like identifying the need for a new product or service (0.820).
- I am motivated to determine how to improve existing products/services (0.794).
- Scanning the environment for new opportunities really excites me (0.793).
- I feel energized when I am developing product prototypes (0.786).
- Searching for new ideas for products/services to offer is enjoyable to me (0.744).
- I think critically about new products or services (0.678).
- It is exciting to figure out new ways to solve unmet market needs that can be commercialized (0.662).
- I strive for new possibilities (0.630).
- I look for new ways to do things (0.620).

Action Orientation

Action orientation can be defined as acting under uncertainty and with often limited resources to bring new, often-unrecognizable products to market and convince stakeholders to support their endeavors. Opportunity-seeking should be followed by action orientation in order to lead people with ideas and know-how to entrepreneurship [18].

The type of action entrepreneurs takes to navigate uncertain entrepreneurial contexts is underspecified. Entrepreneurial hustle is a fundamental behavior that enables entrepreneurs to enroll new venture stakeholders and lead their entrepreneurial efforts [19].

Action Orientation items include the following:

- I like to turn plans into actions (0.818).
- I can't wait to get started on a project (0.695).
- I take the initiative (0.650).
- I prefer participating fully rather than viewing life from the sidelines (0.633).

Passion for New Business

Passion for new business refers to an enthusiasm to develop and launch new ventures. Entrepreneurial passion is a valuable predictor of entrepreneurs' behavior and performance [20]. What makes some entrepreneurs persist in their venture efforts while others quit? Self-efficacy has robustly been found to drive persistence, yet recent work suggests that affect, in particular entrepreneurial passion, may also enhance persistence [21]. Passion for new business helps entrepreneurs overcome the obstacles and setbacks inherent in the entrepreneurial journey. The following four items are used to measure *Passion for New Business* (the standardized factor loadings):

- Owning a company will be energizing (0.941).
- Establishing a new company is exciting (0.924).
- Becoming a business founder is a vital part of whom I want to be (0.876).
- Nurturing a new business through its emerging success is enjoyable (0.801).

Resourcefulness

Entrepreneurs regularly confront resource constraints to bring their ideas to fruition. To overcome resource constraints, they often try to mobilize resources from external providers and use narratives as critical tools. Resourcefulness helps entrepreneurs make the most of these limited resources and find creative ways to overcome an impediment [22]. The entrepreneurship literature also suggests resilience may help explain entrepreneurial success [23].

Frugal entrepreneurs engage in self-reliant resourcefulness behaviors to aid in reaching a goal of self-sufficiency. We integrate social cognitive theory, and its tenets of personal and collective agency, to develop an individual-level perspective on entrepreneurs' resourcefulness behaviors

that illustrates how these behaviors can be classified as ‘self-reliant behaviors’ or ‘joint resourcefulness behaviors’ [24].

The conceptualization of the ‘entrepreneurial resourcefulness’ model helps one understand various aspects prompting an entrepreneur to identify opportunities and thereby regulate and direct their behavior to make the best use of them. The model elaborates on three entrepreneurial competencies—cognitive, affective, and action-oriented [25].

The items for *Resourcefulness* are given as follows:

- I am good at many things (0.743).
- I can manage many things at the same time (0.699).
- I can handle a lot of information (0.667).
- I can tackle anything (0.659).
- I can work under pressure (0.645).
- I can perform a wide variety of tasks (0.644).
- I like to solve complex problems (0.568).
- I need things explained only once (0.485).

Need to Achieve or Achievement Seeking

Successful entrepreneurs overcome many unforeseen obstacles while turning an innovative idea into a reality, which is only possible by having high motivation, commitment, and perseverance to achieve end goals. The need to achieve is positively related to persistence [26, 27]; therefore, it is an essential characteristic of entrepreneurs. Likewise, research shows entrepreneurs exhibit high achievement motivation [28].

The items for *Achievement* are given as follows:

- I plunge into tasks with all my heart (0.818).
- I do more than what's expected of me (0.779).
- I accomplish a lot of work (0.766).
- I set high standards for myself and others (0.744).
- I try to excel in what I do (0.741).
- I try to do my best in what I do (0.686).
- I hang around doing nothing (R)(0.665).
- I find it difficult to get down to work (R)(0.539).
- I need a push to get started (R) (0.535).
- I shirk my duties (R)(0.455).
- I do just enough work to get by (R)(0.400).

Personal Growth

Personal growth is a process of understanding and pushing oneself to reach one's highest potential. Personal growth is important for entrepreneurs because it enables them to keep up with recent advances in their fields and acquire new skills and knowledge for innovative solutions. Research in the separate areas of innovation and growth has considerably intensified in recent years. However, little scholarly attention has been paid to the entrepreneurs' personal characteristics that might explain the growth of micro and small enterprises through innovation [29].

The items for *Personal Growth* are given as follows:

- I go out of my way to attend educational and training events (0.775).
- I view challenging situations as an opportunity to grow and learn (0.760).
- I frequently seek out opportunities to challenge myself and grow as a person (0.739).
- I look forward to the opportunity to learn and grow (0.583).

Creativity

Creativity is the ability to go beyond traditional ways of thinking or acting, cultivating new and innovative ideas. Although entrepreneurs' entrepreneurial creativity is often seen as a prerequisite, previous research indicates that it is not an exclusive determinant of innovation. Given the array of factors that influence success in the market, it may be questioned whether creativity is essentially a prominent factor of entrepreneurship. Pure or raw creativity is certainly not a sufficient factor of entrepreneurship but must first be combined with general business sense or acumen to guarantee innovation success [30].

At the heart of the entrepreneurial process in creative industries are entrepreneurial creativity and opportunity recognition, which influence entrepreneurs' ability to create new ventures or significantly improve the position of an existing business [31].

Results show that entrepreneurs' creative cognitive style positively affects both entrepreneurs' creativity and firm creativity, but entrepreneurs' planning cognitive style has a negative effect. Findings indicate that entrepreneurs with strong family ties and business ties have a high level of individual creativity and firm creativity, which positively influence entrepreneurs' happiness [32].

Creativity and resilience are critical capacities for entrepreneurs in today's economy. Results show that the antecedents of creativity and resilience were contingent on the type of entrepreneurs [33].

The items for *Creativity* are given as follows:

- I often come up with creative solutions to problems (0.904).
- I often come up with new and practical ideas (0.878).
- I am good at generating creative ideas (0.854).

- I often have new and innovative ideas (0.841).
- I am good at providing a fresh approach to problems (0.824).
- I often promote and champion ideas to others (0.744).

Opportunity Awareness and Alertness

The concept of entrepreneurial alertness has been studied from different perspectives, being considered, on the one hand, as a cognitive capacity, a dynamic capacity, or a skill of the entrepreneur and, on the other hand, as an organizational factor that affects a company's performance and a source of competitive advantage [34]. However, this is a highly fragmented field of research that aggregates contributions from researchers in the fields of economics and strategy, entrepreneurship, and psychology.

Montiel-Campos examined the relationship between entrepreneurial passion for developing and strategic change as well as the moderating role of entrepreneurial alertness dimensions in this relationship. It has been shown that entrepreneurs' passion for creating is related to strategic change. Furthermore, this relationship is enhanced at higher levels of the scanning and search dimension as well as the evaluation and judgment dimension, both of which relate to entrepreneurial alertness. Contrary to expectation, the results suggest that the association and connection dimension negatively moderate the relationship between entrepreneurs' passion for developing and strategic change [35].

Prompted by the scant attention that scholars have paid to the link between alertness and the pathways of entrepreneurial thought, it proposes that being alert by adequately scanning and searching for information is likely to increase decision-making effectiveness [36].

The items for *Awareness* are given as follows:

- I recognize social trends (0.920).
- I follow trends in the economy (0.906).
- I am aware of new products and services (0.673).
- I am informed about current social and economic problems (0.648).
- I have a good perception of the markets (0.564).

Team Building and Leadership

Successful entrepreneurs bring together a diverse team of people with complementary skills, motivate them toward a common goal, and create an environment where they work efficiently to develop and implement innovative ideas. An extensive number of papers in the literature discuss teamwork knowledge skills and abilities, which can be categorized into define five major groups: (i) Conflict Resolution; (ii) Collaborative Problem Solving; (iii) Communications, (iv) Goal Setting, and (v) Performance Management and Planning/Task Coordination [37]. Building on the social cognitive theory and the resource-based view of firms, it has been argued that

entrepreneurial leadership fosters employees' innovative work behavior by enhancing their individual and team creativity self-efficacy [38].

Based on the Teamwork Interest, Skills, and Attitudes Scale [39-41], the CEMS includes the following items for teamwork self-efficacies:

- Identifying team resources and team member skills (0.847).
- Coordinating and synchronizing tasks, information, and task interdependencies among team members (0.799).
- Defining tasks and clear expectations to achieve these team objectives (0.777).
- Defining task sequences and inter-dependencies (0.712).
- Defining and understanding team roles and role expectations (0.704).
- Establishing specific team goals (0.591).
- Providing feedback on the team or individual performance (0.521).
- Evaluating team progress toward each team goal (0.492).

Networking

Networking relates to a process of initiating, reacting, and evaluating networking [42]. Successful entrepreneurs build strong support networks [43] and tap into the resources available within those networks. Entrepreneurship programs, such as competitions, can help students develop their support networks during their education [44] and rely on them to pursue their entrepreneurial intention beyond formal education.

The following items are used to evaluate the *Networking* dimension of the CEMS.

- Forming partner or alliance relationships with others (0.900).
- Tapping the expertise of others (0.898).
- Attending professional and learned societies and events (0.834).
- Meeting with new people (0.688).
- Establishing a personal support network (0.672).

Financial Intelligence

Financial Intelligence pertains to an entrepreneur's understanding of financial documents, such as income statements, balance sheets, and cash flow, for their startup and how to use financial information to make better decisions. Berman and Knight [45] provide excellent guides to the numbers.

The items for *Financial Intelligence* are given as follows:

- Managing finances of a firm (0.898).
- Performing financial analysis (0.862).
- Finding funding alternative resources (0.834).

- Developing financial systems and internal controls (0.805).
- Estimating the cost of a product or service (0.688).

Discussions & Conclusion

We introduced a new Comprehensive Entrepreneurial Mindset Scale (CEMS) to measure Entrepreneurial Mindset (EM) and its preliminary reliability. CEMS can be used to determine the impact of entrepreneurship programs on students' entrepreneurial mindsets. Mindsets can be developed and changed over time by practicing attitudes and skills and reflecting on experiences. Therefore, CEMS should be used in longitudinal studies to measure changes in entrepreneurial mindsets rather than short programs. CEMS can also be used as a recruitment tool to identify students who might be interested in developing their entrepreneurial skills and abilities. Another application of CEMS could be to evaluate the overall EM of academic programs in cross-sectional studies.

The preliminary confirmatory factor analysis showed that most items had acceptable levels of factor loadings (higher or closer to 0.7). However, some items had low factor loadings, particularly those related to risk and ambiguity dimensions. In addition, items with reverse codings had low factor loadings. These items will be revised or removed in the next version of the CEMS. For further research, we plan to test the revised version of the CEMS using a more extensive sample set and study its invariance across different student population demographics.

Acknowledgment

This research is sponsored by the National Science Foundation (NSF) Grant (DUE 2120936). Any opinions and findings expressed in this material are of the authors and do not necessarily reflect the views of the NSF.

References

[1] C. Naumann, "Entrepreneurial mindset: A synthetic literature review," *Entrepreneurial Business and Economics Review,* vol. 5, no. 3, pp. 149-172, 2017.

[2] D. F. Kuratko, G. Fisher, and D. B. Audretsch, "Unraveling the entrepreneurial mindset," *Small Business Economics,* vol. 57, pp. 1681-1691, 2021.

[3] R. J. Pidduck, D. R. Clark, and G. Lumpkin, "Entrepreneurial mindset: Dispositional beliefs, opportunity beliefs, and entrepreneurial behavior," *Journal of Small Business Management,* vol. 61, no. 1, pp. 45-79, 2023.

[4] R. D. Ireland, M. A. Hitt, and D. G. Sirmon, "A model of strategic entrepreneurship: The construct and its dimensions," *Journal of management,* vol. 29, no. 6, pp. 963-989, 2003.

[5] S. E. Zappe, "Avoiding Construct Confusion: An Attribute-Focused Approach to Assessing Entrepreneurial Mindset," *Advances in Engineering Education,* vol. 7, no. 1, p. n1, 2018.

[6] R. G. McGrath and I. C. MacMillan, *The entrepreneurial mindset: Strategies for continuously creating opportunity in an age of uncertainty*. Harvard Business Press, 2000.
[7] T. K. F. Foundation. "Transforming Engineering with Entrepreneurial Mindset." https://engineeringunleashed.com/ (accessed.
[8] A. M. Jackson, S. Resnick, R. Hansson, and C. Bodnar, "Student perceptions of an entrepreneurial mindset and its relevance to engineering careers," 2021.
[9] A. Jackson, S. Resnick, R. Hansson, K. Burgess, and C. A. Bodnar, "Exploration of the experiences that shape engineering students' entrepreneurial mindset development," *Entrepreneurship Education and Pedagogy,* vol. 6, no. 1, pp. 60-86, 2023.
[10] C. C. Chen, P. G. Greene, and A. Crick, "Does entrepreneurial self-efficacy distinguish entrepreneurs from managers?," *Journal of Business Venturing,* vol. 13, no. 4, pp. 295-316, 1998.
[11] T. M. Fernandez, G. Sliva Coutinho, M. D. Wilson, and S. R. Hoffmann, "Development of entrepreneurial attitudes assessment instrument for freshman students," 2015.
[12] P. B. Robinson, D. V. Stimpson, J. C. Huefner, and H. K. Hunt, "An attitude approach to the prediction of entrepreneurship," *Entrepreneurship Theory and Practice,* vol. 15, no. 4, pp. 13-32, 1991.
[13] Y. Shou and J. Olney, "Measuring Risk Tolerance across Domains: Scale Development and Validation," (in English), *Journal of Personality Assessment,* vol. 104, no. 4, pp. 484-495, 2022, doi: 10.1080/00223891.2021.1966019.
[14] M. Abdul, A. A. Rahman, M. Yahya, and M. M. Rahman, "Entrepreneurial characteristics and intentions among undergraduates in Malaysia," (in English), *World Review of Entrepreneurship, Management, and Sustainable Development,* vol. 15, no. 5, pp. 560-574, 2019, doi: 10.1504/WREMSD.2019.103532.
[15] I. M. Kirzner, "The alert and creative entrepreneur: A clarification," *Small Business Economics,* vol. 32, pp. 145-152, 2009.
[16] J. H. Dyer, H. B. Gregersen, and C. Christensen, "Entrepreneur behaviors, opportunity recognition, and the origins of innovative ventures," *Strategic Entrepreneurship Journal,* vol. 2, no. 4, pp. 317-338, 2008.
[17] S. Saadat, A. Aliakbari, A. Alizadeh Majd, and R. Bell, "The effect of entrepreneurship education on graduate students' entrepreneurial alertness and the mediating role of entrepreneurial mindset," *Education + Training,* vol. 64, no. 7, pp. 892-909, 2022, doi: 10.1108/ET-06-2021-0231.
[18] S. N. Batool, K. Razzaq, and H. Imam, "How does action-oriented personality traits impact on entrepreneurial career choices? A trait-factor theory perspective," *Kybernetes,* 2022, doi: 10.1108/K-04-2022-0498.
[19] G. Fisher, R. Stevenson, E. Neubert, D. Burnell, and D. F. Kuratko, "Entrepreneurial Hustle: Navigating Uncertainty and Enrolling Venture Stakeholders through Urgent and Unorthodox Action," (in English), *Journal of Management Studies,* vol. 57, no. 5, pp. 1002-1036, 2020, doi: 10.1111/joms.12584.
[20] J.-L. Gao, D.-S. Li, and M.-L. Conway, "Family support and entrepreneurial passion: The mediating role of entrepreneurs' psychological capital," (in English), *Social Behavior and Personality,* vol. 49, no. 3, pp. 1-15, 2021, doi: 10.2224/sbp.9791.

[21] M. S. Cardon and C. P. Kirk, "Entrepreneurial Passion as Mediator of the Self-Efficacy to Persistence Relationship," (in English), *Entrepreneurship Theory and Practice,* vol. 39, no. 5, pp. 1027-1050, 2015, doi: 10.1111/etap.12089.
[22] G. Fisher, E. Neubert, and D. Burnell, "Resourcefulness narratives: Transforming actions into stories to mobilize support," (in English), *Journal of Business Venturing,* vol. 36, no. 4, p. 106122, 2021, doi: 10.1016/j.jbusvent.2021.106122.
[23] J.-C. Ayala and G. Manzano, "The resilience of the entrepreneur. Influence on the success of the business. A longitudinal analysis," (in English), *Journal of Economic Psychology,* vol. 42, pp. 126-135, 2014, doi: 10.1016/j.joep.2014.02.004.
[24] T. L. Michaelis, D. J. Scheaf, J. C. Carr, and J. M. Pollack, "An agentic perspective of resourcefulness: Self-reliant and joint resourcefulness behaviors within the entrepreneurship process," (in English), *Journal of Business Venturing,* vol. 37, no. 1, p. 106083, 2022, doi: 10.1016/j.jbusvent.2020.106083.
[25] S. Misra and E. S. Kumar, "Resourcefulness: A Proximal Conceptualisation of Entrepreneurial Behaviour," (in English), *The Journal of Entrepreneurship,* vol. 9, no. 2, pp. 135-154, 2000, doi: 10.1177/097135570000900201.
[26] S. Wu, Matthews, and G. K. Dagher, "Need for achievement, business goals, and entrepreneurial persistence," *Management Research News,* vol. 30, no. 12, pp. 928-941, 2007.
[27] S. M. Carraher, J. K. Buchanan, and G. Puia, "Entrepreneurial need for achievement in China, Latvia, and the USA," *Baltic Journal of Management,* 2010.
[28] W. H. Stewart and P. L. Roth, "A Meta-Analysis of Achievement Motivation Differences between Entrepreneurs and Managers," (in English), *Journal of Small Business Management,* vol. 45, no. 4, pp. 401-421, 2007, doi: 10.1111/j.1540-627X.2007.00220.x.
[29] I. Laguir and M. d. Besten, "The influence of entrepreneur's personal characteristics on MSEs growth through innovation," (in English), *Applied economics,* vol. 48, no. 44, pp. 4183-4200, 2016, doi: 10.1080/00036846.2016.1153792.
[30] B. Barnard and D. Herbst, "Entrepreneurship, Innovation and Creativity: The Creative Process of Entrepreneurs and Innovators," *Expert Journal of Business and Management,* vol. 7, no. 1, pp. 107-146, 2019.
[31] Y.-Y. Chang and M.-H. Chen, "Creative entrepreneurs' creativity, opportunity recognition, and career success: Is resource availability a double-edged sword?," (in English), *European Management Journal,* vol. 38, no. 5, pp. 750-762, 2020, doi: 10.1016/j.emj.2020.03.004.
[32] M.-H. Chen, Y.-Y. Chang, and Y.-C. Lin, "Exploring creative entrepreneurs' happiness: cognitive style, guanxi and creativity," (in English), *International Entrepreneurship and Management Journal,* vol. 14, no. 4, pp. 1089-1110, 2018, doi: 10.1007/s11365-017-0490-3.
[33] A.-M. Nisula and H. Olander, "The role of motivations and self-concepts in university graduate entrepreneurs' creativity and resilience," (in English), *Journal of Small Business Management,* vol. ahead-of-print, no. ahead-of-print, pp. 1-30, 2020, doi: 10.1080/00472778.2020.1760030.
[34] A. D. Daniel, S. Adeel, and A. Botelho, "Entrepreneurial Alertness Research: Past and Future," (in English), *SAGE open,* vol. 11, no. 3, p. 215824402110315, 2021, doi: 10.1177/21582440211031535.

[35] H. Montiel-Campos, "Moderating role of entrepreneurial alertness on the relationship between entrepreneurial passion and strategic change," (in English), *Journal of Organizational Change Management,* vol. 34, no. 5, pp. 1107-1124, 2021, doi: 10.1108/JOCM-12-2020-0386.

[36] S. Sassetti, V. Cavaliere, and S. Lombardi, "The rhythm of effective entrepreneurs' decision-making process. The pathways of alertness scanning and search and cognitive style. A mediation model," (in English), *International Entrepreneurship and Management Journal,* vol. 18, no. 2, pp. 555-578, 2022, doi: 10.1007/s11365-021-00759-1.

[37] M. J. Stevens and M. A. Campion, "The knowledge, skill, and ability requirements for teamwork: Implications for human resource management," *Journal of Management,* vol. 20, no. 2, pp. 503-530, 1994.

[38] A. Bagheri, M. Akbari, and A. Artang, "How does entrepreneurial leadership affect innovation work behavior? The mediating role of individual and team creativity self-efficacy," (in English), *European Journal of Innovation Management,* vol. 25, no. 1, pp. 1-18, 2022, doi: 10.1108/EJIM-07-2020-0281.

[39] K. Vance, S. Kulturel-Konak, and A. Konak, "Assessing teamwork skills and knowledge," in *2014 IEEE Integrated STEM Education Conference*, 2014: IEEE, pp. 1-6.

[40] A. Konak and S. Kulturel-Konak, "Impact of Online Teamwork Self-Efficacy on Attitudes Toward Teamwork," *International Journal of Information Technology Project Management (IJITPM),* vol. 10, no. 3, pp. 1-17, 2019.

[41] A. Konak, S. Kulturel-Konak, and W. Cheung Gordon, "Teamwork attitudes, interest and self-efficacy between online and face-to-face information technology students," *Team Performance Management: An International Journal,* vol. 25, no. 5/6, pp. 253-278, 2019, doi: 10.1108/TPM-05-2018-0035.

[42] M. Kaandorp, E. van Burg, and T. Karlsson, "Initial Networking Processes of Student Entrepreneurs: The Role of Action and Evaluation," (in English), *Entrepreneurship Theory and Practice,* vol. 44, no. 3, pp. 527-556, 2019, doi: 10.1177/1042258719834019.

[43] T. Byers, H. Kist, and R. I. Sutton, "Characteristics of the entrepreneur: Social creatures, not solo heroes," *The Handbook of Technology Management,* pp. 1-5, 1997.

[44] S. Kulturel-Konak, "Overview of Student Innovation Competitions and Their Roles in STEM Education," in *2021 Fall ASEE Middle Atlantic Section Meeting*, Volume, Nov 12-13 2021, pp. 1-6.

[45] K. Berman and J. Knight, *Financial intelligence, revised edition: A manager's guide to knowing what the numbers really mean*. Harvard Business Review Press, 2013.