Developing a classroom-based assessment framework of secondary students' core competencies - An approach to integrate students' transferable skills in schools

Duong Thi Thu Huong
Vietnam National Institute of Educational Sciences
Email: huongdtt@vnies.edu.vn

ABSTRACT: *Vietnam's 2018 general educational curriculum was developed on the premise that learners in the twenty-first century need to be prepared with generic skills in order to fulfill the requirements of society and the workforce. The evaluation of these key competencies in a classroom environment, on the other hand, has received very little attention in the literature. The aim of this article, which is based on the most recent research work by ACER and ATC21S, is to create a framework for assessing the general competence of secondary school students for use by secondary school instructors. Since then, it has facilitated the creation of assessment procedures and tools for problem-solving activities that require students to exhibit problem-solving and creativity, as well as collaboration and communication.*

KEYWORDS: **Competency-based assessment, assessment framework, general capabilities, core competencies.**

➔ Received 10/3/2020 ➔ Revised manuscript received 28/6/2021 ➔ Accepted 02/7/2021.

1. Introduction

Since the early 1990s, the inclusion of generic skills as learning objectives has been extensively debated. Nearly 90 nations, according to UNESCO, include key competencies in their general education curriculum (Tedesco, J.C, Opertti & Amadio, 2013, p.11). In this context, Vietnam's newly implemented general education curriculum (GEC2018) is a competency-based curriculum. The GEC2018 is especially concerned with the development of students' five core values and ten core competencies, which are outlined below. The five values are patriotism, compassion, diligence, honesty, and accountability, while the ten skills are divided into two categories: general capabilities and specialized capabilities. The GEC2018 must assist students in developing three categories of general capabilities: autonomy and self-learning, communication and cooperation, problem solving and creativity; and seven categories of specialized capabilities, which include language, mathematics, science, technology, computers, aesthetics, and physicality. Additionally, the new curriculum emphasizes "a larger focus on social events, extracurricular activities, and scientific research" and "increasing one's practical application of knowledge".

Teaching has changed dramatically over the last decades, moving from content-based to competency-based education. To successfully transition from content-based to competency-based education, all three components of the Curriculum-Pedagogy-Assessment cycle must be synchronized. What is the connection between the three components of this cycle in order to develop learners' capabilities in competency-based education? First, it is essential to integrate competencies into subject curricula in three steps: (1) define the competencies that students should acquire, (2) develop a learning continuum for each competence, and (3) describe the learning continuum in each learning area. In essence, phase 3 is about identifying opportunities for competency development inside subject curricula. Second, conduct an assessment to identify students' zone of proximal development (ZPD), and then report on their competence

growth. Third, scaffolding interventions to assist them in transitioning from their present zone of development (ZAD) to their ZPD. Thus, the connection between the three parts of this cycle is the learning continuum. While GEC2018 established learning outcomes for general competences and values, these requirements are described only in terms of educational level output standards. The shortcomings identified in GEC2018 that impede school and teacher assessment include poor conceptualization of capacity structure and definition, as well as lack of consistency and overlap in developmental levels. The bulk of educational procedures in Vietnam lack a clear link between government policy and research, despite the worldwide trend toward evidence-based decision-making. Although the Circular 26/2020/TT-BGDT was recently published, it is just a modified version of the prior Circular 58/2011/TT-BGDT, which has become obsolete, and its content is heavily dependent on the predecessor and cannot be reconciled with GEC2018's competency-based approach.

As can be seen, when the GEC2018 is implemented in 2020 with grade 1 and 2021 with grade 6, it is critical to establish a framework for assessing students' competencies and guiding instructors in their evaluation. Utilizing the assessment framework contributes to the assessment's validity and reliability by establishing consistency across instructors and school assessments. Additionally, the creation of a competency-based assessment framework will serve as a strong scientific foundation for the formulation and implementation of educational policies regarding the assessment of secondary students' educational outcomes in the coming years.

2. Literature review

While many studies define "competence" differently, this word is generally believed to refer to a collection of integrated elements of knowledge, abilities, and attitudes (Baartman, L. K. J., & De Bruijn, E., 2011, p.127). The terminology used to define general competencies varies by region and institution (see Table 1). Weldon (2019) discovered that words like skill, capacity, and competence were prevalent when examining the various titles of general competencies, but their names would give information about the perception and emphasis of the capability. For instance, "general" and "generic" imply cross-curricular competence and generalizability, while "transversal" clearly highlights these abilities. The terms "key" and "core" indicate a limited range of fundamental abilities. The term "21st century" refers to new abilities that are compatible with communication technology, while "transferable" refers to the capacity to transfer from one setting to another.

Table 1: The variation of "general competencies" terms across countries and organizations

Country/ organization	Terms
Australia	Key competencies, employability skills, generic skills, general capabilities
Canada	Employability skills, core competencies
European Parliament	Key competences
New Zealand	Essential skills
OECD	Key competencies, Global competencies, 21C skills
Singapore	Critical enabling skills
UNESCO	Transversal competencies
United Kingdom	Core skills, key skills, common skills
United States	Basic skills, necessary skills, workplace know-how, 21st century skills
UNICEF	Transferable skills

Note: Adapted from Changing priorities? The role of general capabilities in the curriculum, by Weldon, 2019 p.5-6

General capabilities are defined in the Australian Curriculum as "knowledge, skills, behaviors, and dispositions'' that, when combined with curriculum content in learning domains, "enable students to live and work successfully in the twenty-first century" (ACARA, 2013). Similarly, GEC2018 emphasizes the fundamental and mandatory nature of core skills and their intended purpose of helping learners live, learn,

and work successfully (MoET, 2018, p.37). While transferable skills allow learners to develop into flexible and adaptable individuals capable of overcoming life's obstacles (Scoular et al., 2020c, p.2). Transferable skills are referred to by a variety of different titles, but they all have one thing in common: the ability to adapt to new situations and conditions. They comprise "fundamental skills (e.g. numeracy, literacy), interpersonal skills (e.g. communication skills), conceptual skills (e.g. problem-solving), business-related skills (e.g. innovation), and citizenship" (Nägele & Stalder, 2017, p.740-742). As a result, transferable skills may be thought of as generic skills or core competencies.

Researchers from the ATC21S project believe that there are four groups of twenty-first century skills: (1) ways of thinking; (2) ways of working; (3) tools for working; and (4) skills for living in the world. Table 2 compares six organizations' 21C skill hierarchies, maps transferable skills in the UNICEF global framework and general competencies in the GEC2018 to the 21C skill frameworks. As can be seen, problem solving and information technology are both represented in the list of six organizations; communication, cooperation, and information literacy are also represented in the majority of the six lists. When compared to the GEC2018 in Vietnam, it can be seen that problem solving and creativity will be classified as "ways of thinking"; communication and cooperation are classified as "ways of working"; autonomy and self-study, while not directly mentioned in any group, may have some similarities with "learning to learn" and

Table 2: Definitions of 21C skills, transferable skills, and core competencies

Organizations	21 CTS Categories			
	Ways of thinking	Ways of working	Tools for working	Living in the world
ATC21S	Creativity & innovation Critical thinking Problem solving Decision making Learning to learn Metacognition	Communication Collaboration	Information literacy ICT operation and concepts	Citizenship Life and career Personal and social responsibility
Partnership for 21st C skills	Creativity & innovation Critical thinking Problem solving Decision making	Communication Collaboration	Information literacy media literacy ICT operation and concepts	e.g. initiative flexibility leadership
Lisbon Council	Problem solving	Collaboration	Information literacy ICT operation and concepts	Flexibilitiy adaptability
ISTE NETS	Creativity & innovation Critical thinking Problem solving Decision making	Communication	Information literacy ICT operation and concepts	
ETS iSkill	Creativity & innovation Critical thinking Problem solving	Communication Collaboration	Information literacy ICT operation and concepts	Initiative Self direction
UNICEF	Creativity & innovation Critical thinking Problem solving Decision making Learning to learn	Communication Collaboration		Active citizenship Employability Personal empowerment
GEC2018 of Vietnam	Problem solving & creativity Autonomy & self-study	Communication & collaboration		Autonomy & self-study

"metacognition" in the "ways of thinking" category, and "life and career" in the "living in the world" category.

The current global education trend stems from the belief that students must be prepared with social skills and awareness in order to fulfill society's and the future workforce's requirements. Numerous educational systems around the globe have included problem solving, creativity, collaboration, and communication in their curricula or supporting materials. However, very little research exists to assist teachers in developing these core competencies/transferable skills at the institutional level. The demand for effective solutions for assessing and teaching core competencies continues to grow. Traditional evaluation techniques are insufficient to reflect the complexities of using transferable skills in a real-world setting. Thus, it is essential to create and standardize new approaches experimentally, and instructors must have effective resources, tools, and professional development.

An in-depth knowledge of how children progress over time is critical for teachers, who then use that information to effectively educate and assess students' skills. According to the present educational evaluation reform, a greater emphasis should be placed on evidence of growth and development (Gonski et al., 2018). It is less helpful to provide information on students' learning outcomes at a certain moment in time than it is to describe the students' learning progress throughout time. Teachers may find the learning continuum extremely beneficial in determining not only students' current competency levels, but also what students should study next to improve their skills. The majority of current research on learning developments is concentrated on literacy, numeracy, and science, as well as collaborative problem solving, critical thinking, creative thinking, information literacy, and communication skills (Scoular et al., 2020a). The Assessment Innovation and Innovation Center (CARI) has developed a framework of assessment and tasks for evaluating and monitoring 21C skills in the classroom under the auspices of ACER. The instruments are connected to challenging problem-solving activities that require students to cooperate, think critically, and be creative. A learning continuum is suggested for each competency to assist in defining a student's proficiency levels and monitoring his/her progress (Scoular et al., 2020a; 2020b; 2020c) .

3. Methodology

The study team will assess the validity of the framework using two approaches: an expert approach and an empirical approach. This will be done in the following phase of the project. As a result, this article presents just the study results from the literature review in order to propose a structure and method for secondary school instructors to use when assessing students' core competencies in the classroom.

After the research team develops an assessment framework based on a review of the literature, the modified Delphi method will be utilized to identify the framework's components. The Delphi approach guarantees topic validity and is widely recognized as a strategy for achieving agreement via many rounds of surveys. Three professors from pedagogical institutions, three researchers, and nine teachers from different lower secondary schools will comprise the expert panel. Experts are selected based on their prior experience teaching in secondary schools, their extensive knowledge of classroom instruction and assessment methods, and their grasp of age psychology. Participants are ignorant of the identity of their fellow participants. The assessment framework, technique, and instruments are rated on a scale of 1 to 9, with 1 to 3 indicating that they are not important/good/feasible, 4 to 6 indicating that they are somewhat important/good/feasible, and 7 to 9 indicating that they are very important/good/feasible. They are invited to make modifications to the structure, phases of the assessment process, continuum of learning levels, and assessment instruments of the framework. Between rounds, the research team will review the results and make the required changes to the framework and related works in response to duplication or clarity suggestions from the expert panel. The second round offers participants with aggregated response data as

well as suggested changes based on the responses from the prior round. They are then tasked with re-evaluating the goods and making further suggestions. The outcome measures include the mean expert evaluation of the importance/goodness/feasibility of each item (on a scale of 1-9), as well as the degree of agreement among experts as measured by Cronbach's alpha.

The assessment framework and instruments will continue to be validated empirically at a number of secondary schools in Hanoi. The project will not use random sampling, but will instead rely on networks of teachers willing to participate. Teachers who participate are selected on a voluntary basis and are not picked at random. One of the project's goals is to determine if the items measuring a particular ability may be combined to create a single variable that reflects that ability. This objective will be achieved via the use of Item Response Theory (IRT). IRT examines the items for consistency in relation to one another in order to substantiate the assessment's construct validity. If the elements do not appear coherently, they may need to be changed or removed to facilitate the skill's interpretation. While the omitted items may have perfectly acceptable statistical characteristics, if they vary from the dimension being measured, they may not be indicative of the skill being assessed and, therefore, are irrelevant to the current assessment. An IRT calibration is intended to be performed separately for each competence, since each competence is recognized as a distinct entity. The IRT parameters which will be explored are item fit and discrimination, as well as reliability indices (Scoular et al., 2020c).

4. Results

The study is based on the ACER's 21S integration alignment model (see Fig. 1). In this approach, there are three essential prerequisites and 10 critical operational stages that make it possible to integrate general capabilities into the education system. Curriculum, evaluation, and teaching are all intimately connected. What the curriculum identifies and lays out influences what is to be learned and taught, as well as what is to be tested.

Learning objectives encompass competence, values, and subject-matter knowledge in a holistically integrated manner. The curriculum establishes learning objectives and a framework for locating opportunities for the general competencies to be demonstrated in different learning domains. Competency assessment helps educators comprehend a student's growth, how

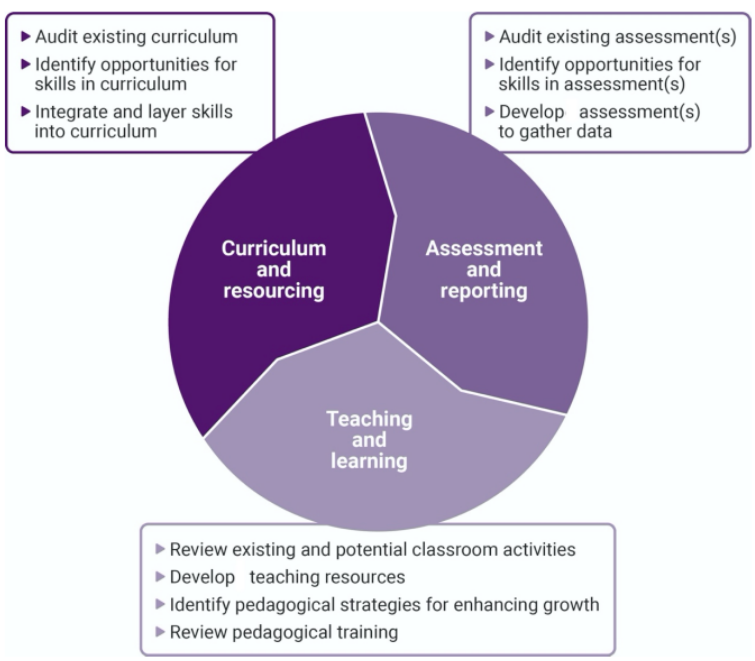

Figure 1: ACER's alignment model for 21S integration (Scoular et al., 2020c)

they've developed over time, and whether or not they've met those particular learning objectives. Teaching methods enable the development of generic skills in pre-existing learning domains.

As shown in Fig. 1, an effective strategy for competence integration in education systems entails a variety of complicated and repetitive tasks. The connecting model's core concept is knowledge of what needs to be integrated. This is feasible when the instructor has a firm grasp of the ideas of competence, their application, and their development in pupils.

It is possible to develop an alignment model for school-based and classroom-based assessment purposes. Teachers can design classroom-based assessment activities to elicit desired behaviors related to the components of general competencies as well as use teaching strategies to develop those components.

4.1. Definitions of core competencies in GEC2018

GEC2018 consists of three core competencies, five values, seven specialized competencies, and fourteen learning areas. As shown in Fig. 2, three perspectives on the integration of core competencies throughout the curriculum will be examined: core competencies and values, specialized competencies, and learning domains.

To incorporate general competencies into the curriculum, instruction, and evaluation of students, it is essential to first identify and explain in full each of the GEC2018 general competencies. However, the GEC2018 as a whole describes the manifestations and output requirements for each general competence at each educational level, but does not provide precise definitions, components, criteria, or indicators for each skill. Two categories of skills will be discussed in this study: problem solving and creativity, as well as communication and collaboration.

Problem solving and creativity

For classroom-based teaching and assessment purposes, problem solving and creativity are divided into two distinct components, with problem solving emphasizing convergent thinking and creativity emphasizing divergent thinking. Additionally, problem solving will be construed as "collaborative problem solving," rather than "individual problem solving." The fundamental distinction between individual problem solving and collaborative problem solving lies in "social nature-the need to communicate, exchange opinions, common identification of the problem

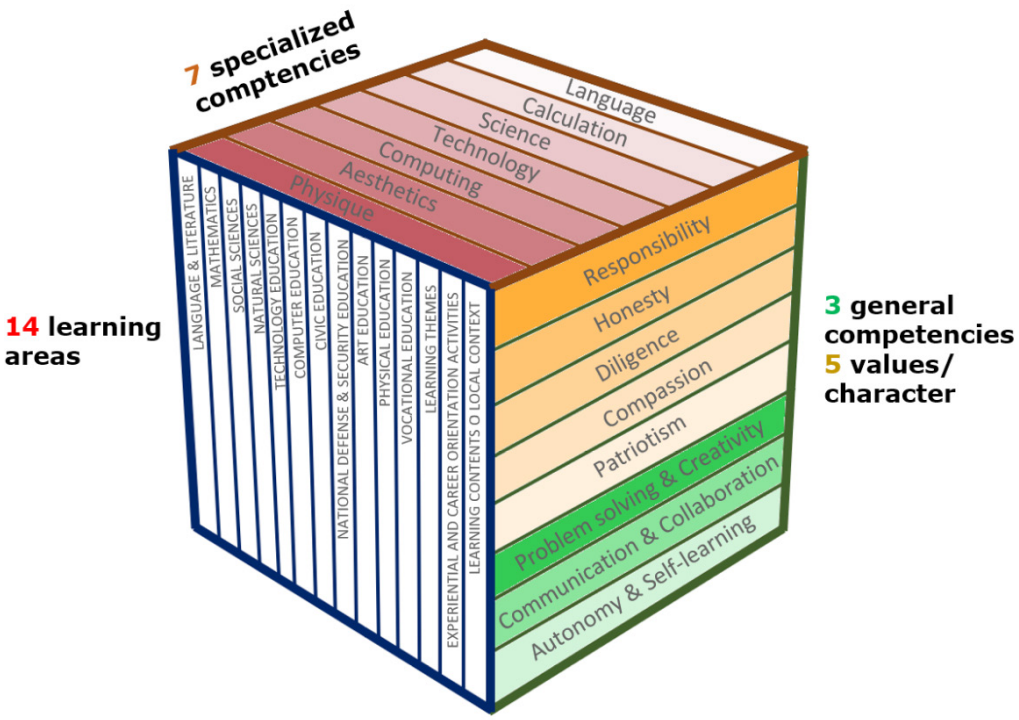

Figure 2: Vietnam's new general education curriculum design cube

and its elements; negotiating agreement on the relationship between the elements of the problem, the relationship between actions and their effects" (Griffin, 2014). Collaboration makes each stage of problem solving visible since it must be communicated to other team members. This effort comes from the reason for creating the assessment framework: key skills are utilized in combination, not individually, in practice.

Although there is no definition of problem solving and creativity in the GEC2018, the authors have highlighted the element of "cooperation" in problem solving in the outcome requirements for core competencies. Specifically, one of the three requirements for the lower secondary level component "designing and organizing activities" is "know how to delegate appropriate tasks to team members"; or "recognize new and positive elements in the opinions of others" in the sub-element "generation and expression of new ideas." Thus, the collaborative problem-solving method is compatible with both the working model of general competence in practice and the GEC2018 viewpoint. As a result, problem-solving competence refers to an individual's capacity to engage successfully in a process in which two or more individuals address the same problem by pooling their knowledge, skills, and efforts to find a solution.

GEC2018 divides problem solving and creativity into six components: (i) recognizing new ideas; (ii) identifying and clarifying the problem; (iii) generating and experimenting with new ideas; (iv) proposing and selecting solutions; (v) designing and organizing an action plan; and (vi) independent thinking. The components of problem solving and creativity may be reorganized to make them more conducive to teaching and assessment.

First, both "recognize new ideas" and "identify and clarify the problem" require students to identify problematic situations through observation, interaction, and information search; identify gaps in their prior knowledge; and demonstrate comprehension of both presented information and information discovered while interacting with problematic situations.

Second, there is no clear distinction between "creating and experimenting with new ideas" and "proposing and choosing solutions." For junior high school students, the requirement of "proposing solutions to improve or replace solutions that are no longer appropriate; comparing and commenting on proposed solutions" in the component "generate and experiment with new ideas" is similar to the requirement of "proposing solutions for solving problems" in the component "propose and select solutions"; and the requirement of "identifying and knowing information related to the problem" in the "propose and select solutions" component has similarities with the "identify and clarify the problem" component.

Third, the divide between problem solving and creative components in GEC2018 is a hybrid of two approaches to higher-order thinking research, namely a process-oriented approach to problem solving and a cognitive ability-oriented approach, but the former is superior to the latter. The components "recognize new ideas," "identify and clarify the problem," "propose and select solutions," and "design and organize action plan" all adhere to Polya's problem-solving process (Polya, 1957), but the final component, "independent thinking," does not quite fit the preceding four components. Independent thinking behaviors are comparable to critical thinking behaviors, and this component may be incorporated into all phases of the problem solving process. Meanwhile, the component "create and test new ideas" is associated with creative thinking.

One of the concepts guiding the development of the structures and learning progressions for general skills is the separation of components, standards, criteria, and indicators. Thus, it is prudent to divide problem solving and creativity into two components to simplify classroom instruction and evaluation, while also reorganizing the aspects of problem solving competence into three components: identifying and defining the problem, solving it, and applying it. Design and organize an action plan, monitoring and reflection. Each step of problem solving is predicated on one or more thinking abilities. Interpretation, inductive, correlation, analogy, and combination

are all types of reasoning abilities that are utilized in problem solving. These abilities are not mutually exclusive; rather, problem solvers will move between them in order to gather data and evaluate possible solutions before settling on one.

(1) Identify and clarify the problem: Students' capacity to identify and articulate problematic situations that arise in everyday life. Students that are adept at problem solving can break down problems into tasks and identify the sequence in which those activities should be completed. This component demands students to possess the critical thinking abilities required to evaluate the validity of arguments, scientific theories, and claims regarding current situations.

(2) Design and implement activities: Planning is a critical component of problem solving. Planning entails establishing objectives, allocating resources, and using those resources to carry out a problem-solving approach. This includes both group and individual activities in which the individual must be able to identify knowledge gaps; collect, organize, and evaluate data and information from multiple sources; and identify patterns and connections in data and information from multiple sources in order to refine the plan.

(3) Monitor and evaluate: Throughout the problem-solving process, students must be able to assess and choose the most appropriate ideas or solutions for the problem at hand. To assess and pick a solution, two abilities are required: identifying selection criteria and evaluating ideas/solutions. A competent problem solver will be able to establish criteria for evaluating findings, solutions, and ideas; and will be able to weigh the advantages and disadvantages of each alternative before making a choice.

This study focuses on creative thinking rather than creativity because (i) creative thinking is the foundation for creative work; (ii) strategies for creative thinking can be taught; and (iii) can emphasize creative thinking as a critical component of a task, whereas creative ability typically entails a collection of combined skills (Ramalingam et al., 2020).

The measurement of creative potential and creative thinking is frequently linked to the '4P' model proposed in the 1960s, which stands for person, process, product, and press. This assessment framework will focus on the creative thinking process and the final product, since these features are observable and measurable using standardized classroom assessment methods. Creative thinking is understood as "the capacity to generate many different kinds of ideas, manipulate ideas in unusual ways, and make unconventional connections in order to outline novel possibilities that have the potential to elegantly meet a given purpose" (Ramalingam et al., 2020).

Creative thinking consists of three components: generating ideas, experimenting with ideas, and idea quality.

(1) Generating ideas: It is a core component of creative thinking. This component is concerned with the quantity and variety of ideas, two qualities that highlight the importance of idea creation, often referred to as the 'fluency' of the creative thinking process. The more ideas you have, the more probable it is that you will come up with something innovative.

(2) Experimenting with ideas: The capacity to 'play' with an idea, whether pre-existing or freshly developed, is a critical component of creative thought. A critical component of this process is the capacity to deliberately evaluate ideas from various viewpoints and think creatively within the task's limitations. The process of idea implementation will be defined by two primary components: the capacity to shift perspectives and the ability to mold ideas. Creative thinkers may deliberately alter their own perceptions of the issue in order to reframe its context and therefore generate novel solutions. Individuals who engage in creative thinking may be required to be receptive, willing to try, analyze, and explore seemingly hopeless alternatives. The notion of the 'ability to alter one's perspective' is referenced throughout the GCE2018 in the context of "proposing ways to enhance or replace ineffective methods." The creative understands how to mix, flip, or put together the components of a job in unpredictable ways in order to generate new options and whole new modes

of thought. As a result, creative thinking often entails modifying or synthesizing existing ideas rather than developing entirely new ones.

(3) Idea quality: The ideas generated should be of high quality. Solution suitability testing is included in the majority of evaluation frameworks for creativity. The GEC2018 refers to "assessing whether the solution is suitable or not and implementing the solution". The quality of the idea is shown in three aspects: fitness for purpose, novelty, and elaboration. The 'fitness for purpose' component recognizes purposeful creative thinking, and if the end result is worthless, it does not accurately reflect the creative mentality. Creative products need to be novel, but should take into account the qualifications of the students. Students are not obliged to come up with an entirely unique idea that has never been thought of before. The degree of detail is also considered in the creative product, in which students can come up with details about an idea that initially seems far-fetched to explain its effectiveness.

4.1.1. Communication and collaboration

Cooperation is an individual's capacity to contribute effectively to a group. It entails persistence, contributing to group understanding, assessing others' efforts, and correcting and resolving disputes. Effective collaboration necessitates giving responsibilities to individuals who will engage actively in the discussion (Scoular et al., 2020b).

According to the GEC2018, communication and cooperation capacity consists of eight major components: (1) defining the purpose, content, means, and attitudes of communication; (2) establishing and developing social relationships; adjusting and resolving conflicts; (3) defining the purpose and protocol of cooperation; (4) defining one's own responsibilities and activities; and (5) identifying the cooperative partners' requirements and skills; (6) organizing and convincing others; (7) evaluating cooperative actions; (8) international integration.

To enable assessment and teaching in the classroom, communication and cooperation capacities are restructured to include the following components: (1) shared knowledge development, (2) collective contribution, (3) regulation, (4) idea and information communication, and (5) digital and multicultural communication.

(1) Shared understanding development: Students develop a shared understanding of assigned activities, including the goals and problems to be addressed; they develop the ability to engage with others and an appreciation for the value of interaction. Collect information on the task from sources and members; identify gaps in perception. After that, it is essential to manage and transmit information to one another, to seek information exchange, to integrate resources in order to develop a shared understanding, and to define the needs for completing the job.

(2) Collective contribution: Once a shared understanding of the group's purpose, roles, and responsibilities has been formed, each individual in the group should contribute to the group's agreed-upon responsibilities, while acknowledging the efforts of other members.

(3) Regulation: It is critical for successful collaboration to adjust group dynamics and individual contributions. A competent collaborator will ensure that his or her input is relevant and beneficial to the purpose, while also fostering mutual understanding. Students may be required to provide feedback to other team members, settle conflicts, modify conduct, and contribute to the advancement of other people's roles, understanding, and views for common benefits.

(4) *Idea and information communication*: After the group has decided on the chosen idea/solution, the product/solution is communicated. A person competent at conveying goods will ensure that the presentation structure is appropriate for the task at hand, while also providing material that is appropriate for the audience. Students may present products professionally and use both verbal and non-verbal techniques to entice listeners and engage them in ways that are appropriate for the task. With the receptive role, students must demonstrate an attitude of actively listening to presentations and actively receiving information.

(5) Digital and multicultural communication:

Individuals with strong communication skills may utilize digital communication technologies creatively to reinforce presentation materials and pique the listener's attention; they can also create communication protocols to accomplish desired outcomes. Additionally, pupils must be able to converse effectively with people from many cultural backgrounds.

4.1.2. Learning continuums of core competencies

The contemporary view of competence development places a premium on and emphasizes the concept of growth and progression. Core competencies may be defined in a developmental context, enhanced via instruction and intervention, and measurable and monitored. For each skill, stages of competence development are used to explain how students show growth in that competency and progress from low to higher level understanding. These levels of competence development are centered on "assessing and monitoring progress over time" and are supported by the recognition that children of the same age and grade may be at quite different stages of learning and development (Scoular et al., 2020a). As a result, they are not connected to particular years of schooling, as the National Australian Curriculum or the GEC2018 do. Rather than assessing students' success solely on the basis of year-level standards, this approach provides information about where students are in their progress at the time of assessment (ZAD) and where they can move next with the assistance of others (ZPD), as well as a foundation for tracking individual progress over time.

While progress may be defined in general terms, what a highly competent problem solver shows in comparison to a less proficient problem solver is still dependent on the particular learning domain. Levels of competence development

	Generation of ideas	**Experimentation**	**Quality of ideas**
	Aspect 1.1 Number of ideas **Aspect 1.2** Range of ideas	**Aspect 2.1** Shifting perspective **Aspect 2.2** Manipulating ideas	**Aspect 3.1** Fitness for purpose **Aspect 3.2** Novelty **Aspect 3.3** Elaboration
High		Learners demonstrate a willingness to experiment, shifting beyond conventional perspectives leading to new possibilities. They question and renegotiate the boundaries of the task to navigate around possible constraints. They test out multiple pathways, even those that seem unlikely. (Aspect 2.1) Learners think flexibly to manipulate elements of the task. They effectively combine elements of a task to allow new possibilities or a different way of thinking about the task. (Aspect 2.2)	Learners develop some original ideas containing concepts less familiar to them beyond their social context. (Aspect 3.2) Learners present ideas that are effective and coherent, fluent and well-elaborated. The elaboration of ideas is substantive, addressing their effectiveness and justifying fitness for purpose. (Aspect 3.3)
Mid High	Learners provide many ideas. (Aspect 1.1) Learners provide a range of ideas that are distinct from one another. (Aspect 1.2)	Learners can shift perspective, thinking about the task/problem in a different way and considering the task/problem from a range of conventional perspectives. They are willing to test out an alternative pathway. (Aspect 2.1) Learners demonstrate some evidence of experimentation, manipulating some of the task elements, or synthesising existing ideas. (Aspect 2.2)	Learners' elaboration of ideas attempts to evaluate effectiveness, and/or justifies fitness for purpose. (Aspect 3.3)

Figure 3: An example of levels of competency development for creativity (Ramalingam et al., 2020)

may aid in the understanding of skills and their development. Additionally, they may help instructors identify gaps in a student's learning areas, where certain kids may need additional assistance.

4.1.3. Classroom-based assessment framework of students' core competencies

Applying the ACER perspective, this research incorporates the ACER-proposed general capacity assessment framework into the GEC2018 (see Fig. 4).

The assessment framework provides a theoretical foundation and helps instructors in developing organized approaches to complex tasks, defining assessment time and indicators for the abilities evaluated in each activity. The assessment framework has two aspects, one of which is Polya's process, and the assessment tasks in this research are structured around process stages. Students must first comprehend and identify problems before developing a plan. Thus, in the assessment assignments in these phases, students will be exposed to the problem and given the chance to address it. The next stage in the process is to carry out the action plan, and students are expected to do so in the assessment assignments by implementing a strategy or solution from the generated choices. Finally, students must reflect and communicate, which is why the assessment assignments assess both the solution to the problem and the ability to convey the solution successfully. The framework for core competence assessment includes the following three primary characteristics:

Problem-based learning

Currently, educational innovation is focusing on the teaching of generic skills via problem-based or inquiry-based learning. This may be because problem solving is one of the abilities listed in all generic skill frameworks of organizations. The capacity to tackle novel problems, which is a component of problem solving, has not been precisely characterized in complicated real-world settings. Students must use a variety of cognitive and social abilities to recognize problems and develop and execute ways to resolve them (Scoular et al., 2020c). Problem solving exercises may stimulate the development of a range of common abilities that need instruction and assessment. Students may cooperate on problem-solving assignments to generate potential solutions. In essence, contemporary learning tasks are often open-

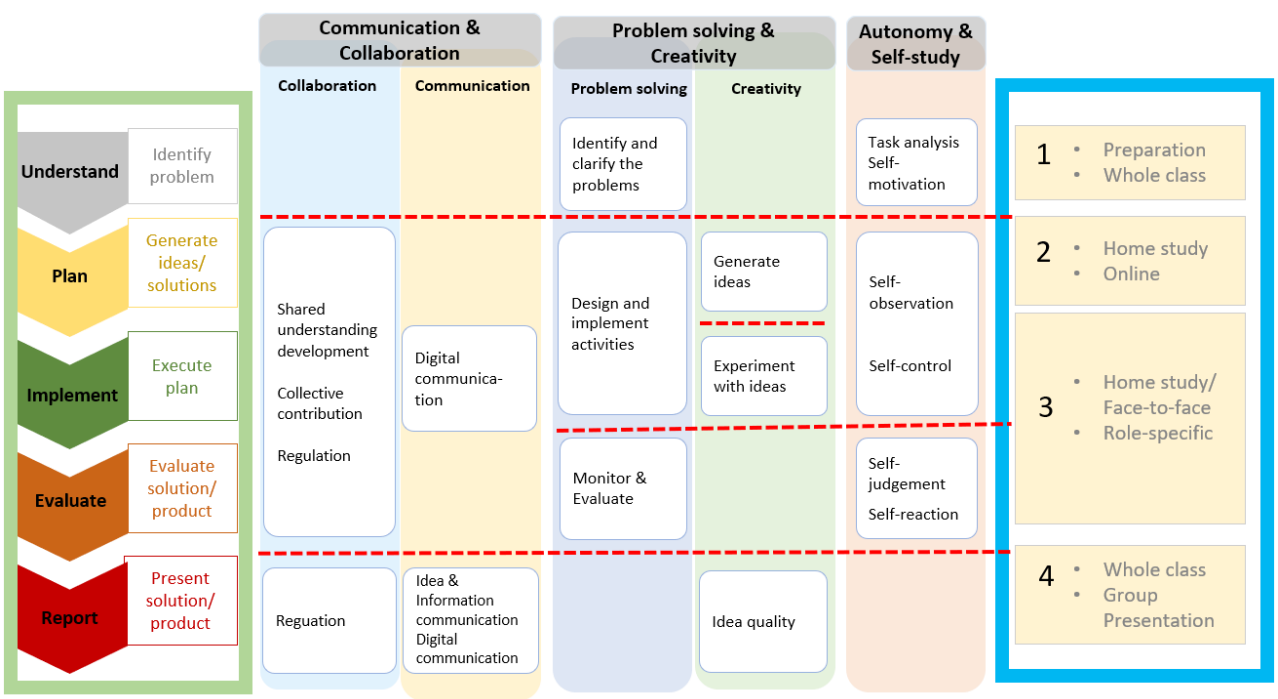

Figure 4: Framework for integrating general capacity assessment into teaching

ended, include unbound collections of knowledge, and may require the task's goal to be redefined on a continuous basis. It is critical for students to acquire the ability to establish and modify objectives depending on available information, to locate relevant and useful information for the job, and to evaluate their progress continuously.

Transferable skills and classroom-based instruction

The classroom provides an opportunity to observe students demonstrate generic skills in real-world problem-solving scenarios or contexts. However, validating and reliably assessing these abilities in the classroom is very challenging. Determining what constitutes a 'good' problem assignment that encourages students to participate for an extended period of time is not simple. Real-world activities have the potential to pique students' attention and involvement while also providing possibilities for skill transfer to real-world settings.

Reflects the multifaceted nature of core competencies

The study method is founded on the premise that, in the real world, core competencies are utilized in conjunction with others, and that evaluating them as distinct abilities is ineffective. When confronted with a complicated issue in life, reasoning is not employed solely; it is supplemented by the use of other social skills, such as cooperation, information literacy to do research and collect knowledge, and creativity to generate new and feasible solutions. This method demonstrates a void in the area of core competence assessment, since there are few studies that measure two or more skills concurrently.

4.1.4. Process of integrating core competencies into curriculum, teaching, and assessment

Assessment of general competencies is not a simple task. While it is feasible to evaluate competence independently using questions of high complexity, such evaluations may miss how these abilities are exhibited in real-world problem-solving situations. As a result, assessing the skills reflected in real-world situations needs novel evaluation techniques. Additionally, instructors need a framework to guide their judgements and observations about their students

Table 3: Classroom-based assessment process of students' core competencies

Problem-solving stage	Assessment task	Task objective	Central competence and its sub-strand assessed	Indicator assessed
0. Introduction of a problem-solving scenario	Teachers assign tasks through situations and information; work instructions	Introduce tasks, working methods, and stimulate students' interest in participation.	N/A	N/A
1. Problem Identification	1. Analyze problem situations	Explain and draw conclusions and views from the problem-solving scenario (PSC)	PS-Statement and clarification of problems	Analyze problem situations
	2. State the problem	Identify problems that need to be solved.	PS-Statement and clarification of problems	State the problem
	3. Clarify the problem	Understand the problem, breaking it down into tasks	PS-Statement and clarification of problems	Clarify the problem
2. Initial idea generation	4. Individuals generate ideas	Generate some initial ideas to support the PSC	CR-Generating ideas; Experimenting with ideas; Idea quality	Number of ideas range of ideas Fitness for purpose Novelty Elaboration

Problem-solving stage	Assessment task	Task objective	Central competence and its sub-strand assessed	Indicator assessed
	5. 'Best' idea; evaluate the ideas of individuals	Look at each group member's ideas and analyze their strengths and shortcomings.	PS-Monitor and reflect	Evaluate solutions/ideas
	6. Selection of the group's best idea	Collaborate as a group to brainstorm and choose the most innovative ideas.	PS-Monitor and reflect	Identify criteria for decision-making Evaluate solutions/ideas
			CC- Shared understanding development; Collective contribution;	Communicating with others Recognize the contributions of others Engage with role & responsibilities Resolves differences
3. Planning	7. Planning for solving problems	Set goals for tasks and planning	PS-Planning and executing	Goal setting Planning
	8. Role agreement	Discuss and agree on the group's duties and responsibilities.	PS-Planning and executing	Resource management
			CC- Shared understanding development; Collective contribution; Regulation	Communicate with others Pool resources & information Negotiate role & responsibilities Engage with role & responsibilities Resolves differences
4. Further investigation	9. Each member does their own study on the topic, modifying the group's best idea.	Conduct role-specific research and apply the findings to your group's most innovative proposal.	PS-Planning and executing	Identify information needs Evaluate information Identify patterns & make connections
		Use the findings to improve your team's most creative ideas.	PS-Monitor and reflect	Evaluate solutions/ideas Flexible adjustment
5. Plan implementation	10. Monitor the plan implementation	Members self-monitor their own and their group's implementation plans.	PS-Monitor and reflect	Tests & monitor implementation Flexible adjustment
			CC-Regulation	Maintain shared understanding
	11. Sharing improvements and making a final group decision	Share information with the group to improve the groups' ideas	CC- Shared understanding development; Collective contribution; Regulation	Communicate with others Recognise the contributions of others Engages with role & responsibilities Resolve differences Adaps behaviour & contribution to others
	12. Interpretation of the group's final best idea	As a group, record the reasons why the idea was chosen by the group.	CR-Generation of ideas; Experimentation; Quality of ideas	Novelty Fitness for the purpose Elaboration

- **Real-life problem situation: Homeless people live on Hanoi sidewalks**
- Implementing the social security policy, as well as building the image of Hanoi civilized and elegant people, 10 years ago, the People's Committee of Hanoi issued Decision No. 90/2009 / QD-UBND on focusing farming. Nursing people wandering in the city. But more than a decade has passed, the problem of homeless people living on the streets of Hanoi has not relieved.
- The Hanoi People's Committee is providing a VND 150,000,000 grant to fund a community action project aimed at helping homeless people settle in.
- Your group is competing with other groups to come up with the idea of winning this grant.

a) Problem scenario

- **Task 4 Ideas to support the resettlement of homeless people in Hanoi sideways**

Item	Item Description	Max Score	Capability
A	Develops multiple solution ideas for a problem context	3	Creative thinking
B	Develops a range of solution ideas from multiple perspectives for a problem context	3	Creative thinking
C	Develops solution ideas for a problem context that include some risk	3	Creative thinking
D	Develops solution ideas for a problem context that demonstrate novelty	3	Creative thinking
E	Develops solution ideas for a problem context that are fit for purpose	3	Creative thinking
F	Develops solution ideas that are elaborated	3	Creative thinking

E. Develop solutions ideas for a problem context that are fit for purpose

Category 0	Category 1	Category 2	Category 3
No ideas are generated	Most ideas are not clearly linked to the purpose of the task and won't have impact	Most ideas plausibly meets purpose of the task but won't have much impact	Most ideas clearly meet the purpose of the task and will have impact

b) Assessment rubric for creativity thinking

Item	Student develops…	Group A			Group B		
		S1	S2	S3	S1	S2	S3
A	Multiple solution ideas	2	1	1	3	3	2
B	A range of solution ideas from multiple perspectives	1	1	1	2	2	1
C	Solution ideas that include some risk	1	1	2	3	2	3
D	Solution ideas that demonstrate novelty	2	1	2	3	1	2
E	Solution ideas that are fit for purpose	2	2	3	3	2	1
F	Solution ideas that are elaborated	1	2	2	2	1	1
	Subtotals	9	8	11	16	11	10
	Group total	**28**			**37**		

c) A scoring sample of two three-person groups

Example: Student from group A

	Ideas
1	Starting amout of money to give for people to start. E.g like about VND500.000
2	To be able to have 1 set of each of each clothing for Summer or Winter
3	Starting a free ATM for fruits, apples, bananas, bread, rice. Everyday you could go down to the ATM to get 1 or 2 fruits/loaves of bread
4	Allowing free passes to go to the elementary school, primary school and secondary school? Especially in pre-primary schools
5	
6	
7	
8	

Lack of detail about how the ideas solve the issue (elaboration)

1-3 distinct and coherent ideas (fluency)

Most ideas are naïve, likely to no impact as a solution to the problem (aptness)

Limited consideration perspectives beyond the homeless themselves (multiple perspectives)

d) A sample of the scoring guide

Figure 5: Screenshots from an experience activity in a humanities setting for Grade 8

in the classroom assessment setting. Teachers must be able to modify or create assessments for a particular learning topic, setting, or environment. We created an assessment template based on ACER research that contains pre-built activities and a corresponding score system, but is flexible enough to enable instructors to modify learning topics or problem scenarios. The assessment process's primary features are as follows: it assesses several skills concurrently, employs real-world problems linked with curriculum content, and uses suggested levels of core competence development.

4.1.5. Assessment instruments

Three lesson plans have been created based on the assessment process and framework for evaluating the core competencies described in the assessment framework and process. The research includes three different learning plans: (i) an experience activity in a humanity setting for Grade 8; (ii) a Vietnamese lesson for Grade 7; and (iii) a STEM interdisciplinary activity for Grade 6. The purpose of developing assessment activities at various grade levels is to provide evidence of student competence growth and to enable the monitoring of student progress across grade levels. Additionally, the evaluation is designed across several learning domains in order to compare competency growth across domains and situations.

The assessment instrument comprises 13 tasks, each of which is designed to elicit one of the two evaluated groups of skills. Students work mostly in groups of four, but certain activities (for example, creativity) require students to work alone before rejoining the group.

Figure 4 depicts a problem scenario including homeless individuals living on Hanoi sidewalks, as well as assignment 4 from the Grade 8 experiential activity in which students are required to assist homeless people with relocation. They must exhibit ingenuity in order to create a list of potential solutions.

5. Conclusions

The assessment framework and process proposed above can be used for a variety of contexts and content, and teachers can use them to develop their assessment tasks by integrating teaching content. They are suitable for both blended-learning and traditional classroom settings, and they are easy to implement. Additional study is necessary to establish the

feasibility and realism of assessment frameworks and instruments. Other issues to consider include proposing the implementation of the general competency assessment component in the classroom in teachers' and schools' educational processes (including assessment time, methods, and tools for a school year, for a grade level), and determining how to combine general competency assessment with subject learning outcomes assessment in students' final learning outcomes.

References

Ananiadou, K. and M. Claro (2009). *21st Century Skills and Competences for New Millennium Learners in OECD Countries.* OECD Education Working Papers, No. 41, OECD Publishing.

Anderson, P. (2016). *Creative thinking framework.* (Unpublished paper)

Australian Curriculum and Assessment Reporting Authority (ACARA). (2013). *General capabilities in the Australian Curriculum.* Retrieved from http://www.australiancurriculum.edu.au/GeneralCapabilities/Pdf/Overview

Baartman, L. K. J., & De Bruijn, E. (2011). *Integrating knowledge, skills and attitudes: Conceptualizing learning processes towards vocational competence*. Educational Research Review, 6, 125–134.

Black, P., Wilson, M., & Yao, S. Y. (2011). *Road maps for learning: A guide to the navigation of learning progressions.* Measurement: Interdisciplinary Research & Perspective, 9 (2–3), 71–123.

Fraillon, J., Schulz, W., & Ainley, J. (2013). *International computer and information literacy study: Assessment framework.* Amsterdam, Netherlands: IEA.

Fraillon, J., Schulz, W., & Ainley, J. (2013). *International computer and information literacy study: Assessment framework.* Amsterdam, Netherlands: IEA.

Gonski, D., Arcus, T., Boston, K., Gould, V., Johnson, W., O'Brien, L.,... Roberts, M. (2018). *Through Growth to Achievement: The Report of The Review to Achieve Educational Excellence in Australian Schools.* Canberra: Commonwealth of Australia

Griffin, P. (2014). *Performance assessment of higher order thinking.* Journal of Applied Measurement, 15 (1), 1–16.

Griffin, P., & Care, E. (2015). *Assessment and teaching of 21st century skills: methods and approach.* Dordrecht, Netherlands: Springer

MoET (2018). *General education curriculum.. Issued with Circular No.32/2018/TT-BGDĐT December 26, 2018 of the Minister of Education and Training, 37-50*

Nägele & Stalder (2017). *Competence and the need for transferable skills.* In the book: Competence-based Vocational and Professional Education (pp.739-753) DOI: 1007/978-3-319-41713-4_34, 740-742

Polya, G. (1957). *How to Solve It. A New Aspect of Mathematical Method.* 2nd Edition, Princeton University Press, Princeton.

Ramalingam, D., Anderson, P., Duckworth, D., Scoular, C., & Heard, J. (2020). *Creative thinking: Skill development framework.* Australian Council for Educational Research. https://research.acer.edu.au/ar_misc/40

Scoular C., Timms M. (2020a). *Development of Measurement approach to assess 21st century skills.* Contemporary Perspectives on research in educational assessment. Information Age publishing, INC. Charlotte, NC, 38-46.

Scoular, C., Duckworth, D., Heard, J., & Ramalingam, D. (2020b). *Collaboration: Definition and structure.* Australian Council for Educational Research. https://research.acer.edu.au/ar_misc/39

Scoular, C., Ramalingam, D., Duckworth, D., & Heard, J. (2020c). *Assessment of general capabilities: Skills for the 21st-century learner. Final report*. Australian Council for Educational Research. https://research.acer.edu.au/ar_misc/47

Tedesco, J.C., R. Opertti and M. Amadio (2013). *The curriculum debate: why it is important today.* IBE Working Papers on Curriculum Issues No. 10. Geneva: UNESCO-IBE, 11

UNICEF (2019*). Global Framework on transferable skills*

Weldon, P. (2019*). Changing priorities? The role of general capabilities in the curriculum.* Camberwell, Australia: Australian Council for Educational Research. https://research.acer.edu.au/nswcurriculumreview/3, 5-6