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A Proposed Entrepreneurial Creativity Competency Framework For Steam Education in Vietnamese High Schools

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ABSTRACT: In the context of digital transformation and the Fourth Industrial Revolution, developing students' entrepreneurial creativity is essential. In Vietnam, the 2018 General Education Curriculum and Government Project 1665 have established policy foundations for entrepreneurship education in schools. Nevertheless, knowledge gaps remain regarding a competency framework for entrepreneurial creativity suited to high school students within the Vietnamese educational context. An analysis of several integrated entrepreneurial-creativity teaching models implemented internationally indicates that STEAM education is particularly well suited to Vietnam due to its interdisciplinary character and emphasis on solving real-world problems. This study proposes a structure for an Entrepreneurial Creativity Competency (ECC) framework within STEAM teaching at the high school level in Vietnam. The framework comprises five sequential components - Inquiry; Ideation; Design; Fabrication and Testing; and Commercialization - operationalized through 16 behavioral indicators. A comparison with the Problem-Solving and Creativity Competency Framework and the Physics Competency Framework demonstrates that the proposed ECC framework inherits core elements of creative thinking and practical problem-solving while adding domain-specific elements related to commercialization and market value creation, thereby confirming the framework's suitability and feasibility for implementation in Vietnamese general education.

1. INTRODUCTION

Digital transformation and the rapid advancement of the Fourth Industrial Revolution (Industry 4.0) have generated an urgent demand for a workforce equipped with innovative thinking and the readiness to act in a continuously changing society. Creativity and entrepreneurship are recognized as two essential 21st-century competencies that students need to develop (Bacigalupo et al., 2016; Chiruguru & Chiruguru, 2020), and the two are deeply interrelated. Creativity constitutes a core element of the entrepreneurship competency framework (Bacigalupo et al., 2016) and enables learners to adapt to social change (Schumacher & Eimler, 2023); entrepreneurship, in turn, simultaneously serves as the driver and the outcome of the creative process (Cvijanović & Dopler, 2020; Della Corte & Del Gaudio, 2017; Fillis & Rentschler, 2010; Schumacher & Eimler, 2023; Zhou & Frisdahl, 2024).

In Vietnam, the 2018 General Education Curriculum (*GEC*) shifted the pedagogical emphasis from knowledge transmission to the development of students' qualities and competencies. Within this framework, problem-solving and creativity competency was designated as one of three core general competencies that all general education students must attain (Vietnam Ministry of Education and Training, 2018a). Concurrently, Government Project 1665 on supporting student entrepreneurship through 2025 set the goal of fostering an entrepreneurial spirit in schools, requiring the provision of entrepreneurship-related knowledge and skills and the creation of a conducive environment in which students can formulate and realize business ideas during their studies (Government of Vietnam, 2017).

Accordingly, research into the relationship between creativity and entrepreneurship is needed to inform the design of integrated instructional processes that simultaneously develop creative competency and cultivate entrepreneurial thinking in students. The General Theory of Entrepreneurial Creativity (*GTEC*) provides an important theoretical foundation for explaining this relationship, viewing entrepreneurship as a domain of creativity and affirming the central role of entrepreneurial creativity in predicting and explaining entrepreneurial performance, enterprise growth, innovation, and contributions to scientific, educational, economic, and social life (McMullan & Kenworthy, 2015). According to GTEC, the structure of entrepreneurial creativity encompasses *intelligence; personality; motivation; thinking style; and knowledge*, while the *environment* (*cultural, social, institutional, and market*) simultaneously functions as a source of support and a generator of challenges that shape the capacity and necessity of entrepreneurial creativity.

Amabile and colleagues decomposed the structure of entrepreneurial creativity into: (1) *internal factors*, comprising domain-relevant knowledge, creative-thinking skills, and intrinsic motivation; and (2) *external environment* that supports entrepreneurial activity (Amabile, 1997; Rigolizzo & Amabile, 2015). The entrepreneurial creativity process unfolds through the stages of *problem or opportunity identification, preparation, idea generation, evaluation, and implementation* (Amabile, 1997). At the problem or opportunity identification stage, intrinsic motivation to accept risk and explore the novel is the core factor and the defining characteristic of entrepreneurship (Amabile, 1997; Palmer et al., 2015; Rigolizzo & Amabile, 2015). In entrepreneurship education, organizing experiential learning activities (Pepin, 2012) and equipping students with interdisciplinary skills (Janssen et al., 2007) help learners integrate knowledge from multiple fields to solve problems flexibly.

Advanced pedagogical models - including Maker Education (Weng et al., 2022), Socio-Scientific Issue Approach (*SIA*) (Arifin & Siew, 2023b; Benek & Akcay, 2022; Sadler, 2011), Project-Based Learning (*PjBL*) (Affandi et al., 2021; Artayasa et al., 2024), and Entrepreneurial STEM (*E-STEM*) (Eltanahy, 2023; Eltanahy et al., 2020a, 2020b; Eltanahy & Mansour, 2024) - have demonstrated effectiveness in developing students' creative thinking and entrepreneurial behavior. However, at the secondary school level, entrepreneurial creativity research still exhibits significant gaps in both theoretical and educational practice dimensions. Specifically, no concrete competency framework for Entrepreneurial Creativity Competency (*ECC*) suited to high school students in alignment with the goals of the *GEC* has yet been established, creating difficulties in organizing instruction, assessing, and measuring the development of students' ECC.

The present study addresses these gaps by proposing an ECC framework appropriate for the Vietnamese educational context, thereby laying the groundwork for integrating entrepreneurial activities into secondary-level teaching. The ECC assessment instrument enables the quantification of students' entrepreneurial creativity development and supports teachers in designing entrepreneurial STEAM learning activities. The study pursues the following specific objectives: *(i) to identify the structure of ECC at the high school level; and (ii) to construct an ECC framework comprising five components with 16 behavioral indicators.*

2. RESEARCH CONTENT

2.1. Defining Entrepreneurial Creativity Competency

In economic development theory, at the individual (*micro*) level, entrepreneurship is regarded as a domain of *applied creativity* (McMullan & Kenworthy, 2015; Schumpeter, 1934). Accordingly, creativity denotes the capacity to generate novel ideas that address a problem (*usefulness*) (Sternberg, 1999), while entrepreneurship refers to a process in which the subject identifies entrepreneurial opportunities (Shane & Venkataraman, 2000) and implements ideas to create value (Bacigalupo et al., 2016; Stevenson, 1983). Within entrepreneurial activity, creative ideas must be linked to practical business opportunities (Fillis & Rentschler, 2010). Amabile (1997) emphasized that the combination of intrinsic motivation (*passion, personal interest*) and extrinsic motivation (*rewards, recognition*) is the basis upon which subjects initiate and develop creative ideas. Divergent thinking - the capacity to generate multiple solutions to a problem - enables subjects to reorganize ideas into novel solutions (Runco, 2004). Social interaction factors, such as *group dynamics*, *group decision-making*, and *social network resources*, help subjects actualize solutions into entrepreneurial projects (Sternberg & Lubart, 1991; Zhou & Shalley, 2024).

Della Corte and colleagues (2017) defined entrepreneurial creativity competency as the ability to create and seize new opportunities while knowing how to combine and employ resources in distinctive ways to increase competitive advantage and generate market value.

Creativity and entrepreneurial creativity differ primarily in terms of goals and activities. Creativity is a necessary but insufficient condition for entrepreneurial activity; even a novel and useful idea does not necessarily constitute an entrepreneurial opportunity (Goss et al., 2007). Entrepreneurial creativity, by contrast, requires an explicit focus on practical value - it is, in essence, a contextualized instantiation of creativity that emphasizes commercial viability and innovation within entrepreneurial activity.

In general education, students' entrepreneurial creativity manifests as: *possessing rich imagination; proposing multiple ideas; working independently; and showing enthusiasm for new challenges* (Artayasa et al., 2024). For measurement and assessment purposes, Arifin and Siew (2023a) proposed the Entrepreneurial Creative Thinking Test (*ECTT*), which comprises five components: *(1) Inquiry; (2) New Ideas; (3) Design; (4) Product Creation; and (5) Commercialization.*

On this basis, entrepreneurial creativity competency in high school students is defined as the capacity to implement novel, useful, contextually appropriate ideas that carry economic and social value. The competency manifests through experiential learning activities in which students identify problems or entrepreneurial opportunities, propose creative solutions, design and fabricate models or products, and carry out product commercialization.

2.2. Stages of the Entrepreneurial Creativity Process

Studies by Amabile (1997), Palmer and colleagues (2015), and Arifin and Siew (2023a) all identify entrepreneurial creativity as a structured process beginning with the identification of a problem or opportunity, proceeding through the generation of novel ideas, and concluding with the actualization of those ideas in practice or on the market (Amabile, 1997; Arifin & Siew, 2023a; Palmer et al., 2015). However, these models differ in the number and delineation of stages. Amabile's model comprises four stages; Arifin proposes five stages; while Palmer condenses Schuler and Görlich's (2007) creativity process into six stages, with an explicit separation of information-seeking and concept-linking steps. A notable point of distinction is the emphasis placed on commercialization: Arifin dedicates a distinct stage to digital-technology-based product marketing. With regard to purpose and research context, Amabile's componential theory of entrepreneurial creativity analyzes the roles of skills, intrinsic motivation, and the work environment; Palmer employs a psychometric instrument (*DBK-PG*) to assess entrepreneurs' creative-cognitive entrepreneurial competency; and Arifin's work focuses on developing a measurement instrument (*ECTT*) for secondary school students in STEM education, integrating a socio-scientific issues approach with design thinking processes.

Table 1. Stages of the Entrepreneurial Creativity Process

<table>
<tr><th>Amabile</th><th>Palmer et al.</th><th>Arifin & Siew</th></tr>
<tr><td>Problem Identification:
Identify and define the problem or opportunity; accept risk; show readiness to face challenges</td><td>Problem Definition:
Explore, identify, and define relevant problems</td><td rowspan="3">Inquiry:
Investigate, collect data, and pose questions to understand the specific problem or need</td></tr>
<tr><td rowspan="2">Preparation:
Gather knowledge and resources from diverse sources to acquire relevant information before proposing solutions</td><td>Information Search:
Search for knowledge and retrieve relevant information</td></tr>
<tr><td>Concept Linking:
Reorganize existing concepts; find connections and analogies among concepts</td></tr>
<tr><td>Idea Generation:
Combine information with prior knowledge to produce new connections and solutions</td><td>Idea Generation:
Generate ideas characterized by originality, fluency, and flexibility</td><td>Ideation:
Propose and develop original, high-potential ideas and solutions through argumentation</td></tr>
<tr><td rowspan="3">Evaluation and Implementation:
Test, adjust, and evaluate the novelty and appropriateness of ideas; identify viable ideas and implement solutions into real products</td><td rowspan="2">Solution Development:
Transform initial ideas into a useful solution</td><td>Design:
Sketch new ideas in the form of drawings; evaluate solution feasibility</td></tr>
<tr><td>Fabrication:
Implement ideas and fabricate a product based on the design</td></tr>
<tr><td>Implementation:
Communicate, persuade, and integrate the solution</td><td>Commercialization:
Introduce and market the product through digital technology</td></tr>
</table>

2.3. Opportunities to Develop ECC Through STEAM Education

McMullan and colleagues (2015) proposed several instructional forms for developing students' entrepreneurial creativity in general education: *creating role-playing situations; providing multi-disciplinary experiential learning; empowering students with freedom and recognition to propose multiple original ideas; solving real-world problems; regularly fabricating creative products; and expressing personal emotions*. Within the scope of the present study, drawing on McMullan's proposals, four teaching models that develop students' ECC are analyzed: *Biopreneurship-PjBL* (Artayasa et al., 2024), *Maker Education 5E* (Weng et al., 2022), *SIA-DT* (Arifin & Siew, 2023b), and *E-STEM* (Eltanahy et al., 2020b).

Biopreneurship Project-Based Science Learning (*Biopreneurship-PjBL)* combines PjBL with bio-entrepreneurial ideation, in which students design biologicallybased products with commercialization potential. The instructional sequence begins with an open entrepreneurial question, followed by project planning, prototype fabrication, presentation, reflection, and evaluation. A pre-test/post-test quasi-experimental study with 100 Grade 9 students demonstrated that the experimental group's ECC (*N-gain*: 53.3–56.4%) substantially outperformed the control group (29.2–29.9%), with particularly pronounced gains in the indicators of *rich imagination* and *readiness to try new challenges*.

Maker Education 5E (*Maker 5E)* is grounded in the 5E learning cycle (*Engage, Explore, Explain, Elaborate, Evaluate*) and embeds maker activities (3D printing, digital communication) within STEM problem-solving. Creativity is assessed against four criteria: *originality, utility, aesthetics, and authenticity*; entrepreneurial competency is structured into three components: *idea-*

opportunity, resources, and action. A case study with 70 Grade 9 students, employing video recording, interviews, and digital artifacts, demonstrated a continuous increase in entrepreneurial creativity indicators and learning motivation across each 5E phase.

Socio-Scientific Issue Approach–Design Thinking (*SIA-DT*) is grounded in constructivist theory and integrates socio-scientific problem analysis with design thinking processes. The entrepreneurial creativity instructional sequence comprises five main steps: investigating the problem and user needs, generating new ideas, sketching the design, fabricating the product, and commercializing. A pre-test/post-test quasi-experiment with 64 Grade 10 students yielded high content validity (*S-CVI/Ave = 0.93*) and satisfactory reliability (*Cronbach's α = 0.82*), and recorded statistically significant improvements in students' ECC at both the overall and component levels.

Entrepreneurial STEM (*E-STEM*) integrates STEM disciplines with entrepreneurial practices through interdisciplinary and competency-based approaches. The six-step instructional sequence comprises: forming groups based on individual competencies; proposing entrepreneurial ideas; conducting SWOT analysis and resource assessment; developing a prototype; implementing the project; and preparing a business plan. A mixed-methods study (*interviews with 12 experts; survey of 134 teachers*) confirmed the model's feasibility (*Cronbach's α = 0.809*) but also identified challenges including insufficient teacher training in entrepreneurship education, difficulties in competency assessment, and limited instructional time.

These pedagogical models collectively satisfy McMullan's proposals for developing entrepreneurial creativity. Students adopt the role of an *entrepreneur* when identifying market needs. The interdisciplinary *STEM-business-design* structure provides multi-disciplinary experiential learning. Ideation or exploration phases empower students to propose original ideas and receive feedback. All projects center on solving local or social real-world problems. Prototyping and fabrication phases require product creation and testing. Reflection and evaluation activities encourage the expression of personal emotions, thereby sustaining motivation and building perseverance.

Vietnamese general education is transitioning toward the development of qualities and competencies, with an emphasis on interdisciplinary integration - as reflected in the 2018 *GEC* through experiential activities, career orientation, and the promotion of STEM education. This context provides a favorable precondition for incorporating teaching models that advance entrepreneurial creativity. However, three principal challenges constrain the practical application of these models in Vietnamese schools. First, the existing curriculum remains heavily academic and examination-driven, making models such as *Maker-5E* or *SIA-DT* difficult to implement in terms of instructional time and lesson objectives. Schools could address this by embedding Maker or SIA-DT projects in extracurricular activities, STEM clubs, or elective topics rather than implementing them universally across all lessons. Second, the concept of *entrepreneurship education* at the high school level remains relatively new; therefore, teacher training and professional development are prerequisite conditions for the successful application of models such as *SIA-DT* or *E-STEM*. Third, entrepreneurship education in Vietnam is currently driven primarily through schemes and competitions, such as the annual *Student Entrepreneurial Ideas Competition*; for entrepreneurial-creativity pedagogical models to take root, educational management authorities must formally institutionalize entrepreneurship content within the curriculum.

STEAM education can be regarded as the most appropriate solution for implementing ECC development in Vietnam. The core characteristic of STEAM is its interdisciplinary approach, centered on solving real-world problems and encouraging students to apply knowledge from science, technology, engineering, mathematics, and the arts to formulate innovative solutions (Bush & Cook, 2019; Rokhmaniyah et al., 2020; Stenard, 2023). Moreover, STEAM teaching effectively integrates instructional models such as Design Thinking (Trung et al., 2025), PjBL (Fan et al., 2020), and Maker Education (Jia et al., 2021). STEAM education therefore responds strongly to the requirements of developing creative thinking, the ability to identify and exploit opportunities, practical problem-solving competency, and the capacity to create new value - all of which are key components of entrepreneurial creativity competency.

Teachers can initially embed entrepreneurial elements into STEAM projects or interdisciplinary lessons (*for example, integrating Technology with Natural Sciences and experiential career-oriented activities*). Compared with other models, STEAM does not require the creation of an entirely new subject or activity; instead, existing STEAM content can be reoriented toward entrepreneurship while incorporating the positive elements of other models. A single STEAM project, for instance, can apply the PjBL method, encourage product fabrication (*Maker Education*), and incorporate design thinking in conjunction with socio-scientific issue discussion (*SIA-DT*). With its flexibility and comprehensiveness, STEAM education holds substantial potential for fostering ECC development, enabling Vietnamese general education to cultivate a generation of students who are both proficient in STEAM knowledge and rich in entrepreneurial thinking - thereby meeting the human resource demands of an innovation-driven economy.

2.4. Proposed ECC Framework for STEAM Education

The ECC framework developed in the present study is grounded in: the conceptual content and definition of entrepreneurial creativity competency in general education; the core components of entrepreneurial creativity; the stages of the entrepreneurial creativity process; behavioral manifestations common across pedagogical models that develop ECC; and the flexible, comprehensive characteristics of STEAM education. The structure of ECC is accordingly defined as a sequential process (*chain of actions*) comprising five components: *Inquiry; Ideation; Design; Fabrication and Testing; and Commercialization.*

Component 1 - Inquiry (IN): The ability to investigate scientific and social problems by collecting information from multiple sources and posing key questions to verify the problem and identify potential entrepreneurial opportunities.
Component 2 - Ideation (IG): The ability to propose a diverse range of creative ideas to address the identified community need. STEAM knowledge is applied to combine or refine ideas into original solutions; each idea is also critically analyzed with respect to strengths and weaknesses in order to select the most feasible option.
Component 3 - Design (DS): The ability to transform ideas into design drawings and preliminary models as the basis for a practical product. The feasibility of the design is comprehensively analyzed from technical, economic, and social perspectives to ensure the selected solution is optimal before fabrication proceeds.
Component 4 - Fabrication and Testing (IT): The ability to fabricate a prototype or small-scale test product based on the selected design; to objectively evaluate the function and operational efficiency of the prototype; and to coordinate human and material resources effectively to ensure efficient fabrication and testing.
Component 5 - Commercialization (CM): The ability to plan the market launch of the product, identify implementation methods and communication channels appropriate to practical conditions, develop promotional content on digital platforms, propose approaches for reaching users and distributing the product, and collect user feedback for product improvement and price adjustment.

Table 2. Entrepreneurial Creativity Competency Framework for High School Students in STEAM Education

Component	Behavioral Indicator	Description
Inquiry (IN)	Information Collection (IN1)	Collect information on scientific and social issues from multiple data sources; pose multiple high-value questions to assess the authenticity of the problem and focus on community needs
	Context Analysis (IN2)	Analyze the context, mechanism, and impact of the problem on the basis of STEAM knowledge, with convincing argumentation and evidence
	Synthesis and Comparison of Existing Solutions (IN3)	Objectively synthesize and compare information on existing solutions to identify the limitations of each
	Entrepreneurial Opportunity Identification (IN4)	Identify entrepreneurial opportunities or potential solutions
Ideation (IG)	Proposing Diverse Ideas (IG1)	Propose diverse new ideas to meet identified community needs
	Combining and Refining Ideas (IG2)	Combine or refine ideas on the basis of STEAM knowledge to generate original ideas
	Evaluating Ideas (IG3)	Critically evaluate ideas to determine their strengths and weaknesses; demonstrate readiness to reassess in order to select the optimal idea
Design (DS)	Translating Ideas into Models (DS1)	Transform ideas into sketches, diagrams, or preliminary design models
	Analyzing Design Feasibility (DS2)	Analyze design feasibility based on technical, economic, and social factors; use convincing argumentation and evidence to select the optimal solution
Fabrication and Testing (IT)	Prototype Fabrication (IT1)	Fabricate a prototype or small-scale product from the selected design
	Testing (IT2)	Test the prototype to objectively evaluate its function and operational efficiency
	Resource Coordination (IT3)	Coordinate human and material resources appropriately throughout the fabrication and testing process
Commercialization (CM)	Product Launch Planning (CM1)	Plan the market launch of the product by posing multiple questions related to objectives, content, format, and channels appropriate to practical conditions
	Creating Promotional Content (CM2)	Design the product brand; create promotional content on digital platforms
	Proposing User Outreach Approaches (CM3)	Propose approaches to reaching and distributing the product to users, supported by convincing argumentation and evidence
	User Feedback Analysis (CM4)	Collect and objectively analyze user feedback to improve the product or adjust pricing

2.5. Suitability of the ECC Framework for the Vietnamese Educational Context

To evaluate the degree of suitability of ECC implementation within the Vietnamese *GEC*, a content analysis and comparison of the behavioral indicators for high school students across three frameworks was conducted: the ECC framework; the Problem-Solving and Creativity Competency Framework (*PSCC - ST1: Recognizing new ideas; ST2: Identifying and clarifying problems; ST3: Forming and developing new ideas; ST4: Proposing and selecting solutions; ST5: Designing and organizing activities; ST6: Independent thinking*); and the Physics Competency Framework (*PCF - PC1: Physics knowledge acquisition; PC2: Inquiry into the natural world from a physics perspective; PC3: Applying acquired knowledge and skills*) (Vietnam Ministry of Education and Training, 2018a, 2018b).

A prominent point of convergence among the ECC framework, the *PSCC* framework, and the *PCF* framework is the shared focus on thinking and action skills aimed at solving practical problems. At the Inquiry (IN) stage, all three frameworks require students to collect information logically and from multiple perspectives, and to identify and analyze problems clearly and scientifically. For example, ECC behavioral indicator IN1 - requiring students to collect and clarify information from multiple sources - corresponds to the *PCF* requirement to "collect and store data from reviews, experiments, and investigations", and to *PSCC* indicators ST1 and ST2 (*recognizing new ideas; identifying and clarifying problems*). Convergence is also evident at the Ideation (IG) stage: all three frameworks emphasize proposing diverse new ideas (IG1), the ability to combine and refine ideas in new situations (IG2), and the objective, independent evaluation of formed ideas (IG3). Both the ECC framework and *PSCC* stress that students should generate novel, non-conventional ideas; *PCF* additionally emphasizes "proposing recommendations for applying research findings", illustrating the shared quality of flexibility and adaptability to real-world situations between *PCF* and ECC.

Nevertheless, notable differences exist between the ECC framework and the other two frameworks. The ECC framework is structured as a sequential process (from *Inquiry* to *Commercialization*), whereas *PSCC* and *PCF* are presented as sets of component competencies. This distinction underscores ECC as an integrated approach that guides students from problem and entrepreneurial opportunity identification through to the creation of concrete value. The defining characteristic of ECC is its specific behavioral indicators related to product creation, commercialization, and user outreach. For instance, the Design (DS) stage of ECC specifies "translating ideas into models" (DS1), a requirement not explicitly stated in *PSCC*, while the *PCF* framework offers a closer parallel by requiring students to "design models and use language and diagrams to express ideas". Most distinctively, the Commercialization (CM) stage is an entirely novel feature unique to ECC. The ECC framework requires students to plan the market launch of the product (CM1), create promotional content (CM2), propose user outreach approaches (CM3), and analyze user feedback (CM4). These indicators are virtually absent from the *PCF* and *PSCC* frameworks, with the partial exception of *PSCC*'s indicators relating to activity planning and plan adjustment. The *PCF* framework, while emphasizing the application of knowledge to practice, does not address commercialization or market engagement, focusing instead on the resolution of scientific and technical problems.

The foregoing analyses demonstrate that the ECC framework both inherits the creative thinking and problem-solving foundations of the other two competency frameworks and extends them by adding specific competencies related to entrepreneurship and market orientation. These findings confirm that ECC is not only appropriate for but also highly feasible within the *GEC*, and that ECC holds strong potential for practical application, enabling students to develop not merely creative competency but also the capacity to transform ideas into products or services of economic value.

3. CONCLUSION

In the era of digital transformation and the rapid advancement of Industry 4.0, creative competency combined with an entrepreneurial spirit has been identified as a core requirement for preparing 21st-century students. In Vietnam, the 2018 *GEC* and Government Project 1665 have established an important policy foundation for advancing entrepreneurship education in schools. A content analysis of integrated entrepreneurship teaching models implemented internationally demonstrates that STEAM education is an effective solution for entrepreneurship education in Vietnam, given its interdisciplinary nature and capacity to center instruction on solving real-world problems. The present study constructed the ECC framework comprising five components and 16 behavioral indicators, which provides a foundational structure for integrating entrepreneurial activities into teaching processes and for systematically supporting the assessment and development of students' competencies. The ECC framework not only demonstrates convergence with existing competency frameworks such as *PSCC* and *PCF* but also supplements them with elements relating to market orientation and commercialization - thereby affirming ECC's feasibility within the *GEC* and its strong potential for practical application, enabling students not only to develop creative competency but also to transform ideas into products or services of economic value.

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