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# Certification of **L**inguistic, **E**ntrepreneurial, **A**nd **D**igital **S**kills

**LEADS**

In the Algerian higher education system

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## Selection Guide to Certification Systems for Digital, Entrepreneurial, and Linguistic Skills

Final Version

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## Introduction

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At the turn of the 21st century, the importance of skills certification as a catalyst for motivation, achievement, and societal advancement cannot be overstated. The LEADS Erasmus project aspires to establish a recognizable Algerian certificate that requires specific knowledge and skills that will be invaluable in the modern economy, facilitating global communication, expanding market reach, fostering cross-cultural understanding, and driving innovation and growth in businesses across various industries.

This certificate is a formal credential awarded to Algerian learners who demonstrate a specified level of proficiency in core areas of Linguistics, Entrepreneurship and Digitalization that will be increasingly recognized as vital skills with implications spanning across academic, professional, and social domains. Through a fusion of skills, learners will explore linguistic traits, acquire digital skills and develop an understanding of the importance of entrepreneurship in the promotion of modern life. Algerians seeking to enhance their educational or career prospects will then acquire work-aligned skills that will serve as powerful enablers of opportunity and advancement in an increasingly competitive and globalized world.

Furthermore, this certificate which is typically obtained by completing standardized skills assessments will play a crucial role in promoting inclusivity and equity in education since it provides Algerian learners from diverse backgrounds with a standardized framework for assessing and validating their skills. By establishing clear benchmarks of proficiency and offering pathways for skill development and recognition, linguistic, entrepreneurial and digital certification will empower these learners of all ages, backgrounds, and abilities to pursue their learning goals with confidence and purpose.

As for the organization of this state of Arts, three different frameworks for Assessing Linguistic, Entrepreneurial and Digital Skills make up the construct of this structure.

- The first category will provide some broad generalities about the importance of Language testing, highlighting a close look on the development of language testing methods and approaches then it outlines the various types of language proficiency testing and certification and lately discussing guidelines towards an establishment of an Algerian Linguistic certification.
- The second sub category entails a comprehensive exploration of the state of the art in entrepreneurship teaching and training, exposing the certification of entrepreneurial skills, and then providing the meticulous selection of best practices.
- As far as the third sub category is concerned, it starts with exploring the concept of digital skills in literature, after that an identification and classification of skills that exist were summarized, and then an identification of the main digital skills framework was analyzed according to different variables (scope, structure, main



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competencies, targeted audience, and global recognition). After that, the same certifications selected according to their scope and scale of application were again analyzed, but from the point of view of the level of skills acquired. The different sections cited before have enabled us to propose the first structure of levels dedicated to the Algerian higher education system and the profiles of learners corresponding to them.

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## 1 Frameworks for Assessing Linguistic Skills

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English is the global lingua franca, and it is gathering momentum in Algerian higher education institutions, thus ensuring proficiency in the language has become a pivotal asset. Annually, millions of students around the world undertake diverse tests to prove their English proficiency. For instance, around 2.3 million and 3.5 million students undertake the two leading English assessments every year, the TOEFL and IELTS respectively. In 2021, the worldwide market for English proficiency tests surpassed 9.87 billion USD and is anticipated to surpass 27.8 billion USD by 2030 (Spherical Insights, s.d.) These certifications are supported by rigorous testing processes and are recognized by educational institutions, employers, and organizations worldwide, becoming a passport to success for their holders. Hence, Algerian students need to embrace new global possibilities through the acquisition of an English language certification.

The LEADS Erasmus+ project aspires to establish an Algerian certification system that will permit individuals to use the language with credentials to maneuver academic pursuits, career and personal growth. The new proposed certification program aims to provide Algerian students with a conclusive and mainly internationally recognized validation of their English language skills. The certificate will also allow them to showcase their language proficiency and widen their career horizons. On the same wavelength, the certificate will help them pursue international career paths as it will offer a comprehensive assessment of language skills. It will cover all the skills of English language proficiency, including reading, writing, listening, and speaking, hence providing a holistic evaluation of capabilities. It aspires to help learners to communicate fluently and accurately in academic and English-speaking settings with international colleagues and engage confidently in English-speaking environments. As part of the LEADS Erasmus+ project, we will establish an Algerian certification system for linguistic skills, benefiting students, academic and administrative personnel, as well as individuals engaged in lifelong learning, to enhance their academic and professional careers. To achieve this goal, we will start by elaborating a comprehensive guide that sets the theoretical background of language proficiency testing and outlines the existing certification guidelines. In so doing, we will highlight best practices and challenges that will serve as a foundation for our language certification system.

### 1.1 Overview of linguistic skills assessment

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#### 1.1.1 Definition of language testing

Language testing refers to the process of evaluating a person's proficiency in a given language, using various methods and tools to assess different language skills, such as





speaking, listening, reading, and writing. The primary goal of language testing is to measure a person's ability to understand and use the language effectively in real-life situations.

It subsumes different techniques and tools to collect sufficient information about the skills and lacunae of learners. Language tests are tools used to assess a learner's proficiency in a specific language. Fully-fledged, they are conceived to evaluate specific language skills, chiefly listening, speaking, reading, and writing. It is pivotal to demystify the purpose of these assessments, which are primarily used for different objectives, such as academic certification, job applications, and language learning syllabuses.

### 1.1.2 Importance of language testing

Language testing plays an important role in various contexts and for different reasons:

- **Education:** It is widely known that language is paramount in any educational setting. In the same spirit, language assessment is essential for evaluating students' language proficiency and determining their language learning needs. Similarly, it provides further information about students who require additional support or specific instruction.
- **Employment:** Further to education, the job market also encompasses language assessment to evaluate potential candidates' language skills, more particularly in multilingual or international settings. Hence, proficiency tests such as the IELTS (International English Language Testing System), or TOEFL (the Test of English as a Foreign Language) aim to evaluate participants' skills and competencies to communicate fluently and accurately in English. It is worth noting that English has gained momentum thus becoming a pivotal requirement for myriad of jobs, notably in multinational firms or when working in a global context.
- **Immigration and citizenship:** Following the same wavelength language assessment is also extensively used in immigration processes to scrutinize an individual's language competency for different visa applications, permanent residency, or citizenship. These tests can be found in the Canadian Language Benchmark (CLB) for Canada. The main purpose is to evaluate the language skills and abilities, and therefore make sure they meet the language requirements of the host country.
- **Language teaching and learning:** Evaluation is considered as a requisite of language teaching and learning. It fosters the learning process and simultaneously aids teachers gauge learners' progress, pinpointing areas of strength and weakness, and helps create syllabuses and courses tailor-made, hence meeting learners' needs. These evaluations may entail various assessments such as class participation to provide ongoing feedback, in the same line summative assessments like exams and projects aiming at evaluating overall proficiency.



- **Research and evaluation:** Language assessment is also paramount in research and evaluation studies to gauge the efficiency of language syllabuses, interventions, or policies. Assessments are mainly used by researchers to gather data on language proficiency, language enhancement, and the impact of instructional strategies. The aforementioned assessments must be reliable and valid in order to supply solid information for decision-making, program development, and therefore policy development.

### 1.1.3 Development of language testing methods and approaches

Language assessment techniques and approaches have developed as a response to the new shift in educational, social, and technological spectra. The following paragraphs are a brisk overview of the notable developments:

- **Grammar-Translation Method:** In this method, language testing was mainly focused on grammar and translation skills. The method's main concerns were to evaluate learners' abilities to accurately use the target language and translate sentences or passages between languages.
- **Direct Method:** The direct Method, evolved in the early 20th century, is considered as a response to the grammar-translation method. This method prioritized oral skills and communicative competencies. In the same spirit, the assessment differed from the grammar-translation method and fostered evaluating learners' ability to communicate and understand the target language in real-life frames.
- **Audiolingual Method:** The Audiolingual Method gained momentum mainly in the United States. Assessment here emphasized repetition and pattern drills. This method's main concern is to evaluate learners' ability to mimic and produce correct language patterns.
- **Communicative Language Teaching (CLT):** Communicative Language Teaching, also known as CLT, evolved as an approach to language teaching and assessment. It highlights communication and real-world language use. Assessment tests began to assess learners' ability to perform authentic tasks, such as role-plays or information gap activities.
- **Task-Based Language Teaching (TBLT):** TBLT prevailed in the late 20<sup>th</sup> century and early 21<sup>st</sup> century. Task-Based Language Teaching scrutinizes learners' different skills by implementing the target language. The evaluation seeks to assess learners' performance on task-based activities, measuring their language use in authentic contexts.
- **Computer-Assisted Language Testing (CALL):** The CALL method gained traction with the advent of technology. In this method, computerized tests fostered and at the same time facilitated the automation of scoring and the integration of multimedia. It is worth noting that the CALL method is exponentially prevailing thanks to the advent of internet tests.



#### 1.1.4 Types of language testing

- **Placement tests** are used to determine a person's level of proficiency to place them in an appropriate language course.
- **Diagnostic tests** are used to identify specific strengths and weaknesses in language skills, allowing teachers to tailor instruction to individual needs.
- **Achievement tests** are used to evaluate a person's knowledge of specific language content or skills that have been learned in a particular course.
- **Proficiency tests** are used to rate the overall language skills of a person, without necessarily providing a language course before or after the test.

Our focus in this LEADS project is on proficiency tests that are used to assess the language skills of a person, with/without providing a language course before/after it. It is often validated by a certification or a formal document that attests to an individual's proficiency in a language based on rigorous guidelines, quality standards, and objective tools. It can be used for academic admissions, job applications/promotions, and migration procedures. It specifically focuses on assessing a person's ability to use a language effectively in different contexts, covering the four skills of listening, speaking, reading, and writing.

#### 1.1.5 Criteria of language proficiency testing

**Validity** refers to the extent to which a language proficiency test accurately measures what it is intended to measure; i.e., the proficiency test is considered valid if it effectively assesses the language skills of the test taker. The following are the varied forms of validity in language proficiency testing (Davies, 1990):

- Content validity refers to the extent to which the content of the test is representative of the four language skills.
- Construct validity is related to the test's ability to measure the theoretical construct it claims to measure, and not another construct.
- Predictive validity evaluates the ability of the language performance test to predict future performance; for instance, if the score can indicate success in the academic or professional use of the language.
- Face validity reflects the extent to which a language proficiency test appears to measure what it claims to measure; in other words, teachers, test takers, and other stakeholders should perceive it as appropriate.
- Consequential validity refers to the impact of the language proficiency test, whether its scores would have positive or negative consequences on test takers' educational or professional careers.

**Authenticity** in language proficiency tests refers to the degree to which the tasks, materials, and assessment criteria reflect real-world language use. In other words, the test replicates



the language requirements that individuals may encounter in genuine communication contexts. The content should be relevant and meaningful to the test takers, reflecting the complex nature of real-life language use. It should also be culturally sensitive, ensuring that the test is fair and accessible to a diverse range of test takers.

**Practicality** refers to the feasibility and efficiency of the testing procedure, considering real-world requirements and constraints. It takes into consideration the following characteristics:

- Time: a practical language proficiency test is administered within a limited timeframe; it does not overburden the test takers or disrupt their schedule.
- User-friendliness: a practical language proficiency test should be straightforward, involving clear instructions and simple tools.
- Accessibility: a practical language proficiency test is accessible to diverse test takers, including individuals with disabilities, as well as individuals from different cultural and linguistic backgrounds.
- Flexibility: a practical language proficiency test should be flexible across diverse settings, accommodating different scenarios like academic admissions, employment/promotion, or migration.
- Scoring: a practical language proficiency test has an efficient scoring system whose results can be processed promptly. Scoring in language testing usually relies on rubrics or grading scales to assess performance levels; they outline the criteria for each proficiency level and provide guidelines for assigning scores based on test responses.
- Cost-effectiveness: a practical language proficiency test can achieve a balance between the quality of evaluation and the cost of its implementation, especially when proficiency tests are needed by a wide range of test takers in higher education institutions.
- Integrity: a practical language proficiency test involves measures to prevent cheating.

**Reliability:** a reliable language proficiency test should produce consistent scores for individuals with the same level of language proficiency if it is administered under similar conditions. This reliability can be of different sorts:

- A language proficiency test can be norm-referenced, where test-taker performance is compared to the performance of a reference group, or criterion-referenced, where performance is measured against predetermined criteria or proficiency levels.
- It must be characterized by internal consistency, meaning that its components measure the same items, and test takers with similar language proficiencies should obtain similar scores.
- The test-retest reliability examines the consistency of scores when the same persons are tested twice using the same or a similar form of the test.



- Inter-rater reliability is required in tests that involve subjective judgments, as in the evaluation of spoken and written productions; different raters should provide consistent scores for the same performance.
- Equivalence reliability is useful to examine if the test taker would get similar scores no matter the format in which the test is administered (oral or written).

**Washback** refers to the impact of the language proficiency test on teaching and learning; i.e., the way teachers prepare students for the test, the skills and knowledge emphasized in the test, that shape the instructional process. For example, the implementation of a language proficiency test leads teachers to align the curriculum with the content and format of the test in order to help students succeed. In the same way, the results of the test provide a feedback loop to teachers and students about the effectiveness of the instruction. The nature of the language proficiency test can also influence the teaching methods employed; for instance, if the test emphasizes written expression, teachers are likely to devote more instructional time to developing this skill. While washback might have positive outcomes in the language classroom, it can lead to adverse effects when it creates a situation of teaching to the test, prioritizing testing over language proficiency itself.

### 1.1.6 Role of technology in language proficiency testing

Most linguistic certification systems are now based on technology-enhanced assessment. As ubiquitous “technology offers new ways for practicing language and assessing performance” (Byram & Wagner, 2018), (Davies, 1990), (Dudeny & Hockly, 2007, p.8), this entails not only the “assessment of learning”, but also the “assessment FOR learning” (Stiggins, 2005, p. 324). Despite the accusation that technology, particularly Artificial Intelligence, might be detrimental to the reliability and validity of the assessment, we argue that it can be used to enhance the way learners are evaluated. For instance, technology allows language teachers to design interactive activities that imitate authentic language scenarios. They can rely on automatic scoring to provide immediate feedback on grammar and vocabulary; they can equally rely on AI-powered speech recognition technology to evaluate learners’ pronunciation, intonation, and fluency during speaking activities. They can incorporate adaptive testing, in which the difficulty level of questions adjusts to the test taker’s performance to provide a more accurate assessment. Technology can likewise help language teachers collect and analyze data on learners’ performance over time, helping them identify areas where they need remedial work and further support.

#### **Suggested software:**

- Moodle platform to create and administer online courses and assessments
- Wordela vocabulary software
- Grammar Planet for grammar, punctuation, and usage
- PRAAT software for pronunciation assessment



## 1.2 Current frameworks and their methodologies

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The following are some of the most widely used certifications across languages; some of them provide a life-long recognition of language proficiency, but some others have a limited duration:

- **English Language Certifications:** TOEFL (Test of English as a Foreign Language), IELTS (International English Language Testing System), and Cambridge English Certifications (CPE, CAE, FCE, PET, KET, and BEC)
- **Arabic Language Certification:** ALPT (Arabic Language Proficiency Test - اختبار الكفاءة في اللغة العربية)
- **French Language Certifications:** DELF (Diplôme d'Études en Langue Française), DALF (Diplôme Approfondi de Langue Française), and TCF (Test de Connaissance du Français)
- **Italian Language Certifications:** CILS (Certificazione di Italiano come Lingua Straniera)
- **German Language Certification:** Goethe-Zertifikat
- **Spanish Language Certification:** DELE (Diplomas de Español como Lengua Extranjera)
- **Portuguese Language Certification:** CAPLE (Centro de Avaliação de Português Língua Estrangeira)
- **Chinese Language Certification:** HSK (Hanyu Shuiping Kaoshi)
- **Japanese Language Certification:** JLPT (Japanese Language Proficiency Test)
- **Korean Language Certification:** TOPIK (Test of Proficiency in Korean)
- **Russian Language Certification:** TORFL (Test of Russian as a Foreign Language)

In our LEADS Erasmus+ project, the focus is on English language certifications; we will hence focus on its widely used frameworks:

### 1.2.1 The Common European Framework of Reference for Languages (CEFR)

The Common European Framework of Reference for Languages (CEFR) is a crucial instrument in the field of language education, providing a uniform structure for evaluating and characterizing language ability in various linguistic environments. The Council of Europe created the CEFR, which offers a methodical framework for comprehending and assessing language proficiency. This framework facilitates communication and allows for global comparability in language learning, certification, and evaluation.

The Council of Europe launched a program in the 1970s to support language learning and linguistic variety throughout Europe, which is where the CEFR had its start. Acknowledging the necessity for a uniform structure to evaluate language ability, the Council initiated a cooperative endeavor comprising linguists, instructors, and language specialists from many European nations. The result of this endeavor was the creation of the CEFR, which was



originally released in 2001 and has subsequently undergone changes to take into account changing educational requirements and paradigms for language acquisition.

**Framework structure:** The CEFR divides language competency into six categories, from A1 (beginning) to C2 (proficient), each of which is associated with a particular set of linguistic abilities. The three basic categories of Basic User (A1, A2), Independent User (B1, B2), and Proficient User (C1, C2) are further subdivided into these levels. Detailed descriptors at each level specify the language skills needed for speaking, listening, reading, and writing, making it easier for students, teachers, and assessors to determine competency.

**Important characteristics:**

1. ***Descriptive rather than prescriptive:*** The CEFR takes a descriptive stance, emphasizing the potential of language use by learners instead of dictating curriculum or linguistic content. This enables curriculum design and evaluation procedures to be flexible to accommodate a variety of learning situations and goals.
2. ***Common Reference Points:*** The Common European Framework of Reference (CEFR) makes it easier to compare and communicate language competency levels across various educational systems, cultural settings, and languages by offering a single set of reference points. This encourages flexibility and openness in language instruction and evaluation, promoting global collaboration and communication.
3. ***Lifelong Learning Perspective:*** While language competency is dynamic and subject to change over time, the CEFR highlights the value of ongoing language study. This approach fosters autonomy and motivation in language learning by motivating students to set attainable objectives, track their development, and constantly better themselves.
4. ***Integration of Skills:*** As speaking, listening, reading, and writing are all interconnected, the CEFR encourages an integrated approach to language acquisition. By using and integrating these abilities in relevant circumstances both within and outside of the classroom, it invites students to grow in their ability to communicate.

**Impact and implementation:** The CEFR has influenced curriculum creation, teacher preparation, and language policy, having a significant global impact on language education and evaluation. As more and more language exams and tests match their frameworks and standards with the CEFR, it has emerged as a commonly used and acknowledged reference tool for language competency evaluation, certification, and accreditation. The CEFR has also sparked creativity and research in language teaching approaches, evaluation procedures, and material creation, which has improved language instruction continuously over the globe.



### What are the CEFR levels?

The levels range from A1 (beginner) to C2 (proficient).

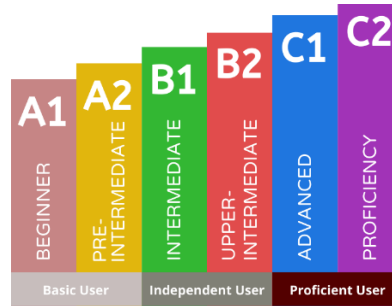


Figure 1. Source: [https://school.really-learn-english.com/the-complete-cefr-levels-in-english-guide#google\\_vignette](https://school.really-learn-english.com/the-complete-cefr-levels-in-english-guide#google_vignette)

**CEFR compared with other frameworks** : As it is well shown in the table below, one of the advantages of the CEFR is that it offers an evaluation for all learners at different learning levels, from beginner to proficient, whereas some other frameworks do not.

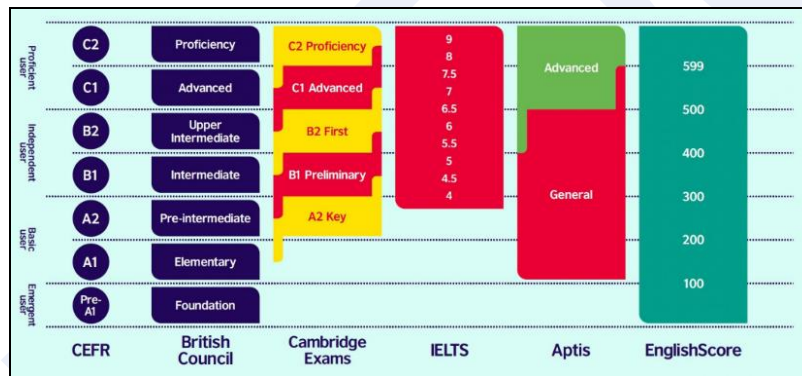


Figure 2. Source: <https://learnenglish.britishcouncil.org/english-levels/understand-your-english-level>

### The "can-do" Approach

The "can-do" approach, which is frequently linked to the CEFR, is a learner-centered approach to teaching languages that places more emphasis on the skills students can acquire than just their language knowledge. To improve learners' communicative competence and confidence in using the language for meaningful objectives, this method places a strong emphasis on the actual use of language abilities in everyday circumstances.

Key aspects of the "can-do" approach include:

- **Setting Clear Objectives:** The "can-do" approach encourages educators to establish clear and achievable learning objectives that specify what learners should be able to do with the language at each proficiency level. These objectives are often aligned with the descriptors provided in the CEFR, which outline the linguistic abilities





required for speaking, listening, reading, and writing skills at different proficiency levels.

- **Task-Based Learning:** Central to the "can-do" approach is the use of task-based learning activities that engage learners in authentic language use and meaningful communication. Tasks are designed to simulate real-life situations and challenges that learners may encounter in their personal, academic, or professional lives, encouraging them to apply their language skills in context.
- **Promoting Autonomy and Self-Assessment:** The "can-do" approach empowers learners to take ownership of their language learning journey by fostering autonomy and self-assessment skills. Learners are encouraged to set realistic goals, monitor their progress, and reflect on their strengths and areas for improvement using the "can-do" descriptors as reference points.
- **Providing Constructive Feedback:** Educators play a crucial role in providing constructive feedback to learners, helping them identify their strengths and areas for development based on their performance in language tasks and activities. Feedback is focused on specific language skills and strategies, enabling learners to make informed decisions about their learning priorities and strategies.
- **Celebrating Progress and Achievements:** The "can-do" approach emphasizes the importance of celebrating learners' progress and achievements along their language learning journey. Recognizing and acknowledging learners' successes, no matter how small, helps to build their confidence and motivation, encouraging them to continue striving for improvement.

Thus, the "can-do" approach promotes a learner-centered and communicative approach to language education, emphasizing the development of practical language skills and competencies that enable learners to communicate effectively in real-world situations. By focusing on what learners can do with the language, rather than simply what they know about the language, this approach empowers learners to become proficient and confident language users.

The Common European Framework of Reference for Languages (CEFR), which offers a thorough and uniform framework for evaluating and characterizing language ability, is a cornerstone in the area of language education. Since its implementation, language learning and assessment have benefited from increased openness, comparability, and mobility, which has benefited students, teachers, businesses, and legislators alike. In the multicultural world of today and future, the CEFR is still a vital resource for fostering linguistic variety, intercultural understanding, and lifelong learning as language acquisition continues to change in response to shifting global trends and social requirements.



## 1.2.2 Test of English as a Foreign Language (TOEFL)

The TOEFL is an American certification framework developed and managed by the Educational Testing Service (E.T.S., 2010) It is a standardized test that measures English skills, mostly in an academic setting, and it is designed to evaluate the ability of test takers to use and understand English, focusing on the four skills (listening, reading, writing, and speaking), with a scoring range of 0 to 120. The TOEFL result is valid for 2 years.

There are different types of TOEFL tests:

- **The TOEFL iBT (Internet-Based Test)**, scored on a scale of 0 to 120, is the most commonly used certification and is available in most countries owing to its online feature.
- **The TOEFL PBT (Paper Based Test or Paper-delivered test)**, also scored on a scale of 0 to 120, is less common and is usually offered in areas where internet-based testing is not available. Both are used to evaluate the test takers' readiness to enroll in an English-speaking higher education institution. They often need a 3-6 months preparation period prior to the test.
- **The TOEFL Essentials exam**, scored from 1 to 12, is an easier and cheaper version used for admissions in high schools, short courses, exchange programs, or student visas.
- Additionally, there are **specialized TOEFL tests**, like the TOEFL Junior test for younger test takers, and the TOEFL ITP (Institutional Testing Program) which is used by institutions for internal assessment rather than for admission purposes.

**Assessment methods:** The reading and listening sections are scored by computer. The speaking and writing sections are scored by a combination of AI (Artificial Intelligence) scoring and multiple highly trained human raters to offer a complete and accurate picture of the student's abilities.

The 4 sections of the test are as follows:

- **Reading:** This section assesses the level of written comprehension in English. It is composed of 20 questions. It lasts 35 minutes
- **Listening** evaluates the level of oral comprehension while listening to different audio documents during 26 minutes.
- **Speaking** measures the student's level of oral expression. It contains 4 tasks to be performed within 16 minutes. The student records his/her answers using a microphone. These will be transmitted to ETS GLOBAL for correction.
- **Writing** assesses the candidate's level of written expression. It consists of 2 tasks for a period of 29 minutes: The first task lasts approximately 20 minutes. The student reads a text, then listens to a lesson delivered on this text, then writes a piece of writing on a given topic. The second task lasts 10 minutes. It was improved thanks to



the new version of the TOEFL iBT test in July 2023. From now on, the candidate must produce a short draft to share an online academic discussion. He will give his opinion on a given topic.

**TOEFL strengths & weaknesses:** There are 4 pros and cons for taking the TOEFL test while applying for a university abroad. **The 4 pros are:**

- TOEFL is recognized by most universities in the US, and by about 10,000 universities in 130 countries, including Canada, the UK, and Australia, according to ETS. All top 100 universities in the world accept TOEFL.
- Booking the test is very easy and test centers are available everywhere. Moreover, the test taker is not confined by a rigid schedule, as there are 50 TOEFL iBT test dates every year. Finally, results come out in about 15 days.
- There is a substantial amount of free learning resources to help test takers prepare, some of which are free.
- The test has a detailed scale of assessment. It is not just about right or wrong answers, but also about context and acceptable versions of answers. For example, the speaking part of the test is assessed more objectively, as it is estimated by 3-4 teachers rather than one interviewer. Another example is that one can still get MCQ (multiple choice questions) which increases the chances of getting at least some of the answers right.

**Conversely, there are 4 cons for taking the TOEFL test:**

- TOEFL places are filled very quickly and the test taker might wait until the next round.
- The test taker needs to be good at all skills (reading, writing, listening, speaking, and grammar), as it is not easy to get a good score by relying on one skill.
- The exam is long to complete, requiring the ability to maintain focus for a long time.
- Since TOEFL iBT is delivered exclusively online if the test taker does not have good computer skills, the test will be a challenge.

The difficulty of the TOEFL test can vary from one person to another. While some test takers may find it challenging, others might perceive it as manageable. Adequate preparation, practice, and familiarity with the test format can help candidates to sit for the exam more confidently.



### 1.2.3 International English Language Testing System (IELTS)

It is a British certification framework developed and managed by the British Council, IDP IELTS, and Cambridge University Press & Assessment. It is designed to assess the English language proficiency of candidates in a variety of contexts. It consists of four modules (listening, reading, writing, and speaking), each of them scored individually; an overall band score is calculated on this basis. The scoring system ranges from 0 (non-user) to 9 (expert user) bands, and the equivalence with the CEFR is illustrated in figure 3:

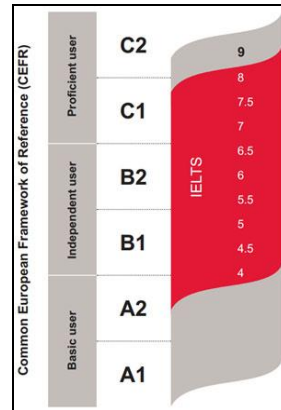


Figure 3. Source: <https://tracktest.eu/elts-test-exam/>

### 1.2.4 American Council on the Teaching of Foreign Languages (ACTFL)

This scale was developed by the American Council on the Teaching of Foreign Languages.

it serves as a comprehensive framework for assessing language proficiency across various levels. It categorizes proficiency into Novice, Intermediate, Advanced, Superior, and Distinguished levels; each level is further divided into sublevels, allowing for a more accurate evaluation of skills in speaking, listening, reading, and writing.

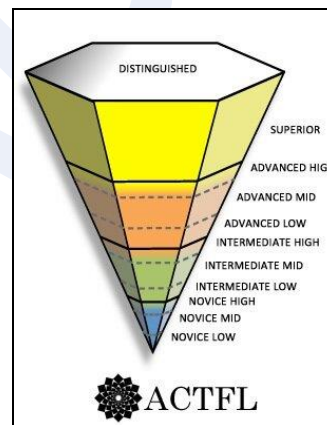


Figure 4. Source: <https://theglobalseal.com/actfl-language-proficiency-levels>

Some language certifications that align with ACTFL guidelines:

- ACTFL OPI (Oral Proficiency Interview)
- ACTFL WPT (Writing Proficiency Test)
- AAPPL (Assessment of Performance toward Proficiency in Languages)



### 1.2.5 Test of English for International Communication (TOEIC)

The Test of English for International Communication (TOEIC) is tailored to assess the practical English skills needed in international work settings, and it offers various examination formats. The TOEIC Listening & Reading Test includes two sections, assessing comprehension with a combined score of 990. The test provides separate assessments for speaking and writing proficiency. The speaking test evaluates pronunciation, intonation, vocabulary, grammar, coherence, relevance, and completeness, while the writing test scrutinizes grammar, sentence quality and diversity, vocabulary usage, organizational skills, and the expression of opinions with supporting examples. Both speaking and writing assessments employ a scoring range from 0 to 200.

### 1.2.6 Duolingo English Test (DET)

It is a relatively new proficiency test (created in 2016) that attracted interest during the Covid-19 pandemic. It is affordable and accessible from any place in the world, offering a major advantage over the other certification systems, but this characteristic raises serious concerns about cheating possibilities. It is scored from 10 to 16, offering a wider scope for the evaluation of linguistic proficiency, but the fully computerized feature reduces its objectivity because of the focus on multiple-choice questions. The speaking section, which involves reading a text aloud, is also questionable because it does not assess the test taker's actual speaking skill. Yet, it recognizes British and American variants, allowing inclusivity in linguistic certification.



## 1.3 Challenges and considerations in linguistic skill assessment

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### 1.3.1 General considerations

- Training qualified assessors who can maintain objectivity and consistency in evaluation;
- Ensuring that language certification is fair and unbiased by creating transparent scoring criteria, making them available to test takers, and providing detailed feedback on linguistic performance;
- Ensuring that tests are valid and reliable assessments of actual linguistic proficiency;
- Ensuring accessibility and inclusivity to individuals from diverse backgrounds;
- Implementing measures related to cheating and impersonation;
- Implementing continuously updated procedures based on test takers' feedback, methodological advancements, and technological innovations.

### 1.3.2 Guidelines for the creation of an Algerian system of linguistic certification

In our LEADS project, it was important to examine the major certification systems whose analysis and comparison highlighted their strengths and weaknesses to derive a fit-for-purpose Algerian framework for linguistic certification. The study of the preceding certification systems showed that they provide standardized frameworks for assessing language proficiency across the four skills (listening, speaking, reading, and writing). Our Algerian certification system must also comprehensively cover the four skills.

The LEADS team decided to combine some characteristics of two major certification systems, namely, the CEFR and the TOEFL not only to address some limitations related to each one of them, but also to create a framework that truly fits the Algerian context and enhances the assessment of Algerian students' English language proficiency.

A useful way of combining the CEFR and the TOEF is through merging their scoring scales to get a more accurate assessment of the test taker's linguistic proficiency, from A1 to C2 (like the CEFR), and in parallel, from 0 to 120 (like the TOEFL):

- **A1 - Beginner (Not determined):** the test taker can understand and use familiar everyday expressions and very basic phrases.
- **A2 - Elementary (Not determined):** the test taker can understand sentences and frequently used expressions, as well as communicate information on familiar and routine matters.



- **B1 - Intermediate (42-71):** the test taker can produce simple connected text on topics that are familiar or of personal interest, as well as understand topics related to daily routine.
- **B2 - Upper Intermediate (72-94):** the test taker can understand the main ideas of complex texts and interact with a degree of fluency with native speakers.
- **C1 - Advanced (95-113):** the test taker can understand a wide range of demanding longer texts and recognize implicit meaning.
- **C2 - Proficiency (114-120):** the test taker can summarize information from different spoken and written sources, reconstructing arguments and accounts in a coherent presentation.

The CEFR, which provides detailed descriptors of language performance at each proficiency level, describing what learners can do in terms of language skills and communication tasks, will serve as the backbone of our Algerian certification system. Incorporating some aspects of the TOEFL into it will provide a more precise evaluation of specific language sub-skills that enable individuals to effectively communicate in a particular language. For instance:

- **Listening skills** involve recognizing and interpreting various features of speech, such as tone, intonation, and context.
- **Speaking skills** involve articulating sounds, words, and sentences accurately, fluently, and appropriately in different contexts and situations.
- **Reading skills** involve decoding written symbols, recognizing words, understanding vocabulary, and grasping the main ideas and details of written texts.
- **Writing skills** involve organizing ideas coherently, using appropriate grammar and vocabulary, and effectively conveying meaning through written communication.

This choice will allow us to implement a sound assessment that goes beyond usual feedbacks such as: articulating pronunciation, assessing comprehension, fluency, and coherence, as well as interpreting and analyzing information.

### 1.3.3 Adaptation to the Algerian cultural context

A major drawback in the studied certification systems is their focus on linguistic competence regardless of cultural competence. We hence suggest a certification system that focuses on the local cultural context. Moreover, in the case of English language proficiency tests, while some of them focus on British or American variations, our Algerian certification system will not favor one over the other. Integrating the Algerian local culture into the linguistic certification framework can make it more engaging for test takers. For example, we may include reading and listening materials, as well as writing and speaking prompts that reflect diverse aspects of local history, society and traditions. We must also ensure that the questions represent a variety of cultural perspectives and experiences that reflect the breath of Anglophone culture.



Without language, culture is incomplete, and conversely, language is influenced and shaped by culture. A different language is a different vision of the world, and those multiple visions of the same world have been widely recognized as an important intercultural dimension in foreign language education, but unfortunately still poorly explored (Byram & Wagner, 2018) (Baker, 2012) Today, more people are interacting with individuals from different cultures, world-views, and ways of expression. The dialogue between cultures is getting more and more challenging to establish a common ground where all these concepts meet and become mutually comprehensible since nearly every person is influenced by his/her native language and culture. Moreover, socio-cultural misrepresentations often lead to misunderstandings because people might be unaware of their own code and set of behaviors, and then automatically project them on the other (the notion of otherness). Hence, the importance to overcome cultural diverse encounters for an effective intercultural citizenship.

**Linguistic relativity:** The relationship between language and culture or language and perception goes back to Whorf and Sapir known as the Sapir-Whorf Hypothesis. Sapir first established the primary foundation of linguistic relativity in 1929, then it gained importance in the 1950's following Whorf's works on the relationship between language, culture, and cognition to refine its frame as a communication question. Thus, the theory linguistic relativity took the study of language from a structural description towards merging both linguistic, cognitive, and socio-cultural aspects of foreign language learning, and that the society where language is spoken natively is organized and controlled by commonly accepted beliefs and assumptions of its speakers' world view. In the 1960's and the 1970's, more studies were dedicated to this relationship (Hymes, 1972)

**From cultural competence to intercultural communicative competence:** In intercultural communicative competence (ICC), a number of other concepts are included: culture, intercultural communication, competence, and communicative competence. Their aim is to increase dialogue and cooperation among members of different national cultures within a common European Union or within a global economy (Kramsch, 1998) owing to the influence of globalization on intercultural communication, and the way modern societies adjust from local to global exchanges and vice versa (Jensen & Longreen, 1995).

**The Algerian cultural context:** For this reason, in our LEADS project, we aim to move from ethno-centrism to ethno-relativism in order for the Algerian EFL students to overcome cultural, racial, and gender stereotypes. We also intend to move from globalization to glocality as our Algerian students construct meaning according to their local environment. It is also important to take into account the Algerian EFL students'/takers' (of the Algerian proficiency test) cultural background knowledge versus the target cultural background knowledge (i.e. British, American, European...). As a result, there should be bridges to overcome the gap between local and target language and culture(s). Algerian EFL students' cultural knowledge and intercultural competence are necessary to enable them to function effectively between different languages and cultures as global citizens. Students' linguistic





and communicative skills need to be completed with cultural, intercultural skills (Alptekin, 2002).

From a practical perspective, we need to add in our LEADS project some elements related to our Algerian cultural context. We can consider the Algerian cultural, social, historical, geographical, political, religious, ideological values and notions, in comparison with the English language and culture.

**Examples of Algerian cultural values, notions, and knowledge content to be covered:**

- The notion of time in Algerian Vs. in British, American, European cultures (time is money)
- Greetings/ weddings ceremonies in Algerian Vs. British, American cultures
- The value of hospitality in Algerian Vs. foreign cultures
- Knowledge content: Historical events that account for the national identity Vs. the target language and culture
- The notion of geographical perspective that explains certain features of the national character Vs. the target language and culture
- The political, religious, ideological perspectives of the local language culture Vs. the target language and culture
- The Algerian creative arts Vs. foreign creative arts
- The Algerian socio-political problems of unemployment, migration, pollution in Algeria Vs. target language and culture
- Attitudes: The notion of tolerance towards otherness
- Intercultural awareness: Comparing the foreign culture with the Algerian one (to find similarities and differences), mutual representations, images, stereotypes of the students' own culture and the foreign culture

## 1.4 Conclusion

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Following the preceding overview of best practices in linguistic certifications, the LEADS Erasmus+ team will combine aspects of the CEFR and TOEFL to create a fit-for-purpose Algerian linguistic certification framework that does not overlook the local cultural context. Later, it will be the task of the Ministry of Higher Education and Scientific Research to validate it and promote it internationally.



## 2 Frameworks for Assessing Entrepreneurial Skills

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In today's rapidly evolving global economy, the demand for transversal skills (digital, entrepreneurship, critical thinking, problem-solving, learning to learn ...) has become increasingly paramount. These skills, which transcend specific disciplines and industries, are essential for navigating the complexities of modern workplaces and driving innovation. As such, they serve as the cornerstone for fostering adaptability, creativity, and resilience among individuals seeking to thrive in diverse professional environments.

In the array of skills vital for success, entrepreneurial skills shine as essential assets in today's dynamic environment. As the entrepreneurial spirit continues to fuel economic growth and societal advancement, the importance of cultivating entrepreneurial competencies cannot be overstated. These skills encompass a broad spectrum, ranging from critical thinking and problem-solving to communication, collaboration, and risk management. They empower individuals not only to identify opportunities but also to seize them, transforming ideas into tangible ventures that contribute to economic prosperity and social development.

In light of the critical role played by entrepreneurial skills, the necessity for a robust framework designed to assess and cultivate these competencies becomes apparent. This framework offers a systematic method for gauging individuals' proficiency across the multifaceted spectrum of entrepreneurship. Providing a structured assessment process, not only facilitates the identification of strengths and areas for improvement but also informs the development of tailored learning pathways and support mechanisms. Educators and policymakers alike benefit from the insights garnered through this framework, enabling them to design targeted interventions and educational initiatives that effectively nurture entrepreneurial talent and drive innovation.

The LEADS project endeavors to address this pressing need by exploring and evaluating existing frameworks for assessing entrepreneurial skills. By scrutinizing the strengths and limitations of these frameworks, the project aims to identify the most suitable model for implementation within Algerian universities. Through this endeavor, LEADS seeks to equip future generations of Algerian students with the entrepreneurial competencies necessary to thrive in an increasingly competitive and dynamic global landscape.



## 2.1 Definition and components of entrepreneurial skills and competences

### 2.1.1 Entrepreneur and Entrepreneurship

**Entrepreneur:** The word ‘entrepreneur’ originates from the French (“Entreprendre”) and means someone who ‘undertakes’ a venture or an enterprise.

*“A person who makes money by starting or running businesses, especially when this involves taking financial risks” (Oxford English Dictionary, s. d.).*

*“Any attempt at new business or new venture creation, such as self-employment, a new business organization, or the expansion of an existing business, by an individual, a team of individuals, or an established business” (Global Entrepreneurship Monitor, 2023).*

*“Entrepreneurs are those persons (business owners) who seek to generate value, through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets” (OCDE, 2022).*

Entrepreneurship is a multifaceted phenomenon that encompasses various aspects of market economy and related activities, such as the identification, creation, expansion, and transformation of businesses. It involves enterprising human action aimed at generating value by identifying and exploiting new products, processes, or markets. Entrepreneurs can be seen as the “key agents of change” responsible for “creative destruction” by bringing innovation (Schumpeter, 1934) or as “disruptive” to established economic practices through introducing new value propositions into the economy (Metcalfe, 2004) or as “opportunist” while re-equilibrating the market when disseminating knowledge and information appropriately (Kirzner). Nonetheless, entrepreneurs play a crucial role in driving economic growth and creating new opportunities for individuals and communities.

**Types of Entrepreneurs:** According to (Matlay, 2005), entrepreneurs can be divided into three types (Westhead and Wright, 1998): novice entrepreneurs, serial entrepreneurs, and portfolio entrepreneurs.

- *Novice entrepreneurs:* those who have no prior experience in the business ownership field but currently own an equity stake in an economically active firm.
- *Serial entrepreneurs:* those who own an equity stake in a single active firm and have previously sold or closed down similar businesses.
- *Portfolio entrepreneurs:* those who simultaneously own equity stakes in two or more economically active firms.

Successful entrepreneurs for their part come in different forms and possess various characteristics (Nexford University, s. d.)

- *The inventor:* He is a problem-solver creatively and has a knack for developing new and innovative products or services.



- *The small business owner*: typically starts and operates a specific niche industry or business, focusing on developing a loyal customer base and providing high-quality products or services.
- *Online entrepreneurs*: operate businesses entirely online, exploiting digital marketing and e-commerce platforms to reach a global audience.
- Home business owners: operate their businesses from their homes, providing services or products directly to customers, or using an online business from their home.

**Entrepreneurship:** Entrepreneurship is a common concept that has entered everyday parlance and, as a generic term, is used in a variety of contexts. It encompasses a broad range of interchangeable meanings and situations.

*“The activity of making money by starting or running businesses, especially when this involves taking financial risks; the ability to do this (Oxford English Dictionary, s. d.)*

*Entrepreneurial activity is the enterprising human action in pursuit of the generation of value, through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets. Entrepreneurship is the phenomenon associated with entrepreneurial activity. (OECD, s. d.)*

*“The pursuit of creating and growing a new venture that solves a customer's problem and creates value in the market” (Strategyzer | Corporate Innovation Strategy, Tools & Training, s. d.)*

Entrepreneurship is a driving force for societal prosperity and well-being. It ignites economic growth, inspires creativity, creates job opportunities, and tackles some of the most complex issues our society faces, such as achieving the UN Sustainable Development Goals and revitalizing economies impacted by the COVID-19 pandemic. This later has caused significant harm to economies worldwide, and as a result, governments have come to recognize the importance of entrepreneurship in building sustainable and sturdy economies. To make this vision a reality, decision-makers, investors, and other stakeholders will require accurate, comprehensive, and reliable data that can inform their choices and promote robust entrepreneurial ecosystems on both a local and global scale.

Entrepreneurship combines different elements into a mindset, a process, and a set of principles or methods (Lindner et al., 2020):

- **Entrepreneurship as a mindset** (Duckworth et. al., 2007; Dweck, 2007. Rae, 1999): is made up of interrelated beliefs and assumptions that guide our behavior and underpin our decisions. They can be cultivated and nurtured through entrepreneurial learning. It is a way of creative thinking that helps a person go beyond challenges, make decisions, and take responsibility. Additionally, it drives individuals to improve their skills, learn from their mistakes, and take continuous action on their ideas.
- **Entrepreneurship as a process** (Kuratko and Hodgetts, 1998). (Stevenson and Jarillo, 1990; Ronstadt, 1985): It consists of various phases. The first is identifying possibilities



and potential without considering the resources that a person currently has. This is the starting point for developing new ideas that create value for an individual, a company, or society. The next phase is developing a concept, and finally, putting it into practice.

- ***Entrepreneurship as a method*** (Neck and Green, 2011; Connor et al, 2018; Sarasvathy and Venkataraman, 2011), Entrepreneurship is also a method - a way of thinking and acting. It is built on a set of guidelines underpinning entrepreneurial action, such as effecting change or experimenting with new ways of doing things.

***Most common types of entrepreneurship:*** Entrepreneurship can be categorized into several types (QAA, 2018):

- ***Social entrepreneurship*** refers to entrepreneurial ventures that aim to solve social or cultural issues rather than solely seeking financial gain or profit.
- ***Green entrepreneurship*** involves exploring environmental problems to result in a net positive impact on the natural environment through the use of sustainable processes.
- ***Digital entrepreneurship*** revolves around the creation, marketing, delivery, and support of digital products and services online. It's important to recognize that these entrepreneurial ventures aim to become financially sustainable while also addressing the needs of their target audience(s).
- ***Intrapreneurship*** involves the application of enterprise behaviors, attributes, and skills within an existing micro or small business, corporate or public-sector organization.
- ***Women Entrepreneurship*** refers to the process of creating, managing, and developing a business enterprise by a woman or group of women.

The exploration of entrepreneurship and its multifaceted dimensions illuminates its pivotal role in driving innovation, economic growth, and societal advancement. Defined by its capacity for opportunity recognition, risk-taking, and value creation, entrepreneurship transcends traditional business ownership to embody a mindset of creativity, resilience, and adaptability which called entrepreneurial skills.

### 2.1.2 Entrepreneurship as a competence from the academic perspective

The Theory of Entrepreneurial Competence posits that successful entrepreneurship is not solely reliant on innate traits, but can be cultivated through the development of specific competencies. This theory suggests that individuals can acquire and enhance their entrepreneurial abilities through education, training, and experience. The theory emphasizes the dynamic nature of entrepreneurial competence, which evolves over time through continuous learning and adaptation to changing circumstances.

Additionally, it highlights the interaction between individual competencies and environmental factors such as education, culture, social networks, and institutional support. Overall, the Theory of Entrepreneurial Competence underscores the importance of



developing a specific set of competencies to excel in entrepreneurial endeavors and contributes to our understanding of the factors that drive entrepreneurial success. In this context, “Entrepreneurship is when you act upon opportunities and ideas and transform them into financial, cultural, or social value for others” (Bacigalupo et al., 2016). This definition:

- Focus on value creation across diverse contexts and sectors;
- Encompasses various forms of entrepreneurship, including intrapreneurship, social entrepreneurship, green entrepreneurship, and digital entrepreneurship;
- Entrepreneurship as a competence extends beyond business, enabling personal development and societal contribution;
- It facilitates entry into the job market as an employee or self-employed individual;
- It empowers individuals to initiate ventures driven by cultural, social, or commercial motives.

### 2.1.3 Definition of entrepreneurial skills

Based on common understanding within the field of entrepreneurship and business management, entrepreneurial skills refer to the capabilities and qualities possessed by individuals that enable them to identify opportunities, take calculated risks, and effectively manage and grow businesses or ventures. These skills are essential for entrepreneurs to navigate the complexities of starting and running successful enterprises in various industries and contexts.

According to (García-Cabrera et al., 2023), competences denote a collection of attributes, including knowledge and its application, attitudes, skills, and responsibilities, which gauge an individual's capacity to execute them Tuning (2003).

Nevertheless, there exists a lack of consensus regarding the competences that delineate entrepreneurs (for example, Kyndt & Baert, 2015; RezaeiZadeh et al., 2017; Schelfhout et al., 2016; Tittel & Terzidis, 2020), as well as the most crucial competences that prospective entrepreneurs should acquire (Solomon, 2007) presented in the table below; are several prevalent definitions, accompanied by their respective authors:



<p><b>Definition 01:</b> "Entrepreneurial skills refer to the abilities and competences necessary for individuals to create, develop, and manage successful businesses or ventures."</p>	<p><b>Author:</b> Shane, S. A., &amp; Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. <i>Academy of Management Review</i>, 25(1), 217-226.</p>
<p><b>Definition 02:</b> "Entrepreneurial skills are the combination of knowledge, attitudes, and behaviors that equip individuals to create and manage ventures, innovate, adapt to change, and drive business growth"</p>	<p><b>Author:</b> Peterman, N. E., &amp; Kennedy, J. (2003). Enterprise education: Influencing students' perceptions of entrepreneurship. <i>Entrepreneurship Theory and Practice</i>, 28(2), 129-144.</p>
<p><b>Definition 03:</b> "Entrepreneurial skills are the unique set of capabilities possessed by individuals that enable them to effectively identify, evaluate, and exploit opportunities, as well as to navigate the uncertainties and challenges inherent in entrepreneurial endeavors."</p>	<p><b>Author:</b> Kuratko, D. F. (2005). The emergence of entrepreneurship education: Development, trends, and challenges. <i>Entrepreneurship Theory and Practice</i>, 29(5), 577-597.</p>
<p><b>Definition 04:</b> "Entrepreneurial skills encompass a range of personal attributes, cognitive abilities, and practical competences that enable individuals to identify opportunities, innovate, take risks, and create value in the marketplace."</p>	<p><b>Author:</b> Fayolle, A., &amp; Gailly, B. (2008). From craft to science: Teaching models and learning processes in entrepreneurship education. <i>Journal of European Industrial Training</i>, 32(7), 569-593.</p>
<p><b>Definition 05:</b> "Entrepreneurial skills encompass the cognitive, emotional, and behavioral competences required to identify opportunities, mobilize resources, and execute innovative strategies to create value and achieve sustainable business success."</p>	<p><b>Author:</b> Liñán, F., &amp; Chen, Y. W. (2009). Development and cross-cultural application of a specific instrument to measure entrepreneurial intentions. <i>Entrepreneurship Theory and Practice</i>, 33(3), 593-617.</p>

#### 2.1.4 Entrepreneurial competences

The discussion about entrepreneurial competences is not new. An in-depth review dates back to the year 2008 by Mitchelmore & Rowley. The topic still attained attention after 2010, and quite several newer contributions have been published.



## A. Definition of Competence

Source	Definition
EU Parliament and the Council (2006, p. 13)	Competence is a combination of knowledge, skills and attitudes appropriate to the context
ERIC (2019, online)	The individual's demonstrated capacity to perform, i.e., the possession of knowledge, skills and personal characteristics needed to satisfy the special demands or requirements of a particular situation
BIBB (2018, online)	Competence is understood as the combination of knowledge and skills in coping with the requirements of action (translated)
DQR (2011, p. 17)	Competence describes the ability and readiness of the individual to use knowledge, skills and personal, social and methodological competences and to behave in a considered, individual, and socially responsible manner. Competence is understood in this sense as a comprehensive action skill.
Lokhoff et al. (2010, p. 21)	Competence is a quality, ability, capacity, or skill that is developed by and that belongs to the student
Erpenbeck and von Rosenstiel (2011, p. 24)	Competences are considered as dispositions of self-organized behavior
Weinert (2001, p. 27)	Competences are understood as cognitive abilities and skills possessed by or able to be learned by individuals that enable them to solve particular problems, as well as the motivational, volitional, and social readiness and capacity to utilize the solutions successfully and responsibly in variable situations [translated by Klieme and Leutner (2006, p. 309)]
Klieme and Leutner (2006, p. 879)	Context-specific cognitive dispositions that are acquired by learning and needed to successfully cope with certain situations or tasks in a specific domain
DeSeCo (2001, p. 13)	For the Swedish Metal Workers' Union, competence is a combination of what one knows, what one can do, what one wants, and what one dares to do. "Know" means theoretical knowledge, "can" implies practical knowledge and informal knowledge, "want" deals with ambition, attitude, goals and outlook, and "dare" reflects self-confidence and self-esteem
Dominique Simone Rychen (2002, p. 5)	A competence is the ability to meet a complex demand successfully or carry out a complex activity or task
Beaumont (1995, p. 12)	The ability to apply knowledge, understanding, and skills in performing to the standards required in employment. This includes solving problems and meeting changing demands'

Table 1. Source : (Tittel & Terzidis, 2020)

## B. Comparison between Competence / Competency:

A review of literature suggested that 'competency' and 'competence' are two distinct 'approaches' to studies in the Human Resources Management field.

- **The first one is a person-oriented behavioral approach.** This approach commonly uses the term 'competences' to refer to the behaviors or personal attributes supporting an area of work and is particularly influential in the United States.





- **The second one is a task-oriented functional approach.** This approach, on the other hand, uses the term ‘competence’ more frequently for describing an area of work tasks or job outputs and is dominant in the United Kingdom.

The table below makes a comparison between them:

Competence	Competency
Focus on the results	Focus on a person’s behaviors
Describe the features of the area of work tasks or job outputs	Describe the attributes of the person
Constitute of the various skills and knowledge needed for performing the job	Constitute the underlying attributes of a person for superior work performance
Not transferable as each skill and knowledge is more specific to perform the job	Transferable from one person to another
Assessed by performance on the job	Assessed in terms of behaviors and attitude
Task-oriented	People-oriented

Table 2. Source :. (Yuvaraj, 2011)

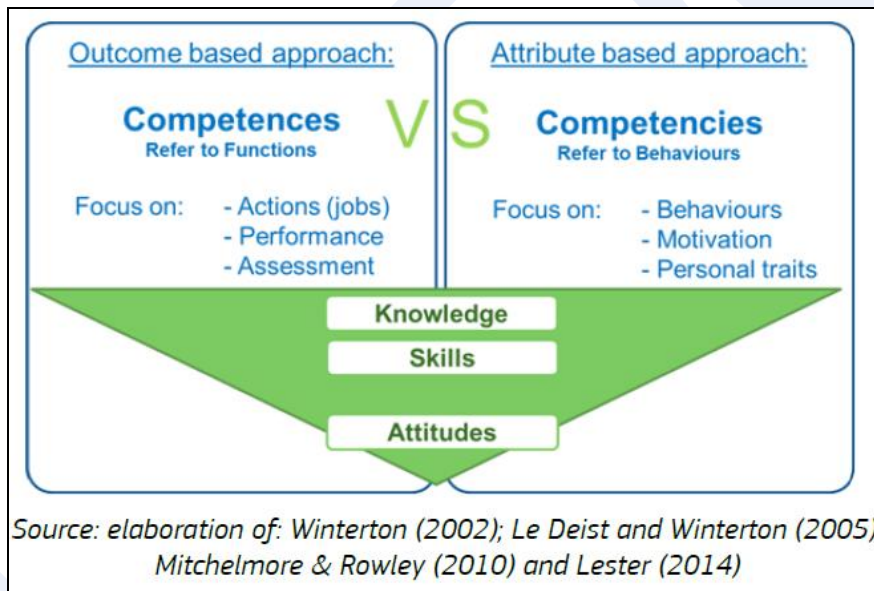


Figure 5. Source: (Komarkova et al., 2015) <https://data.europa.eu/doi/10.2791/067979>

In the following paragraphs, we will use the term ‘entrepreneurial competences’ when referring to competences and competencies concerning entrepreneurship. We will use the appropriate terminology in the cases where it is required.

### C. Entrepreneurial Competences

The Table below (García-Cabrera et al., 2023) shows a definition of entrepreneurial competences and examples of specific abilities related to every competence:

Entrepreneurial Competences	Abilities	Illustrative references
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<p><b>Opportunity</b> Ability of managers to recognize business opportunities and/or improvements in any department of the business.</p>	<ul style="list-style-type: none"> <li>- Identify business opportunities</li> <li>- Perceive unmet consumer needs</li> <li>- Actively look for products/services that provide real benefit to customers</li> </ul>	<p>Ahmad et al. (2011) Reis, Fleury, and Carvalho (2021) Kyndt and Baert (2015)</p>
<p><b>Relational</b> Ability of managers to create, maintain and improve interpersonal relationships with different stakeholders (clients, employees, providers ...).</p>	<ul style="list-style-type: none"> <li>- Manage conflicts</li> <li>- Build and keep networks and relationships to get knowledge and resources</li> <li>- Build consensus</li> </ul>	<p>Ahmad et al. (2010) Botha, Van Vuuren, and Kunene (2015) Lans et al. (2011)</p>
<p><b>Conceptual</b> The intellectual capacity of managers to gather and process information that reflects on their decision-making process in the business (intuitive, rational, deductive ...).</p>	<ul style="list-style-type: none"> <li>- Treat new problems as opportunities</li> <li>- Apply ideas and observations to alternative contexts</li> <li>- Think intuitively</li> </ul>	<p>Man et al. (2002) Rahman et al. (2015) Schelfhout et al. (2016)</p>
<p><b>Organizing</b> Ability of managers to organize human, physical, financial, and technological resources.</p>	<ul style="list-style-type: none"> <li>- Develop efficient procedures minimizing unnecessary hierarchy</li> <li>- Leading employees</li> <li>- Supervise subordinates</li> </ul>	<p>Alcaraz-Rodríguez et al. (2014) Mitchelmore and Rowley (2010) RezaeiZadeh et al. (2017)</p>
<p><b>Commitment</b> Ability and spirit of managers to, in the presence of adversity, continue with their work in the business or department.</p>	<ul style="list-style-type: none"> <li>- Sustained Commit to long term business goals</li> <li>- Refuse to let the business fail</li> <li>- Restart after failure</li> </ul>	<p>Ahmad et al. (2010) RezaeiZadeh et al. (2017) Schelfhout et al. (2016)</p>
<p><b>Strategic</b> Ability of managers to formulate, implement, and control business or functional strategies.</p>	<ul style="list-style-type: none"> <li>- Set challenging but achievable business goals and vision</li> <li>- Make strategic change</li> <li>- Monitor progress toward strategic goals</li> </ul>	<p>Fuel et al. (2021) Garzón (2010) Rahman et al. (2015)</p>
<p><b>Learning</b> Ability of managers to acquire knowledge, abilities, attitudes or values that are relevant for the business activity.</p>	<ul style="list-style-type: none"> <li>- Search for techniques, knowledge or methods that allow them to improve professionally</li> <li>- Learning from diverse and heterogeneous sources of information, such as their own experience or that of others</li> <li>- Transferring abilities and knowledge learned to useful actions for the business</li> </ul>	<p>Ahmad et al. (2011) Kyndt and Baert (2015) Zhao et al. (2021)</p>
<p><b>Personal strength</b> Emotional ability that allows them to perceive, assimilate, understand, and manage their own emotions as well as those of others.</p>	<ul style="list-style-type: none"> <li>- Self-confidence and a positive attitude</li> <li>- Self-control in stressful situations, time management</li> <li>- Accepting constructive criticism</li> </ul>	<p>Reis et al. (2021) Schelfhout et al. (2016) Zhao, Seibert, and Lumpkin (2010)</p>
<p><b>Technical</b> Ability of managers to use tools relevant for the business or department.</p>	<ul style="list-style-type: none"> <li>- Knowledge of basic concepts in their area.</li> <li>- Operation of and proficiency in relevant tools and techniques</li> </ul>	<p>Ahmad et al. (2010) Mitchelmore and Rowley (2010) Rahman et al. (2015)</p>
<p><b>Social responsibility</b> Ability of managers to exercise socially responsible management.</p>	<ul style="list-style-type: none"> <li>- Environmentally friendly business decision making</li> <li>- Treating employees fairly and consistently</li> <li>- Offering quality sustainable products at reasonable prices</li> </ul>	<p>Ahmad et al. (2011) Alsmadi and Alnawas (2019) Ramos-González, Rubio-Andrés, and Sastre-Castillo (2021)</p>

Table 3. (García-Cabrera et al., 2023)



**Categories of entrepreneurial competences:**

<b>Author</b>	<b>Categorization of EC (Entrepreneurial Competence)</b>
Bird (1995)	Motive and trait level
	Social role and self concept level
	Skill level
Man et al. (2002)	Opportunity Competences
	Relationship Competences
	Conceptual Competences
	Organizing Competences
	Strategic Competences
	Commitment Competences
Schallenkamp and Smith (2008)	Technical Skills
	Managerial Skills
	Entrepreneurial Skills
	Personal Maturity Skills
Mitchelmore and Rowley (2010)	Business and management competences
	Human relations competences
	Entrepreneurial competences
	Conceptual and relationship competences
Komarakova et al. (2015)	Operational and contextual
	Entrepreneurial
	Conceptual and relationship
Lackeus (2015)	Knowledge
	Skills
	Attitudes
Bacigalupo et al. (2016)	Ideas and Opportunities
	Resources
	Into Action

*Table 4. Source : (Tittel & Terzidis, 2020)*



#### D. The entrepreneur competence framework

Mitchelmore and Rowley (2010; 2013) developed a thorough framework of competencies with the aim of examining the competences of successful entrepreneurs as documented in the literature. The next table summarizes the result of their work.

Factor	Item
<b>Conceptual and Relationship Competencies</b>	<ul style="list-style-type: none"> <li>- Interpersonal skills</li> <li>- Oral communication skills</li> <li>- Relationship building</li> <li>- Networking</li> <li>- Integrity</li> <li>- Self – confidence</li> <li>- Motivating self</li> <li>- Political competence</li> <li>- Being active</li> <li>- Desire to succeed</li> <li>- Perseverance</li> </ul>
<b>Business and Management Competencies</b>	<ul style="list-style-type: none"> <li>- Budgeting skills</li> <li>- Business operational skills</li> <li>- Developing management systems</li> <li>- Formulating and implementing strategies for exploiting opportunities</li> <li>- Business plan preparation and writing</li> <li>- Development of operational systems</li> <li>- Planning business activities</li> <li>- Managing finance</li> </ul>
<b>Entrepreneurial competencies</b>	<ul style="list-style-type: none"> <li>- Idea generating</li> <li>- Innovation skills</li> <li>- Visioning</li> <li>- Envisioning opportunities</li> <li>- Product innovation</li> <li>- Creativity</li> <li>- Willingness to take risks</li> <li>- Scan environments for opportunities</li> <li>- Risk taking</li> </ul>
<b>Human relations competencies</b>	<ul style="list-style-type: none"> <li>- Employee development</li> <li>- Managing employee performance</li> <li>- Human relation management skills</li> <li>- Employee relations</li> <li>- Hiring skills</li> <li>- Leadership skills</li> <li>- Motivate others</li> <li>- Management style</li> <li>- Management skills</li> </ul>

Table 5. (Komarkova et al., 2015) (<https://data.europa.eu/doi/10.2791/067979>)

After this classification, the research debate continuous in the sense of asking which knowledge, skills and personal traits contribute to the success of the enterprise.



## E. Components and elements of entrepreneurial competences

The dimension of entrepreneurship competence contains four key factors:

- Components in terms of knowledge, skills and attitudes (K-S-A framework), as defined by the European Parliament and the Council (*European Parliament, 2006*)
- Individual elements clustered within larger themes and categorized under even larger groups;
- The process side of entrepreneurship, reflecting the different phases of entrepreneurial activity from intention to ideas development, to implementation, and exploitation, thus, turning ideas into actions, value generation, and activity expansion;
- The learning progresses.

As shown in the following figure:

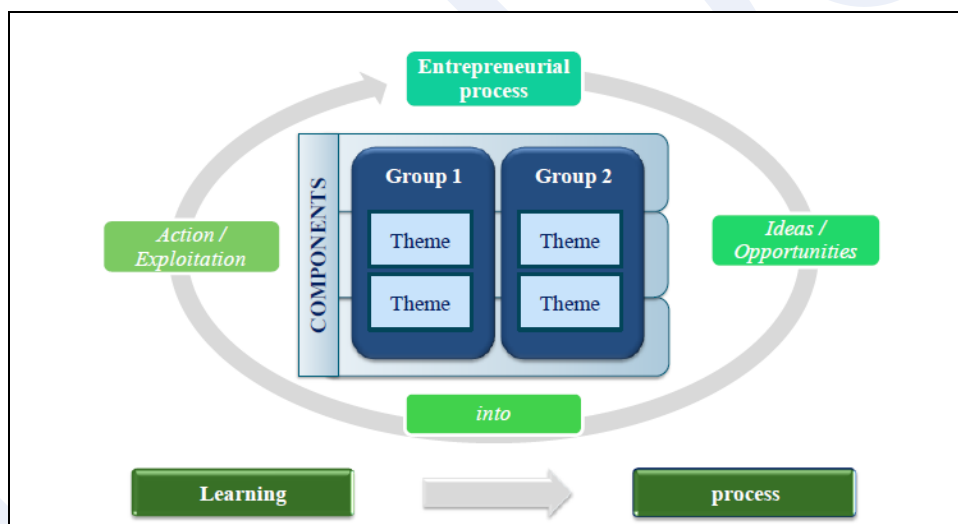


Figure 6. Source: (Komarkova et al., 2015) <https://data.europa.eu/doi/10.2791/067979>

Another strong reference when we talk about competence components terminology is the OvEnt study draws on the European Reference Framework - Key Competences for Lifelong Learning (European Commission & Directorate-General for Education, 2019) which identifies eight key competences for all members of a knowledge-based society and defines them in terms of Knowledge, Skills and Attitudes (*European Parliament, 2006*).

The OvEnt study examines the components of entrepreneurial competences within the framework of the European Reference Framework - Key Competences for Lifelong Learning. It identifies these components as **knowledge**, **skills**, and **attitudes** (K-S-A), emphasizing their role in fostering entrepreneurial behavior and success. Additionally, the study explores how these components are interconnected and how they contribute to the development of



entrepreneurial capabilities in individuals. Through its analysis, the OvEnt study provides insights into the essential elements of entrepreneurial competences and their significance in various contexts, based on the report of EntreComp, four examples are mentioned.

The European Reference Framework **Key Competences for Lifelong Learning** defines the competence 'Sense of initiative and entrepreneurship' as encompassing knowledge of identifying suitable opportunities, understanding economic/business contexts, and recognizing specific employer challenges. Relevant skills include proactive project management, effective representation and negotiation abilities, and self-assessment of strengths and weaknesses. Individuals with an entrepreneurial attitude display initiative and proactivity in personal, social, and work contexts.

**The European Qualification Framework (EQF)** aims to standardize qualifications across borders, focusing on learning outcomes rather than study duration. It delineates knowledge as theoretical and factual, skills as involving logical, intuitive, and creative thinking, and practical skills as requiring manual dexterity and use of methods/tools. Competences involve applying knowledge and skills autonomously in various situations. (<https://euopass.europa.eu/en/euopass-digital-tools/european-qualifications-framework>).

Various initiatives draw from the **K-S-A** framework of the European Parliament and Council (2006), while others adopt alternative approaches. For example, the UK Quality Assurance Agency for Higher Education emphasizes learning outcomes in terms of behaviors, skills, and attributes, excluding knowledge to facilitate curriculum integration. Rasmussen & Nybye (2013) categorize entrepreneurship into creativity, action, attitude, and outward orientation, aligning with the understanding of components. 'Attitude' reflects personal resources in facing challenges, 'Environment' pertains to understanding local/global contexts, 'Knowledge' enables opportunity spotting, and 'Creativity' and 'Action' involve skills and partly attitude. The following figure summarizes the 4 examples:

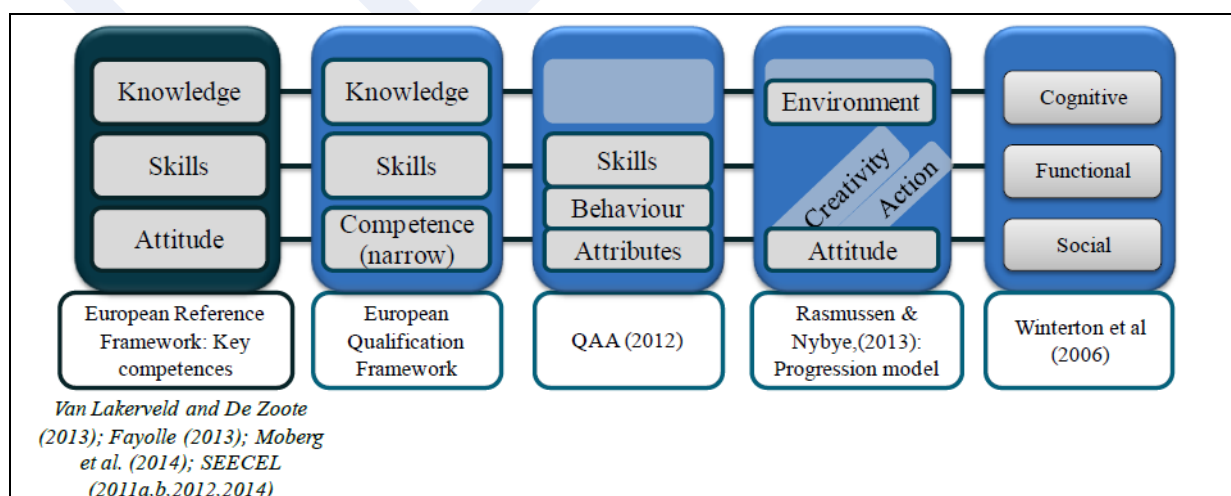


Figure 7. Source (Komarkova et al., 2015)



The research surrounding the dimensions, elements, and components of entrepreneurial competences underscores the complexity and multifaceted nature of entrepreneurship. While various frameworks and perspectives exist, there is a consensus on the importance of integrating knowledge, skills, and attitudes in defining entrepreneurial competences. These components, when intertwined, contribute to the holistic development of individuals' entrepreneurial capabilities, enabling them to identify opportunities, innovate, and create value in diverse contexts. Moving forward, further research and dialogue are essential to deepen our understanding of entrepreneurial competences and their role in fostering entrepreneurship and driving economic and societal progress.

## 2.2 Role of entrepreneurial competences in innovation and economic growth

The Global Entrepreneurship Monitor (GEM) is a major study of entrepreneurship globally. It uses a standardized approach to analyze self-employment and new business entries across countries. GEM focuses on individual behavior, attitudes, and national contexts impacting entrepreneurship. Research shows varying levels of entrepreneurial activity among countries at similar development stages, with a positive relationship between entrepreneurship and economic growth in wealthier countries, but a negative one in less developed ones. This highlights the importance of building larger companies in developing nations. (Adapted from (Ogunlana, 2018))

Here, we delve into the multifaceted role of entrepreneurial competences in fueling innovation and driving economic prosperity:

1. **Catalyzing Innovation:** Entrepreneurial competences such as creativity, problem-solving, and risk-taking are essential for catalyzing innovation. Entrepreneurs identify unmet needs, envision new possibilities, and develop innovative solutions to address market gaps, driving technological advancements, and societal progress.
2. **Fostering Entrepreneurial Ecosystems:** Entrepreneurial competences are instrumental in creating and nurturing vibrant entrepreneurial ecosystems conducive to innovation and growth. Skilled entrepreneurs collaborate with stakeholders, mentor aspiring innovators, and build networks that facilitate knowledge sharing, resource mobilization, and ecosystem development.
3. **Creating Value:** Entrepreneurial competences enable the creation of value through the commercialization of innovative ideas and the establishment of new ventures. Entrepreneurs leverage their skills in opportunity recognition, market analysis, and business model development to transform innovative concepts into viable products, services, and businesses that generate economic value and societal impact.
4. **Driving Productivity and Competitiveness:** Entrepreneurial competences drive productivity gains and enhance competitiveness by fostering a culture of innovation,



efficiency, and continuous improvement. Entrepreneurs leverage their skills in strategic planning, resource allocation, and organizational leadership to optimize operations, differentiate products and services, and gain a competitive edge in dynamic markets.

5. ***Stimulating Job Creation and Economic Development:*** Entrepreneurial ventures fueled by skilled entrepreneurs serve as engines of job creation and economic development. By launching new businesses, expanding existing enterprises, and driving industry growth, entrepreneurs generate employment opportunities, stimulate local economies, and contribute to wealth creation and poverty alleviation.
6. ***Promoting Technological Adoption and Dissemination:*** Entrepreneurial competences facilitate the adoption and dissemination of new technologies, driving innovation diffusion and societal change. Entrepreneurs serve as early adopters and champions of emerging technologies, demonstrating their commercial viability and inspiring broader adoption across industries and markets.
7. ***Fostering Resilience and Adaptability:*** Entrepreneurial competences empower individuals and organizations to navigate challenges, adapt to changing circumstances, and thrive in dynamic environments. Skilled entrepreneurs exhibit resilience, agility, and resourcefulness, turning setbacks into opportunities, and leveraging adversity to drive innovation and growth.
8. ***Cultivating a Culture of Entrepreneurship:*** Entrepreneurial competences contribute to the cultivation of a culture of entrepreneurship that values creativity, initiative, and risk-taking. Skilled entrepreneurs inspire and mentor future generations of innovators, instilling an entrepreneurial mindset that fosters a spirit of innovation, collaboration, and resilience throughout society.

In summary, entrepreneurial competences play a crucial role in driving economic growth, However, in the pursuit of economic development, it's essential to consider broader considerations of sustainability and well-being, as advocated by Doughnut Economics.

The concept of “Doughnut Economics”, created by researcher Kate Raworth (Oxford University), aims to reformulate the foundations of the traditional economic vision to incorporate the social and environmental sphere into the classic approach based purely on economic growth. In doing so, it aims to reduce inequalities and ensure environmental sustainability. By aligning entrepreneurial activities with the principles of Doughnut Economics, such as promoting social equity and environmental sustainability, entrepreneurs can contribute to building more inclusive, resilient, and sustainable economies that benefit both present and future generations. Thus, integrating entrepreneurial competences with the principles of Doughnut Economics offers a pathway towards more balanced and holistic economic growth. (<https://doughnuteconomics.org/about-doughnut-economics#what-is-the-doughnut>).





## 2.3 Review of existing frameworks for entrepreneurial skill assessment

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By systematically evaluating the effectiveness of entrepreneurial skills assessment frameworks across these dimensions, researchers, educators, and practitioners can gain a comprehensive understanding of their strengths, weaknesses, and areas for improvement. This evaluative process contributes to the refinement and enhancement of assessment practices, ultimately facilitating the development of more valid, reliable, and impactful frameworks for assessing entrepreneurial skills and fostering entrepreneurial success. Below we will develop some of these frameworks:

### 2.3.1 EntreComp (Entrepreneurship Competence Framework)

Developed by the European Commission as part of its efforts to promote entrepreneurship and foster entrepreneurial skills development across Europe. Introduced in 2016, EntreComp provides a common reference framework for understanding and assessing entrepreneurial competences, aiming to integrate entrepreneurship education and training initiatives across the continent. EntreComp has the potential to be used in a variety of ways including (McCallum E., Weicht R., McMullan L., Price A., 2018):

- supporting policy and practice to develop entrepreneurial skills
- assessing entrepreneurial skills
- supporting training of educators, trainers and teachers to deliver entrepreneurial skills
- designing programs and learning opportunities
- recognizing and certifying skills.

The phases of the EntreComp study that have led to the definition the EntreComp Framework are depicted in Figure below:

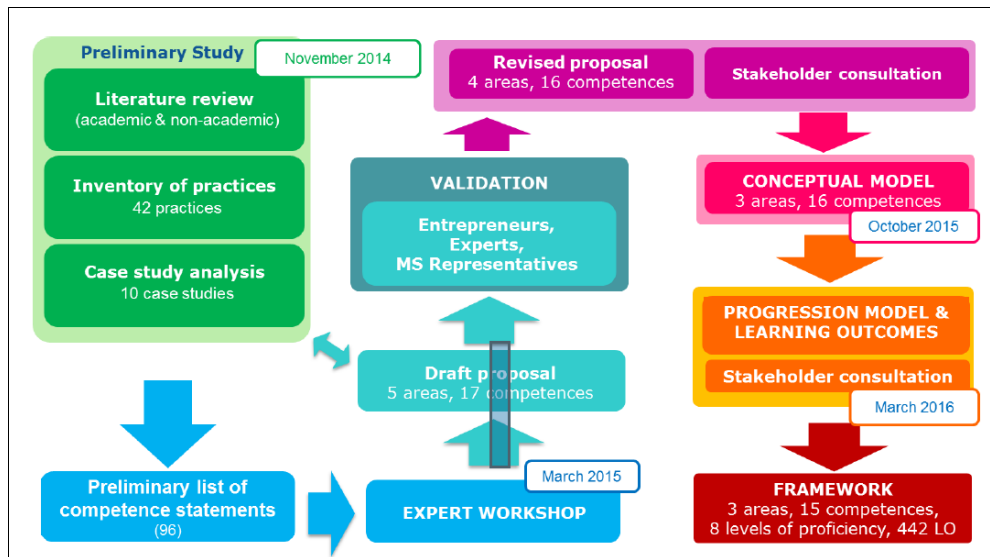


Figure 8. Main phases of the study that have led to EntreComp Framework (Komarkova et al., 2015)

The EntreComp conceptual model comprises two primary dimensions:

- Three competence areas directly reflecting entrepreneurship's essence as the ability to transform ideas into value-generating actions for others,
- The 15 competences that collectively define entrepreneurship as a universal competence. These competences (detailed in the figure below) each include practical guidance and descriptors outlining their core aspects.

The model's three areas—'Ideas and Opportunities,' 'Resources,' and 'Into Action'—emphasize entrepreneurship as the capacity to translate ideas into action by leveraging personal, material, and non-material resources. These resources encompass self-awareness, motivation, financial means, specific knowledge, and skills. While tightly interconnected, the 15 competences collectively form the foundation of entrepreneurship as a competence. Mastery of all 15 competences is not mandated; instead, the framework underscores their collective importance in nurturing entrepreneurial capability, suggesting that entrepreneurship comprises these 15 essential components.



COMPETENCE		HINT	DESCRIPTION
<p>Competences per area <b>IDEAS &amp; OPPORTUNITIES</b></p>	1.1 Spotting opportunities	Use your imagination and abilities to identify opportunities for creating value	<ul style="list-style-type: none"> <li>Identify and seize opportunities to create value by exploring the social, cultural and economic landscape</li> <li>Identify needs and challenges that need to be met</li> <li>Establish new connections and bring together scattered elements of the landscape to create opportunities to create value</li> </ul>
	1.2 Creativity	Develop creative and purposeful ideas	<ul style="list-style-type: none"> <li>Develop several ideas and opportunities to create value, including better solutions to existing and new challenges</li> <li>Explore and experiment with innovative approaches</li> <li>Combine knowledge and resources to achieve valuable effects</li> </ul>
	1.3 Vision	Work towards your vision of the future	<ul style="list-style-type: none"> <li>Imagine the future</li> <li>Develop a vision to turn ideas into action</li> <li>Visualise future scenarios to help guide effort and action</li> </ul>
	1.4 Valuing ideas	Make the most of ideas and opportunities	<ul style="list-style-type: none"> <li>Judge what value is in social, cultural and economic terms</li> <li>Recognise the potential an idea has for creating value and identify suitable ways of making the most out of it</li> </ul>
	1.5 Ethical & sustainable thinking	Assess the consequences and impact of ideas, opportunities and actions	<ul style="list-style-type: none"> <li>Assess the consequences of ideas that bring value and the effect of entrepreneurial action on the target community, the market, society and the environment</li> <li>Reflect on how sustainable long-term social, cultural and economic goals are, and the course of action chosen</li> <li>Act responsibly</li> </ul>
<p>Competences per area <b>RESOURCES</b></p>	2.1 Self-awareness & self-efficacy	Believe in yourself and keep developing	<ul style="list-style-type: none"> <li>Reflect on your needs, aspirations and wants in the short, medium and long term</li> <li>Identify and assess your individual and group strengths and weaknesses</li> <li>Believe in your ability to influence the course of events, despite uncertainty, setbacks and temporary failures</li> </ul>
	2.2 Motivation & perseverance	Stay focused and don't give up	<ul style="list-style-type: none"> <li>Be determined to turn ideas into action and satisfy your need to achieve</li> <li>Be prepared to be patient and keep trying to achieve your long-term individual or group aims</li> <li>Be resilient under pressure, adversity, and temporary failure</li> </ul>
	2.3 Mobilising resources	Gather and manage the resources you need	<ul style="list-style-type: none"> <li>Get and manage the material, non-material and digital resources needed to turn ideas into action</li> <li>Make the most of limited resources</li> <li>Get and manage the competences needed at any stage, including technical, legal, tax and digital competences</li> </ul>
	2.4 Financial & economic literacy	Develop financial and economic know-how	<ul style="list-style-type: none"> <li>Estimate the cost of turning an idea into a value-creating activity</li> <li>Plan, put in place and evaluate financial decisions over time</li> <li>Manage financing to make sure your value-creating activity can last over the long term</li> </ul>
	2.5 Mobilising others	Inspire, enthuse and get others on board	<ul style="list-style-type: none"> <li>Inspire and enthuse relevant stakeholders</li> <li>Get the support needed to achieve valuable outcomes</li> <li>Demonstrate effective communication, persuasion, negotiation and leadership</li> </ul>
<p>Competences per area <b>INTO ACTION</b></p>	3.1 Taking the initiative	Go for it	<ul style="list-style-type: none"> <li>Initiate processes that create value</li> <li>Take up challenges</li> <li>Act and work independently to achieve goals, stick to intentions and carry out planned tasks</li> </ul>
	3.2 Planning & management	Prioritise, organise and follow up	<ul style="list-style-type: none"> <li>Set long-, medium- and short-term goals</li> <li>Define priorities and action plans</li> <li>Adapt to unforeseen changes</li> </ul>
	3.3 Coping with uncertainty, ambiguity & risk	Make decisions dealing with uncertainty, ambiguity and risk	<ul style="list-style-type: none"> <li>Make decisions when the result of that decision is uncertain, when the information available is partial or ambiguous, or when there is a risk of unintended outcomes</li> <li>Within the value-creating process, include structured ways of testing ideas and prototypes from the early stages, to reduce risks of failing</li> <li>Handle fast-moving situations promptly and flexibly</li> </ul>
	3.4 Working with others	Team up, collaborate and network	<ul style="list-style-type: none"> <li>Work together and co-operate with others to develop ideas and turn them into action</li> <li>Network</li> <li>Solve conflicts and face up to competition positively when necessary</li> </ul>
	3.5 Learning through experience	Learn by doing	<ul style="list-style-type: none"> <li>Use any initiative for value creation as a learning opportunity</li> <li>Learn with others, including peers and mentors</li> <li>Reflect and learn from both success and failure (your own and other people's)</li> </ul>

Figure 9. (McCallum E., Weicht R., McMullan L., Price A., 2018)



The progression in entrepreneurial learning involves two key aspects:

- Advancing autonomy and responsibility in acting on ideas to create value.
- Progressing from generating value in simple, predictable contexts to complex, dynamic environments.

The EntreComp Progression Model doesn't prescribe a linear path for individuals to become proficiently entrepreneurial or start ventures. Instead, it illustrates that entrepreneurial competencies can expand, leading to greater impact through value creation.

The model offers a framework for proficiency development, ranging from value creation with external support at the Foundation level to transformative value creation at the Expert level. It consists of four main levels—Foundation, Intermediate, Advanced, and Expert—each subdivided into two sub-levels.

At the Foundation level, value is created with external assistance, progressing to Intermediate level where autonomy increases. Advanced level focuses on transforming ideas into action, and Expert level emphasizes significant impact within a domain.

These proficiency levels guide learning outcomes. For example, the first outcome at the Expert level emphasizes quick spotting and seizing of opportunities. While learners begin developing this skill at lower levels, the Expert level underscores the strategic importance of timely action, potentially leading to substantial growth, innovation, or transformation.

Foundation		Intermediate		Advanced		Expert	
Relying on support <sup>6</sup> from others		Building independence		Taking responsibility		Driving transformation, innovation and growth	
Under direct supervision.	With reduced support from others, some autonomy and together with my peers.	On my own and together with my peers.	Taking and sharing some responsibilities.	With some guidance and together with others.	Taking responsibility for making decisions and working with others.	Taking responsibility for contributing to complex developments in a specific field.	Contributing substantially to the development of a specific field.
Discover	Explore	Experiment	Dare	Improve	Reinforce	Expand	Transform
Level 1 focuses mainly on discovering your qualities, potential, interests and wishes. It also focuses on recognising different types of problems and needs that can be solved creatively, and on developing individual skills and attitudes.	Level 2 focuses on exploring different approaches to problems, concentrating on diversity and developing social skills and attitudes.	Level 3 focuses on critical thinking and on experimenting with creating value, for instance through practical entrepreneurial experiences.	Level 4 focuses on turning ideas into action in 'real life' and on taking responsibility for this.	Level 5 focuses on improving your skills for turning ideas into action, taking increasing responsibility for creating value, and developing knowledge about entrepreneurship.	Level 6 focuses on working with others, using the knowledge you have to generate value, dealing with increasingly complex challenges.	Level 7 focuses on the competences needed to deal with complex challenges, handling a constantly changing environment where the degree of uncertainty is high.	Level 8 focuses on emerging challenges by developing new knowledge, through research and development and innovation capabilities to achieve excellence and transform the ways things are done.

Figure 10. (Komarkova et al., 2015)



### 2.3.2 Référentiel “Sensibilisation d'Entrepreneuriat et d'Esprit d'Entreprendre”

(Awareness of Entrepreneurship and the Entrepreneurial Spirit" reference guide) -Ministry of Higher Education - France: This reference framework proposes a structure for the programs to be included in the student training process: universities, schools, short vocational short vocational courses (often closer to entrepreneurial approaches). With a focus on discovery in the Licence curriculum and feasibility in the L/M/D curriculum, the two pathways will be dissociated on the basis of a difference of intensity rather than nature. This process should be seen as a continuum:

- **Information phase:** lectures by entrepreneurs, events and demonstrations on campus on entrepreneurship, presentation of support networks and sources of information.
- **Awareness-raising phase:** training modules (with ECTS credits awarded) designed to develop an appetite for entrepreneurship, particularly around the idea of entrepreneurship every student's access to this type of module which can then make them want to go further with other modules. The target is undergraduates and the equivalent in schools.
- **Specialization phase:** in-depth training modules (with ECTS credits awarded) enabling students to develop a business plan. These modules require personal work outside the school. The target is the Master's degree and equivalent in Schools, but also doctoral schools, but also doctoral schools, integrating the economic value of research through innovation.

The competences set out in this reference framework are divided into 3 levels described in the table below:



<b>L (Undergraduate Level)</b>	
<b>Expected Transversal Competences</b>	<b>Step 1:</b> <ul style="list-style-type: none"> <li>- Gaining confidence,</li> <li>- self-knowledge</li> <li>- creativity</li> </ul>
	<b>Step 2:</b> <ul style="list-style-type: none"> <li>- Taking initiative: being proactive and moving forward; act and drive action,</li> <li>- Autonomy: deciding on one's goals and means, ensuring one's self-control</li> <li>- Risk taking: daring, accepting and taking ownership of change</li> <li>- Know how to plan ahead while ignoring constraints</li> </ul>
	<b>Step 3:</b> <ul style="list-style-type: none"> <li>- Leadership / dynamism: being motivated and motivating others, individual/collective</li> <li>- Management / teamwork: working with others, listening to them and integrating their points of view</li> <li>- The meaning of effort: work as much as the project requires, surpass yourself</li> <li>- Will and determination: do not be discouraged at the first obstacle, persevere and see things through to the end</li> </ul>
	<b>Step 4</b> <ul style="list-style-type: none"> <li>- The discovery of accomplishment: realizing oneself through the project, self-development</li> <li>- Connections to reality, presentation of the project in front of professionals</li> </ul>
<b>Expected management competences</b>	<ul style="list-style-type: none"> <li>- Identify opportunities and use creativity tools</li> <li>- Imagine and design new technically or socially innovative products and services</li> <li>- Structuring a project</li> <li>- Discover and master the essential stages of a business plan in a limited time (entrepreneurial team, market study and proof of the concept, economic model, human and material resources to be implemented, costing and financial dimension)</li> </ul>
<b>Graduate Level / Phd</b>	
<b>Development of expected transversal competences</b>	<ul style="list-style-type: none"> <li>- Spirit of initiative: find out information, find information and resource people, build a network</li> <li>- Leadership: knowing how to convince / knowing how to mobilize and lead teams or partners</li> <li>- Experimentation with trial and error to bring out the need to persevere</li> <li>- Confrontation with reality: extract everything you can from the environment in which you want to insert your project, source of problems/constraints and solutions/resources</li> <li>- Openness, dreams, curiosity, divergence then the search for the possible, the concrete, the feasible</li> <li>- Know how to design</li> <li>- Knowing how to be and master communication within the team and establishing a meaningful deadline for students (appearance before a jury of professionals)</li> <li>- Collectively produce a coherent and professional document</li> </ul>
<b>Development of expected management competences</b>	<ul style="list-style-type: none"> <li>- Creativity: how to generate ideas (methods, mindset, exercises), open up to the innovation process</li> <li>- Structuring a project, building a scenario, evaluating different scenarios, evaluating the idea and coherence of the project</li> <li>- Analyze a market and competitive dynamics, define a strategic opportunity, integrate the societal and environmental context</li> <li>- Build a business model integrating a financial approach into time (cost price, break-even point, income statement, balance sheets, financing statements, cash flow, working capital requirements)</li> <li>- Finance a project (sources and cost; banks, equity, public funds, partnerships)</li> <li>- Identify and organize means to be implemented (marketing and commercial offer, techniques, human resources)</li> <li>- Protect a project (intellectual property) and master the legal fundamentals (business law, labor law and corporate law)</li> <li>- Develop a strategic vision of the project integrating strategic and operational deployment</li> <li>- Communicate with professionals, interpersonal skills</li> <li>- Provide entrepreneurial expertise: leadership and management</li> </ul>



### 2.3.3 SFEDI's Framework for Enterprise and Entrepreneurship (National Occupational Standard)

Originated from the Small Firms. Enterprise Development Initiative (SFEDI) in the UK which is the Sector Skills Body for Enterprise and Entrepreneurship Support, works collaboratively with the relevant stakeholders, practitioners and experts to research and write the competences and was commissioned by the UK Commission for Employment and Skills (UKCES) to develop and review the suite of standards relating to Pre Enterprise, Understanding Enterprise and Business Enterprise to ensure they continue to be fit for purpose. These are the most current National Occupational Standards (NOS) that specify UK standards of performance that people are expected to achieve in their work, and the knowledge and skills they need to perform effectively.

This work is usually carried out as a project with a Steering Group, Working Group and Project Executive Group in place to support progress. NOS have been agreed through this process and have to meet the quality criteria set down by UKCES, who are responsible for the approval of all NOS that are available for almost every role in every sector in the UK.

NOS, which are approved by UK government regulators, responding to the need for a standardized approach to assessing and developing entrepreneurial skills among individuals and small business owners, are designed, on the one hand, to inform and support the activities of educators who interact with students through the delivery of enterprise and entrepreneurship within the curriculum and/or extracurricular activity and on the other hand, for anyone thinking about starting or running a small or micro business. Thus, all functions are contextualized within starting and managing one's own business. They focus on all areas of small or micro business management and explain the competences required at each stage of the business journey from pre start to exit.

This framework is designed National Occupational Standards For Pre Enterprise (*National Occupational Standards for Enterprise – Institute of Enterprise and Entrepreneurs, s. d.*)



NOS TITLE	Performance Criteria: You must be Able To:
Prepare yourself for enterprise	<ul style="list-style-type: none"> <li>- identify your own motives, what success means to you and what you would like to achieve in the future.</li> <li>- identify your strengths and weaknesses</li> <li>- set yourself realistic and achievable goals</li> <li>- develop ways to deal with stress and change</li> <li>- use your working time effectively</li> <li>- make sure you can assess and take calculated risks</li> <li>- gain and keep support from the people around you</li> <li>- identify who you can call on if you need information or help to make a decision</li> <li>- build a good support network, by choosing advice and support that is impartial, best for you, cost effective and meets your whole range of needs.</li> </ul>
Find out about business	<ul style="list-style-type: none"> <li>- find out what is involved in starting or running a business</li> <li>- be aware of the advantages, pitfalls and barriers to starting a business</li> <li>- be aware of the types of legal requirements related to starting a business</li> <li>- find out what business decisions you will need to make if you start a business, what information you will need when making them, and what support is available to you</li> <li>- find out what business techniques are necessary, including marketing, selling, and money management, when starting or running a business</li> <li>- develop your skills and understanding of business techniques</li> </ul>
Promote yourself and your ideas	<ul style="list-style-type: none"> <li>- dress appropriately for different situations</li> <li>- speak the business language when you need to</li> <li>- show that you understand what you are talking about</li> <li>- use the positive things about you to help you</li> <li>- communicate your point of view so that others understand it</li> <li>- listen to what others are saying so that you understand what they mean</li> <li>- say no to requests that you are unable or unwilling to meet</li> <li>- present ideas to others with passion and enthusiasm</li> <li>- clearly and succinctly summarize features, benefits and key information</li> <li>- identify what you want to achieve and decide when to argue your point or adapt your expectations</li> </ul>

### 2.3.4 ICE Model of Entrepreneurial competences

Emerged from theoretical and empirical research on the essential dimensions of entrepreneurial competences, particularly focusing on Innovation, Creativity, and Entrepreneurship. Developed over several decades by researchers and scholars across various disciplines, the ICE model provides a conceptual framework for understanding the interplay between these dimensions in shaping entrepreneurial behavior and outcomes. It is commonly employed by researchers, educators, and practitioners to inform entrepreneurship education, training, and research initiatives, particularly those focused on fostering innovation and creativity in entrepreneurship.





### 2.3.5 EUROPASS Entrepreneurship Competence Framework

Developed as part of the broader EUROPASS program by the European Union, facilitates the recognition and validation of entrepreneurial skills and competences across Europe. Launched in 2005, the framework provides a standardized approach for describing, assessing, and recognizing entrepreneurial competences, enhancing transparency and comparability in education and training systems across the continent. It is widely utilized by educational institutions, employers, and individuals to document and validate entrepreneurial skills, supporting mobility, employability, and lifelong learning initiatives.

The European Qualifications Framework (EQF) was created by the EU to make national qualifications easier to understand and compare and serving as a translation tool too. Its main goals are: promoting lifelong learning and professional development, in addition to supporting cross-border mobility of learners and workers across Europe. The EQF consists of 8 levels (*The European Qualifications Framework (EQF) | Europass, s. d.*) learning outcomes-based framework applicable to all types of qualifications. Thus, it enhances transparency, comparability, and portability of people's qualifications and makes the comparison of qualifications from different countries and institutions possible.

The EQF covers all levels and types of qualifications and uses learning outcomes to indicate what a person knows, understands, and is capable of doing. The EQF was established in 2008 and revised in 2017, but its core objectives remain the same: creating transparency and mutual trust in the qualifications landscape of Europe.

Europass is a portfolio that comprises various tools designed to "assist individuals in communicating their skills, qualifications, and experience through the use of standardized document templates", and is available in 27 European languages. The documents that make up Europass include the Curriculum Vitae, the Language Passport, the Certificate Supplement, the Diploma Supplement, and the Mobility record (Antonazzo et al., 2022) :

- The Curriculum Vitae is a structured and transparent way of describing an individual's qualifications, work experience, and skills.
- The Language Passport is a self-evaluation grid-based template that enables individuals to record their language skills according to the Common European Framework of Reference for Languages.
- The Certificate Supplement is issued as a supplement to national qualifications or certificates, making them understandable in an international context. The Diploma Supplement fulfills the same function as the certificate, but for higher education diplomas.
- The Mobility record provides a standardized and detailed way of recording information about an individual's learning or training experiences abroad, such as the list of tasks performed during mobility and the competencies acquired.



The Europass initiative aims to "promote the sharing of information on skills and qualifications in a consistent manner across borders." The portfolio has three objectives:

- To assist citizens in effectively communicating their skills and qualifications when seeking employment or training,
- To assist employers in understanding the skills and qualifications of their workforce,
- To help education and training authorities define and communicate curriculum content.

### 2.3.6 OECD Entrepreneurship Indicators Program

Established to provide comprehensive insights into entrepreneurial activities worldwide. Developed by the Organization for Economic Co-operation and Development (OECD), this program utilizes a rigorous research methodology to collect and analyze data on entrepreneurial activities across countries and regions. It offers a set of indicators for measuring and assessing entrepreneurial competences, informed by empirical research and expert consensus. The OECD entrepreneurship indicators are widely used to inform policy-making and program development efforts, providing valuable insights into the prevalence, characteristics, and drivers of entrepreneurship globally and enabling cross-country comparisons to facilitate evidence-based decision-making.

It is noteworthy that the OECD provides policy analysis and advice on policies and programs that support the creation of businesses and self-employment for various groups, including women, youth, seniors, the unemployed, migrants, and people with disabilities. Inclusive entrepreneurship and social entrepreneurship are the focus of the guidance notes developed by the OECD, which cover different policy approaches that link to good practices and each pillar of the Tool, such as culture, finance, and skills (OCDE, 2022).

The OECD-Eurostat Entrepreneurship Indicators Program (EIP) is an initiative that develops policy-relevant and internationally comparable indicators based on an analytical model and measurement infrastructure. The Program, launched in 2006, initially produced methodological tools to structure the development and collection of indicators of entrepreneurship. Entrepreneurship at a Glance, a yearly publication that provides a collection of core indicators of entrepreneurial performance and a selection of indicators of entrepreneurial determinants, has been published since 2011 (Hoffmann & Ahmed, 2007).

### 2.3.7 UNIDO Entrepreneurship Development Program

Aims to strengthen entrepreneurial competences in developing countries by providing reference frameworks and assessment tools tailored to local needs. Developed by the United Nations Industrial Development Organization (UNIDO), this program emphasizes



cultural sensitivity and adaptation, ensuring that assessment tools and interventions are relevant and effective in diverse cultural contexts. It offers practical tools and resources for economic growth, supporting entrepreneurship education, training, and business development initiatives in developing countries. The UNIDO Entrepreneurship Development Program is instrumental in promoting sustainable development and poverty reduction efforts by fostering entrepreneurship and enterprise development in underserved communities.

UNIDO's efforts are focused on supporting the development of entrepreneurial culture and skills through the Entrepreneurship Curriculum Program (ECP). By introducing practical entrepreneurship curricula at secondary and vocational training institutions, UNIDO is targeting the development of entrepreneurial skills among young people, both girls and boys, before they enter into the workforce. This is a great way of enriching their skills with elements of ICT training including both basics of entrepreneurship and practical experience in using new technologies which prepare them for the requirements of the labor market in an increasingly networked information society (*Entrepreneurship Development | UNIDO, s. d.*).

The Entrepreneurship Curriculum Program (ECP) is a cost-effective initiative that aims to enhance the entrepreneurial skills of young people. The program is designed to cater to both boys and girls residing in urban and rural areas. It helps lay the foundation for private sector development in the country. The curriculum includes entrepreneurship as a subject in general secondary schools as well as in technical and vocational schools throughout the nation. Furthermore, universities and colleges serve as centers of excellence providing support to national efforts in the context of promoting entrepreneurship and technology absorption capacity.

Young people develop various personal qualities such as self-confidence, innovation, creativity, initiative-taking abilities, and willingness to collaborate within calculating risks. They also learn skills like saving, investing, and growing, which can help them in their careers as employees or entrepreneurs. The program's curriculum focuses on taking action and is designed for practical research in identifying business opportunities, assessing available resources, and learning from successful entrepreneurs both in the classroom and in their companies. The program's time is divided into more than 50% practical research and skill-building activities.

### **2.3.8 Australian Core Skills Framework (ACSF) - Entrepreneurship Skills**

Includes a specific component for assessing entrepreneurship skills, reflecting the growing recognition of entrepreneurship as a core skill in the contemporary workforce. Developed in Australia to assess core skills across different domains, the ACSF provides a standardized framework for describing and assessing entrepreneurship skills in the Australian context. It



offers guidelines and proficiency levels for assessing entrepreneurial competences, supporting education and training programs aimed at fostering entrepreneurship skills development. The ACSF - Entrepreneurship Skills component enhances the practical utility of the framework by addressing the evolving needs of the workforce and promoting entrepreneurship as a key driver of economic growth and innovation in Australia.

These frameworks offer a variety of perspectives and approaches for understanding, assessing, and developing entrepreneurial competences at different levels and in various contexts. They serve as valuable resources for researchers, educators, policymakers, and practitioners interested in promoting entrepreneurship and enhancing entrepreneurial skills worldwide (*Australian Core Skills Framework - Adult Learning Australia, s. d.*).

FRAMEWORK			Novice	Advanced Beginner	Capable	Proficient	Expert
1 Navigate the world of work	1a. Manage career and work life	Identify work options; Gain work; Develop relevant skills and knowledge	See relevant Performance Features tables for details				
	1b. Work with roles, rights and protocols	Work with roles and responsibilities; Operate within legal rights and responsibilities; Recognise and respond to protocols					
2 Interact with others	2a. Communicate for work	Respond to communication systems, practices and protocols; Speak and listen; Understand, interpret and act; Get the message across	See relevant Performance Features tables for details				
	2b. Connect and work with others	Understand self; Build rapport; Cooperate and collaborate					
	2c. Recognise and utilise diverse perspectives	Recognise different perspectives; Respond to and utilise diverse perspectives; Manage conflict					
3 Get the work done	3a. Plan and organise	Plan and organise workload and commitments; Plan and implement tasks	See relevant Performance Features tables for details				
	3b. Make decisions	Establish decision making scope; Apply decision-making processes; Review impact					
	3c. Identify and solve problems	Identify problems; Apply problem-solving processes; Review outcomes					
	3d. Create and innovate	Recognise opportunities to develop and apply new ideas; Generate ideas; Select ideas for implementation					
	3e. Work in a digital world	Use digitally based technologies and systems; Connect with others; Access, organise, and present information; Manage risk					
Influencing Factors	<ul style="list-style-type: none"> <li>existing skills and knowledge</li> <li>familiarity with the context</li> <li>complexity of tasks</li> <li>nature and degree of support</li> <li>level of autonomy</li> </ul>	<ul style="list-style-type: none"> <li>degree of motivation</li> <li>self-belief and resilience</li> <li>cultural and value-based factors</li> <li>external factors</li> </ul>					

Figure 11. source (*Adult Learning Australia- ALA, 2018*)

The five fundamental talents listed in the Australian fundamental talents Framework (ACSF) are necessary for people to engage in society as productive members. These include learning, reading, writing, speaking and listening, and numeracy. Three categories are used to characterize the five fundamental talents listed in the ACSF:

1. Performance (ranking from 1 for low performance to 5 for high performance)
2. Performance factors: Task complexity, Support, Context, and Text complexity
3. Communication domains: education and training, workplace and employment, and personal and community

Each level of the five levels of performance is described using:

- indicators: statements that provide an overview of exit performance at each level
- focus areas: aspects within each indicator against which performance features are organized



- performance features: descriptors of what an individual could do at each level
- sample activities: specific examples of what someone could do at a particular level.

The Australian Core Skills Framework (ACSF) identifies five key skills that are essential for individuals to participate effectively in society. These skills are Learning, Reading, Writing, Oral Communication, and Numeracy. The ACSF describes each of these five core skills across three areas: Performance (ranging from 1: Low-level performance to 5: High-level performance), Performance Variables (Support, Context, Text Complexity, and Task Complexity), and Domains of Communication (Personal and Community, Workplace and Employment, and Education and Training).

Each level of the five levels of performance is described using indicators, which are statements that provide an overview of exit performance at each level. Focus areas are aspects within each indicator against which performance features are organized. Performance features describe what an individual could do at each level, while sample activities provide specific examples of what someone could do at a particular level.

The Core Skills for Work Developmental Framework, or CSfW, is a guide that outlines a set of non-technical skills, knowledge and understanding that are essential for successful participation in the workforce. These non-technical skills, which are also known as generic or employability skills, work together with technical or discipline-specific skills, as well as core language, literacy and numeracy (LLN) skills, to contribute to work performance. It's worth noting that work performance can also be affected by various factors related to the context in which these skills are applied. (Adult Learning Australia- ALA, 2018)

## 2.4 Evaluation of the effectiveness of these frameworks

The evaluation of the effectiveness of entrepreneurial skills assessment frameworks is a critical aspect of ensuring their validity, reliability, and utility in practice. We explore the methodologies and criteria used to assess the efficacy of these frameworks, aiming to provide insights into their strengths, limitations, and areas for improvement.

Evaluating these frameworks using metrics such as validity, reliability, practical utility, and cross-cultural validity, we can gain insights into their effectiveness in assessing entrepreneurial competences and informing policy and practice in entrepreneurship education, training, and development.

### 2.4.1 The metrics of the effectiveness evaluation

<b>Validity Assessment</b>	Validity refers to the extent to which an assessment framework measures what it intends to measure. Evaluating the validity of entrepreneurial skills assessment
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	frameworks involves examining whether they accurately capture the intended entrepreneurial competences and whether the assessment methods used align with the conceptual framework of entrepreneurship.
<b>Reliability Analysis</b>	Reliability pertains to the consistency and stability of assessment results over time and across different contexts. Assessing the reliability of entrepreneurial skills assessment frameworks entails conducting reliability analyses, such as test-retest reliability and inter-rater reliability, to ensure that assessment outcomes are consistent and reproducible.
<b>Criterion-Related Validity</b>	Criterion-related validity assesses the degree to which assessment outcomes correlate with external criteria or measures of entrepreneurial success. Evaluating criterion-related validity involves examining the relationship between assessment scores and objective indicators of entrepreneurial performance, such as business performance metrics, venture success, or entrepreneurial behavior.
<b>Construct Validity</b>	Construct validity assesses the extent to which the theoretical constructs underlying the assessment framework are accurately represented and measured. Evaluating construct validity involves conducting factor analyses, confirmatory factor analyses, and other statistical techniques to confirm the structural validity of the framework and its alignment with theoretical models of entrepreneurship.
<b>Practical Utility</b>	Practical utility refers to the usefulness and applicability of assessment frameworks in real-world settings. Assessing practical utility involves gathering feedback from stakeholders, such as entrepreneurs, educators, and policymakers, regarding the clarity, relevance, and ease of use of the assessment tools and methodologies.
<b>Sensitivity to Change</b>	Entrepreneurial skills assessment frameworks should demonstrate sensitivity to changes in entrepreneurial competences over time and in response to interventions or training programs. Evaluating sensitivity to change involves assessing the ability of the framework to detect improvements or declines in entrepreneurial skills following interventions or changes in context.
<b>Cross-Cultural Validity</b>	Given the global nature of entrepreneurship, it is essential to evaluate the cross-cultural validity of assessment frameworks to ensure their applicability across diverse cultural contexts. This involves examining whether the frameworks measure entrepreneurial competences consistently across different cultural settings and populations.
<b>Ethical Considerations</b>	The evaluation of assessment frameworks should consider ethical considerations, such as fairness, bias, and inclusivity. Ensuring that assessment tools are fair and unbiased, and free from cultural or demographic biases, is essential for promoting equitable opportunities for individuals from diverse backgrounds to demonstrate their entrepreneurial potential.



### A. EntreComp (Entrepreneurship Competence Framework)

- **Validity:** EntreComp has undergone extensive validation studies to ensure that it accurately captures the multidimensional nature of entrepreneurial competences.
- **Reliability:** Reliability analyses, such as internal consistency and test-retest reliability, have been conducted to ensure the consistency of assessment outcomes over time.
- **Practical Utility:** EntreComp is widely used across Europe and has been integrated into various educational and training programs, demonstrating its practical utility in fostering entrepreneurial skills development.
- **Cross-Cultural Validity:** EntreComp has been adapted and localized in different European countries, demonstrating its cross-cultural validity and applicability across diverse cultural contexts.

### B. SFEDI's Framework for Enterprise and Entrepreneurship (National Occupational Standards)

- **Validity:** The SFEDI framework has been developed based on extensive research and consultation with industry experts to ensure its validity in identifying key competences for entrepreneurship.
- **Reliability:** Reliability testing has been conducted to assess the consistency of assessment outcomes using the SFEDI framework.
- **Practical Utility:** The SFEDI framework is widely used in the UK to guide entrepreneurship education and training programs, indicating its practical utility in supporting entrepreneurial skills development.
- **Cross-Cultural Validity:** While primarily developed for the UK context, the SFEDI framework can be adapted and contextualized for use in other cultural settings, although further validation may be necessary.

### C. ICE Model of Entrepreneurial competences

- **Validity:** The ICE model has been developed based on theoretical foundations and empirical research on innovation, creativity, and entrepreneurship, contributing to its validity in assessing these key dimensions of entrepreneurial competences.
- **Reliability:** Reliability testing has been conducted to assess the consistency of assessment outcomes using the ICE model.
- **Practical Utility:** The ICE model provides a clear and concise framework for assessing entrepreneurial competences, facilitating practical application in educational and training settings.
- **Cross-Cultural Validity:** The universal nature of innovation, creativity, and entrepreneurship suggests that the ICE model may have cross-cultural validity, although further validation studies in diverse cultural contexts would be beneficial.



#### D. EUROPASS Entrepreneurship Competence Framework

- **Validity:** The EUROPASS framework has undergone validation studies to ensure its alignment with established theories of entrepreneurship and its relevance to real-world contexts.
- **Reliability:** Reliability analyses have been conducted to assess the consistency of assessment outcomes using the EUROPASS framework.
- **Practical Utility:** The EUROPASS framework provides a standardized framework for assessing and recognizing entrepreneurial skills across Europe, enhancing practical utility for educational institutions, employers, and individuals.
- **Cross-Cultural Validity:** The EUROPASS framework has been designed to be adaptable to different cultural contexts within Europe, although further validation may be needed for broader applicability.

#### E. OECD Entrepreneurship Indicators Program

- **Validity:** The OECD program has developed a comprehensive set of indicators for measuring entrepreneurial competences, informed by empirical research and expert consensus.
- **Reliability:** Reliability testing has been conducted to assess the consistency of data collection methods and measurement outcomes within the OECD program.
- **Practical Utility:** The OECD entrepreneurship indicators provide valuable insights into the state of entrepreneurship at national and international levels, supporting evidence-based policy-making and program development.
- **Cross-Cultural Validity:** The OECD indicators have been used to compare entrepreneurial activities across countries, demonstrating their cross-cultural validity and relevance.

#### F. UNIDO Entrepreneurship Development Program

- **Validity:** The UNIDO program incorporates best practices in entrepreneurship development and has been tailored to the specific needs and contexts of developing countries through extensive consultation and collaboration with local stakeholders.
- **Reliability:** Reliability testing has been conducted to assess the consistency of assessment tools and methodologies used in the UNIDO program.
- **Practical Utility:** The UNIDO program provides practical tools and resources for strengthening entrepreneurial competences in developing countries, contributing to economic growth and poverty reduction efforts.
- **Cross-Cultural Validity:** The UNIDO program emphasizes cultural sensitivity and adaptation, ensuring that assessment tools and interventions are relevant and effective in diverse cultural contexts.





### G. Australian Core Skills Framework (ACSF) - Entrepreneurship Skills

- **Validity:** The entrepreneurship skills component of the ACSF has been developed based on research and consultation with industry experts to ensure its validity in assessing key entrepreneurial competences.
- **Reliability:** Reliability testing has been conducted to assess the consistency of assessment outcomes using the entrepreneurship skills component of the ACSF.
- **Practical Utility:** The ACSF provides a standardized framework for assessing core skills, including entrepreneurship skills, in Australia, supporting educational and workforce development initiatives.
- **Cross-Cultural Validity:** While primarily designed for the Australian context, the ACSF can be adapted and contextualized for use in other cultural settings, although further validation may be necessary.



### 2.4.2 Strengths and limitations comparison

The framework	Strengths	Limitations
<b>1/ EntreComp</b>	<ul style="list-style-type: none"> <li>- Comprehensive framework covering a wide range of entrepreneurial competences.</li> <li>- Developed by the European Commission, ensuring credibility and alignment with European entrepreneurship policies.</li> <li>- Widely adopted across Europe, facilitating standardized assessment and recognition of entrepreneurial skills.</li> </ul>	<ul style="list-style-type: none"> <li>- May lack specificity for certain entrepreneurial contexts or industries.</li> <li>- Translation and adaptation for non-European contexts may be necessary, potentially impacting cross-cultural validity.</li> </ul>
<b>2/ Référentiel “Sensibilisation d’Entrepreneuriat et d’Esprit d’Entreprendre”:</b>	<ul style="list-style-type: none"> <li>- Focus on Awareness and Mindset: It emphasizes raising awareness about entrepreneurship and nurturing an entrepreneurial mindset.</li> <li>- Holistic Approach: The framework likely covers various aspects of entrepreneurship, providing learners with a comprehensive understanding.</li> <li>- Adaptability: It can be customized to different educational contexts and align with national goals for economic development.</li> <li>- Practical Orientation: It includes practical elements to enhance engagement and relevance for learners</li> </ul>	<ul style="list-style-type: none"> <li>- Lack of Specificity: The framework may lack clear learning outcomes, assessment criteria, and instructional methods.</li> <li>- Overemphasis on Awareness: It might prioritize awareness-building over developing concrete entrepreneurial skills.</li> <li>- Limited Focus on Contextual Factors: The framework may not adequately address cultural, socio-economic, and institutional influences on entrepreneurship.</li> <li>- Potential for Superficial Understanding: Without depth and rigor, learners may develop a superficial understanding of entrepreneurship.</li> <li>- Resource Intensity: Implementing the framework effectively may require significant resources, limiting scalability and sustainability.</li> </ul>
<b>3/ SFEDI’s Framework (National Occupational Standards)</b>	<ul style="list-style-type: none"> <li>- Developed in the UK with input from industry experts, ensuring relevance and practical applicability.</li> <li>- Provides clear guidelines for assessing and developing key entrepreneurial competences.</li> <li>- Widely used in the UK, supporting the integration of entrepreneurship education and training initiatives.</li> </ul>	<ul style="list-style-type: none"> <li>- Primarily tailored for the UK context, may require adaptation for other cultural contexts.</li> <li>- May not cover all dimensions of entrepreneurial competences, potentially lacking comprehensiveness.</li> </ul>



<p><b>4/ ICE</b></p>	<ul style="list-style-type: none"> <li>- Focuses on key dimensions of innovation, creativity, and entrepreneurship, offering a unique perspective on entrepreneurial competences.</li> <li>- Provides a clear conceptual framework for understanding the interplay between these dimensions.</li> <li>- Offers flexibility for adaptation and application in various educational and training contexts.</li> </ul>	<ul style="list-style-type: none"> <li>- Limited emphasis on other important aspects of entrepreneurship, such as business management or finance.</li> <li>- Relatively less established compared to other frameworks, potentially affecting credibility and adoption.</li> </ul>
<p><b>5/ EUROPASS</b></p>	<ul style="list-style-type: none"> <li>- Developed as part of the EUROPASS program, ensuring compatibility with European standards and policies.</li> <li>- Provides detailed descriptions and proficiency levels for assessing entrepreneurial competences, enhancing transparency and comparability.</li> <li>- Supports mobility and lifelong learning initiatives across Europe.</li> </ul>	<ul style="list-style-type: none"> <li>- May be perceived as overly bureaucratic or complex, potentially limiting practical utility.</li> <li>- Relatively limited recognition and adoption outside of Europe, potentially reducing global relevance.</li> </ul>
<p><b>6/ OECD</b></p>	<ul style="list-style-type: none"> <li>- uses rigorous research methodology and empirical data collection, ensuring reliability and validity.</li> <li>- Offers a comprehensive set of indicators for measuring and assessing entrepreneurial competences at national and international levels.</li> <li>- Provides valuable insights into entrepreneurial activities and trends, informing policy-making and program development efforts.</li> </ul>	<ul style="list-style-type: none"> <li>- Focuses more on measuring outcomes and indicators rather than directly assessing individual competences.</li> <li>- May lack specificity in terms of defining and operationalizing entrepreneurial competences for assessment purposes.</li> </ul>
<p><b>7/ UNIDO</b></p>	<ul style="list-style-type: none"> <li>- Tailored to developing country contexts, addressing specific needs and challenges in entrepreneurship development.</li> <li>- Emphasizes cultural sensitivity and adaptation, ensuring relevance and effectiveness in diverse cultural contexts.</li> <li>- Provides practical tools and resources for economic growth and poverty reduction through entrepreneurship.</li> </ul>	<ul style="list-style-type: none"> <li>- Limited recognition and adoption outside of developing countries, potentially reducing global impact and influence.</li> <li>- May face challenges in terms of scalability and sustainability of interventions in resource-constrained settings.</li> </ul>
<p><b>8/ Australian Core Skills Framework (ACSF) - Entrepreneurship Skills</b></p>	<ul style="list-style-type: none"> <li>- Provides a standardized framework for assessing core skills, including entrepreneurship skills, in the Australian context.</li> <li>- Enhances the practical utility of the ACSF by addressing the evolving needs of the Australian workforce.</li> <li>- Supports education and training programs aimed at fostering entrepreneurship skills development.</li> </ul>	<ul style="list-style-type: none"> <li>- Primarily tailored for the Australian context, may require adaptation for other cultural contexts.</li> <li>- May lack global recognition and adoption, potentially limiting its relevance beyond Australia's borders.</li> </ul>



## 2.5 Case Studies and Practical Applications

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### 2.5.1 Examples of successful implementation of entrepreneurial skill assessment frameworks

In our exploration of practical applications and successful implementations of entrepreneurial skill assessment frameworks, we've already delved into this topic in the preceding element (Review of existing frameworks for entrepreneurial skill assessment). In that section, we thoroughly examined various frameworks designed to assess entrepreneurial skills, evaluating their efficacy and impact in real-world scenarios. Through comprehensive analyses and case studies, we uncovered how these frameworks have been successfully applied in diverse contexts, such as education, startup incubation, and workforce development. By discussing the different frameworks and their effectiveness, we gained valuable insights into the practical applications of entrepreneurial skill assessment frameworks and their role in fostering entrepreneurship and innovation. Building upon this foundation, we can further explore specific examples and success stories to highlight the tangible benefits and transformative power of these frameworks in empowering individuals and driving economic growth.

In this context, we should talk about the "OvEnt Inventory" which is a compilation or inventory of initiatives aimed at enhancing entrepreneurship competence in Europe and beyond. It categorizes these initiatives based on various criteria (learning setting, target, competences, pedagogical approaches and assessment methods) and provides insights into their characteristics, impacts, and implementation. This inventory serves as a valuable resource for understanding.

The main objective of the OvEnt case studies is to gain a profound understanding of the entrepreneurship competence concept currently translated into learning objectives, curricula, teaching guidelines, and practical courses. Mainly based on the EntreComp final report (Komarkova et al., 2015), 10 cases studies were selected based on a set of criteria. The table below summarizes the overview of 7 among the 10 selected case studies.



Name and designer	Target Group and Geographical Scope	Short Description
<b>LUT Measurement Tool for Enterprise Education (LUT MTEE)</b> -Lappeenranta University of Technology (LUT) -	teachers from Finland and over 20 European countries used the tool in 2014	<ul style="list-style-type: none"> <li>- The world's first entrepreneurship education self-assessment tool</li> <li>- Developed for primary, secondary, and vocational schools' teachers and principals.</li> <li>- simple structured, web-based questionnaire allowing teachers to self-evaluate their practice and develop their know-how in entrepreneurship and enterprise education, as well as monitor their learning progress.</li> <li>- Provides systematic feedback as well as useful tips for developing more effective practice and reinforces entrepreneurial teaching.</li> <li>- Evaluate contents, modes of operation, and methods of teaching.</li> <li>- High potential for schools or national-level authorities to benchmark their effective entrepreneurship education.</li> </ul>
<b>The Entrepreneurial Skills Pass (ESP)</b> - Junior Achievement- Young Enterprise Europe (JA-YE Europe)-	European countries and other countries, piloted in 2013/2014 a first year of its implementation followed.	<ul style="list-style-type: none"> <li>- Europe's largest provider of entrepreneurship education programs.</li> <li>- a tool to certify entrepreneurship competence levels gained by graduates after a mini-company experience.</li> <li>- Builds on the well-established JA-YE Company program</li> <li>- Focuses on developing new tools to assess entrepreneurship competences.</li> <li>- Consists of 3 components: JA-YE Company program (the real experience), ESP self-assessment, and ESP exam.</li> </ul>
<b>Youth Start Initiative</b>	Mainly Austria but activities expanding to Europe Since 2014/2015, the You <sup>th</sup> Start Framework has been implemented in the syllabus of Austria's New Middleschool (11-14 year old students – upper secondary education).	<ul style="list-style-type: none"> <li>- a larger initiative comprising several activities and projects implemented in different phases and mutually complementing each other:</li> <li>- The You<sup>th</sup> Start framework of reference for entrepreneurship competence: statements of what learners can do, used as a planning and design tool addressed to educators and school governance in secondary and vocational education institutions.</li> <li>- embedded into a series of activities implemented: the TRIO Model for Entrepreneurship Education; the Next Generation Entrepreneurship Challenge Program; the Certification of Entrepreneurship Schools and Teacher Training.</li> </ul>
<b>Enterprise and Entrepreneurship</b>	the UK (Wales) Art Design students, Teachers,	<ul style="list-style-type: none"> <li>- A curriculum based 'Art &amp; Design' studies and a new extra-curricular activity 'Life Design'</li> <li>- Entrepreneurship competences (in particular skills &amp; attitudes) are addressed by innovative and non-traditional</li> </ul>



<b>Education at University of Wales Trinity Saint David</b> - according to the QAA guidance-	Professionals	teaching and assessment methods. <ul style="list-style-type: none"> <li>- 14 Junior Entrepreneur Program (JEP) developed the first of its kind teacher training program</li> <li>- Post Compulsory Education &amp; Training (PCET) -, where teachers but also professionals may learn how to teach entrepreneurially.</li> </ul>
<b>Program SIMULIMPRESA</b>	Italy - secondary schools VET, Universities to adult learning targeting people from 11 till 60 years old.	<ul style="list-style-type: none"> <li>- From a real office, each Practice firm simulates a real-world enterprise while financial and business operations are simulated online.</li> <li>- prepare trainees for the world of work by enhancing the competences related to the enterprise function (e.g. autonomy, responsibility).</li> <li>- includes an important train-the-trainer element.</li> </ul>
<b>TRANSITION incubation program</b>	European Countries (7 countries, including 6 scaling centers)	<ul style="list-style-type: none"> <li>- Focuses on the development of an effective scaling-up model for social innovations</li> <li>- Social Innovation Journey concept: consists of large-scale events called “spark sessions” followed by a selection of social innovations to which an intensive incubation program is delivered by 6 scaling centers established in 6 countries.</li> <li>- Framed by two components: thematic workshops and –obligatory – one-to-one mentoring or coaching.</li> <li>- The project aims at shared learning among participating organizations and developing a methodology for evaluating the impacts of social innovation support programs.</li> </ul>
<b>SEECEL Instrument for Entrepreneurial Learning - Key Competence Approach</b>	Albania, Bosnia and Herzegovina, Croatia, Kosovo, The Former Yugoslav Republic of Macedonia, Montenegro, Serbia - and Turkey Teachers and schools (school management) in the primary education level	<ul style="list-style-type: none"> <li>- Pre-service (initial) teacher training is interestingly addressed by another SEECEL instrument developed for</li> <li>- ISCED level 5 &amp; 6.</li> <li>- Level 1 entrepreneurial learning package): includes a framework of learning outcomes defined in terms of knowledge, skills, and attitudes, and corresponding teaching and assessment methods.</li> <li>- In-service (continuous) teacher training provides concrete teacher training modalities.</li> </ul>

Table 6. Adapted from “EntreComp final report” (Komarkova et al., 2015)



### 2.5.2 The ACT system and knowledge compilation in entrepreneurial skill acquisition

The ACT system, which stands for "Assess, Create, and Transfer," is a framework commonly used in education and training contexts to guide skill acquisition and development. It is a concept that draws upon principles from cognitive psychology, educational theory, and instructional design. The ACT system provides a structured approach to learning, emphasizing the assessment of existing skills, the creation of new knowledge through active learning experiences, and the transfer of learning to real-world contexts.

**Assessment:** The first step in the ACT system involves the assessment of individuals' existing skills, competencies, and knowledge related to entrepreneurship. Through self-assessment tools, performance evaluations, and feedback mechanisms, individuals gain insights into their strengths, weaknesses, and areas for improvement. This assessment phase serves as a foundation for identifying learning objectives and designing personalized learning pathways tailored to individuals' needs and goals.

#### Assessment for Learning Strategies
















<p><b>Multiple choice</b> Give questions based on previous lesson's learning but with options.</p> <p>a)   b)   c)</p> 	<p><b>Images</b> Use images to link to conventions or themes being taught. It can then be used to recall the knowledge.</p> <p>E.G. Connotations = think/feel</p> 	<p><b>Match up</b> Matching terms to definitions or criteria to starter sentences can help create a check list for independent tasks.</p> 
<p><b>Cloze activity</b> AKA – gap filling. To consolidate processes, help recall key knowledge, information.</p> 	<p><b>Check list</b> Create a list of concrete things to include in an answer or steps to follow. Highlight the proof as self assessment and set own targets.</p> 	<p><b>Window of Opportunity</b> Get pupils to highlight a box around a section of their work and ask them to write down a question or for specific feedback on a section of work.</p> 
<p><b>Money points / points</b> Set prices for things pupils should have included in their work. The more challenging criteria... the higher the price! Pupils can see what they 'earn' and set targets.</p> 	<p><b>Partner Questions</b> After teaching some key knowledge ask pupils to write 3 questions for their partner (with the answers separate) Swap questions and mark each others.</p> 	<p><b>Today, Yesterday, Tomorrow</b> Retrieval Practice is low stakes AFL. Setting questions that are based on previous lessons, today's lesson and tomorrow's lessons help focus on what has been learnt and also pitching your lessons.</p> 
<p><b>Knowledge Organiser</b> Create own knowledge organiser using a template that pupils can continue to fill: vocabulary, themes, key figures, images etc.</p> 	<p><b>Jenga</b> Number a Jenga set and create a set of questions based on the knowledge of your last scheme of learning to match. They get the points on the Jenga Piece if they get it correct. Don't forget to create the Answers too!</p> 	<p><b>SOLO</b> Structured Observed Learning Outcomes. 1. Ask – what do you already know?  2. Name 1 thing you've learnt  3. Name as many things as you can that you've learnt  4. Can you link / connect your list in number 3? 5. Can you link your connections to other subjects, real experiences or real life examples? </p>

Figure 12. (Strategies for Assessment for Learning | Structural Learning, s. d.) <https://www.structural-learning.com/post/strategies-for-assessment-for-learning>

**Creation:** Once individuals have identified their learning objectives, they engage in the creation of new knowledge and skills through active learning experiences. This creation phase emphasizes hands-on, experiential learning activities that simulate real-world entrepreneurial challenges and opportunities. Through entrepreneurial projects, case studies, simulations, and experiential exercises, individuals apply theoretical concepts to practical situations, experiment with different approaches, and develop innovative solutions to business problems.



**Transfer:** The final step in the ACT system is the transfer of newly acquired knowledge and skills to real-world contexts. This transfer phase focuses on bridging the gap between learning and application by providing opportunities for individuals to practice and refine their entrepreneurial competencies in authentic settings. Through internships, apprenticeships, entrepreneurial projects, and startup ventures, individuals translate theoretical knowledge into action, navigate uncertainty and ambiguity, and adapt to changing circumstances in the entrepreneurial environment.

Knowledge compilation, as a complementary concept to the ACT system, refers to the process of organizing, integrating, and consolidating knowledge and skills acquired through learning experiences. In the context of entrepreneurship skill acquisition, knowledge compilation involves synthesizing theoretical concepts, practical insights, and experiential learning outcomes into a coherent understanding of entrepreneurial phenomena. This process enables individuals to develop mental models, heuristics, and decision-making frameworks that guide their actions and inform their entrepreneurial endeavors.

Through the integration of the ACT system and knowledge compilation, individuals engage in a dynamic process of skill acquisition and development that empowers them to succeed as entrepreneurs. By assessing their current capabilities, creating new knowledge through active learning experiences, and transferring that knowledge to real-world contexts, individuals build the entrepreneurial competencies needed to identify opportunities, solve problems, and create value in today's competitive business landscape. As they compile and integrate their learning experiences into a robust entrepreneurial mindset, individuals become more agile, adaptable, and resilient in navigating the challenges and opportunities of entrepreneurship.

### 2.5.3 Real-world impact of entrepreneurship assessment frameworks

Entrepreneurship assessment frameworks have a profound impact on both education and workforce development, shaping the skills, mindset, and capabilities of individuals to thrive in entrepreneurial endeavors. Here are some key ways in which these frameworks contribute to real-world outcomes:

#### A. Education

- **Curriculum Enhancement:** Entrepreneurship assessment frameworks inform the development of educational curricula, ensuring that students are equipped with the necessary entrepreneurial skills and competencies to succeed in the modern economy.
- **Experiential Learning:** By incorporating assessment frameworks into entrepreneurship education programs, students engage in hands-on, experiential learning activities that simulate real-world entrepreneurial challenges and opportunities.





- **Skill Development:** Assessment frameworks provide a structured approach to skill development, allowing students to assess their strengths and weaknesses in areas such as creativity, problem-solving, risk-taking, and communication.
- **Entrepreneurial Mindset:** Exposure to entrepreneurship assessment frameworks cultivates an entrepreneurial mindset among students, encouraging them to identify opportunities, take initiative, and persevere in the face of adversity.

## B. Workforce Development

- **Talent Identification:** Assessment frameworks help employers identify and cultivate entrepreneurial talent within their organizations, enabling them to build high-performing teams and drive innovation and growth.
- **Training and Development:** By using assessment frameworks as a guide, organizations design training and development programs that address specific skill gaps and foster entrepreneurial competencies among employees.
- **Intrapreneurship:** Assessment frameworks encourage intrapreneurship within organizations, empowering employees to innovate, experiment, and pursue new ideas and initiatives that contribute to the organization's success.
- **Career Advancement:** Employees who demonstrate strong entrepreneurial competencies, as assessed by frameworks, are better positioned for career advancement opportunities within their organizations, as well as in the broader job market.

Overall, entrepreneurship assessment frameworks play a crucial role in bridging the gap between education and workforce development, ensuring that individuals are equipped with the skills, mindset, and capabilities needed to succeed in today's dynamic and competitive business environment.



## 2.6 Future Directions and Recommendations

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For us, EntreComp is the most suitable model, given its strengths expressed throughout this deliverable. At this stage, it can be considered as a starting point, an interpretation of entrepreneurial competence, which will be developed and refined over time, particularly through the limitations of its use and the contributions of various trends to meet the specific needs of target groups. To enrich this thought, we present here some future directions and recommendations.

### 2.6.1 Future Directions

- **Integration of Technology:** Leverage advancements in technology, such as artificial intelligence (AI), machine learning, and data analytics, to enhance the effectiveness and efficiency of entrepreneurial skills assessment. Develop digital platforms and tools that offer personalized feedback, adaptive learning experiences, and real-time performance tracking for aspiring entrepreneurs.
- **Cross-disciplinary Collaboration:** Foster collaboration between entrepreneurship educators, industry professionals, and policymakers to develop holistic and contextually relevant entrepreneurial skills assessment frameworks. Integrate insights from diverse disciplines, including psychology, sociology, and neuroscience, to better understand the complex nature of entrepreneurship and tailor assessment approaches accordingly.
- **Global Standardization:** Work towards establishing a global standard for entrepreneurial skills assessment, building upon existing frameworks such as EntreComp. Encourage cross-border collaboration and knowledge sharing to ensure consistency, comparability, and transferability of assessment practices across different countries and regions.
- **Longitudinal Studies:** Conduct longitudinal studies to track the long-term impact of entrepreneurial skills assessment on individuals' career trajectories, business performance, and societal contributions. Explore how entrepreneurial competencies evolve over time and how assessment results correlate with real-world outcomes such as startup success, job creation, and economic growth.

### 2.6.2 Recommendations

- **Tailored Assessment Approaches:** Develop tailored assessment approaches that take into account the diverse backgrounds, experiences, and aspirations of individuals pursuing entrepreneurship. Offer multiple assessment modalities, including self-assessment, peer assessment, and expert evaluation, to provide a comprehensive picture of entrepreneurial competencies.



- **Continuous Feedback and Support:** Provide ongoing feedback and support to individuals undergoing entrepreneurial skills assessment, emphasizing strengths-based approaches and constructive guidance for improvement. Incorporate coaching, mentoring, and peer learning opportunities to facilitate continuous learning and development.
- **Real-world Application:** Design assessment tasks and activities that closely simulate real-world entrepreneurial challenges and opportunities. Encourage participants to apply their entrepreneurial skills in authentic contexts, such as startup projects, business competitions, and community initiatives, to demonstrate their readiness for entrepreneurship.
- **Ethical Considerations:** Ensure that entrepreneurial skills assessment processes adhere to ethical standards and principles, respecting individuals' autonomy, privacy, and dignity. Safeguard against bias, discrimination, and unfair practices by implementing transparent and inclusive assessment procedures and providing recourse mechanisms for grievances.
- **Promotion of Lifelong Learning:** Foster a culture of lifelong learning and continuous improvement among aspiring entrepreneurs by promoting regular skills assessment and reflection. Encourage individuals to seek out learning opportunities, pursue personal and professional development goals, and adapt to evolving market trends and industry demands.

### 2.6.3 Emerging trends in skill assessment

These generic skills include entrepreneurial skills, which help students think more critically in a real-world business context, solve complex problems and make successful decisions, come up with new ideas in novel situations, show originality, and be willing to learn from both successes and failures (Bedwell et al., 2014; Curtin, 2004; Gibbons-Wood and Lange, 2000; Sin et al., 2016).

Several emerging trends are shaping the landscape of entrepreneurial skill assessment:

- **Digital Assessment Tools:** With the increasing digitization of education and training, there's a growing use of digital assessment tools for evaluating entrepreneurial skills. These tools often leverage technologies such as artificial intelligence, gamification, and simulation to provide interactive and engaging assessment experiences.
- **Competency-based Assessment:** There's a shift towards competency-based assessment, focusing on evaluating specific skills and competencies rather than traditional knowledge-based assessments. Competency-based assessments provide a more holistic view of individuals' capabilities and their readiness for entrepreneurship.
- **Experiential Assessment:** Experiential assessment methods, such as simulated exercises, case studies, and real-world projects, are gaining prominence. These



methods allow individuals to demonstrate their entrepreneurial skills in authentic contexts, providing a more accurate assessment of their capabilities.

- **Multi-dimensional Assessment:** Entrepreneurial skill assessment is becoming more multi-dimensional, considering not only technical skills but also soft skills, attitudes, and mindset attributes essential for entrepreneurship. This holistic approach provides a comprehensive understanding of individuals' entrepreneurial readiness.
- **Personalized Assessment:** There's a growing emphasis on personalized assessment approaches tailored to individuals' unique backgrounds, experiences, and learning goals. Personalized assessments enable customized feedback and development plans, maximizing the effectiveness of entrepreneurial skill development.
- **Continuous Assessment:** Rather than one-time assessments, there's a trend towards continuous assessment, where individuals' entrepreneurial skills are evaluated regularly over time. Continuous assessment allows for ongoing feedback and adaptation, supporting continuous learning and improvement.
- **Cross-disciplinary Assessment:** Entrepreneurial skill assessment is increasingly cross-disciplinary, recognizing the importance of integrating knowledge and skills from diverse fields such as business, technology, design, and social sciences. Cross-disciplinary assessments reflect the interdisciplinary nature of entrepreneurship.
- **Global Competence Assessment:** With entrepreneurship becoming increasingly globalized, there's a need for assessing entrepreneurial skills in diverse cultural, economic, and social contexts. Global competence assessment considers individuals' ability to operate effectively in international settings and multicultural environments.
- **Data-driven Assessment:** Data-driven assessment approaches, leveraging analytics and insights from large datasets, are emerging to enhance the accuracy and validity of entrepreneurial skill assessment. Data-driven assessments enable evidence-based decision-making and continuous improvement of assessment practices.
- **Integration with Credentialing and Certification:** Entrepreneurial skill assessment is being integrated with credentialing and certification processes, providing individuals with formal recognition of their entrepreneurial capabilities. This integration enhances the value and portability of entrepreneurial skills in the labor market and academia.
- **Assessment for Sustainable Entrepreneurship:** There's a rising focus on assessing entrepreneurial skills within the context of sustainability and social impact. Assessment methods are being developed to evaluate individuals' ability to create businesses that address environmental, social, and governance (ESG) concerns while generating economic value.
- **Inclusion and Diversity in Assessment:** There's an increasing emphasis on ensuring that entrepreneurial skill assessment processes are inclusive and equitable, considering diverse backgrounds, perspectives, and experiences. Assessment methods are being designed to mitigate biases and promote diversity in entrepreneurship.



- **Peer and Collaborative Assessment:** Peer and collaborative assessment methods, where individuals assess each other's entrepreneurial skills within a group or team setting, are gaining traction. These methods foster peer learning, collaboration, and social interaction, enhancing the assessment experience.
- **Ethical and Responsible Assessment Practices:** There's a growing emphasis on ethical and responsible assessment practices in entrepreneurship education and training. Assessment methods are being developed with a focus on fairness, transparency, confidentiality, and respect for individuals' rights and dignity.
- **Integration with Work-integrated Learning:** Entrepreneurial skill assessment is increasingly integrated with work-integrated learning experiences such as internships, apprenticeships, and co-op programs. These integrated assessment approaches provide opportunities for individuals to apply and demonstrate their entrepreneurial skills in real-world work settings.

#### 2.6.4 Recommendations for policymakers, educators, and industry leaders

*Fitts and Posner's model of skill acquisition:* Their theory posits that skill acquisition follows three sequential stages: cognitive, associative, and autonomous. The rate of skill acquisition varies across the three stages. (Fitts, P.M. & Posner, M.I., 1967)

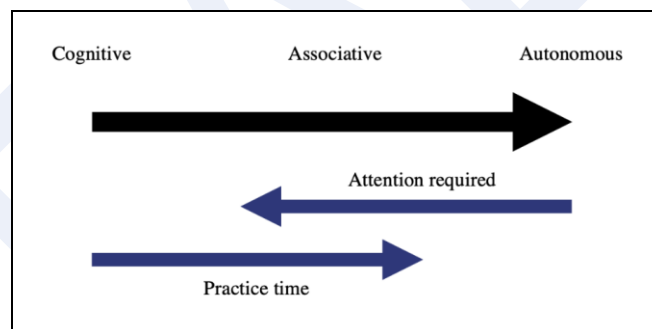


Figure 13. The 3 stages of learning. Source: <https://sportscienceinsider.com/stages-of-learning/>

To better understand why EntreComp is recommended to policymakers, educators, and industry leaders as the best framework for their needs, it's essential to highlight its comprehensive and adaptable nature, its alignment with international standards, and its practical applicability in various contexts.

- **Comprehensive and Adaptable:** EntreComp offers a holistic approach to entrepreneurship competence, encompassing 15 key competences organized into three main areas: Ideas and Opportunities, Resources, and Into Action. This comprehensive framework covers both technical skills and soft skills essential for success in entrepreneurship. Additionally, EntreComp's flexible structure allows for customization and adaptation to diverse educational, training, and industry settings.



- **Alignment with International Standards:** EntreComp is endorsed by the European Commission and aligns with European frameworks for education, training, and lifelong learning. Its development involved extensive research and consultation with stakeholders across Europe, ensuring its relevance and applicability in European and global contexts. Policymakers, educators, and industry leaders can trust EntreComp as a reliable and internationally recognized framework for assessing entrepreneurial competence.
- **Practical Applicability:** EntreComp provides practical guidance and resources for implementing entrepreneurial learning and assessment initiatives. The EntreComp Into Action Guide ((McCallum E., Weicht R., McMullan L., Price A., 2018) offers concrete examples, case studies, and tools for integrating the framework into educational curricula, training programs, and organizational practices. Educators and industry leaders can leverage EntreComp to design tailored pedagogies, assessment methods, and learning environments that foster effective entrepreneurial learning.
- **Promotion of Innovation and Adaptability:** EntreComp encourages innovation and adaptability in entrepreneurship education and assessment. Its emphasis on creativity, problem-solving, and opportunity recognition reflects the dynamic nature of entrepreneurship in today's rapidly evolving world. Policymakers, educators, and industry leaders can use EntreComp to promote a culture of innovation and entrepreneurship that drives economic growth and societal development.
- **Recognition and Validation:** EntreComp provides a common language and framework for assessing and validating entrepreneurial competence. Policymakers, educators, and industry leaders can use EntreComp to establish standardized criteria for evaluating individuals' entrepreneurial skills and competences. Additionally, EntreComp offers a basis for credentialing and certification initiatives, providing formal recognition of individuals' entrepreneurial capabilities.

Overall, EntreComp is a valuable resource for policymakers, educators, and industry leaders seeking to promote entrepreneurship education, training, and skill development. Its comprehensive, internationally endorsed framework, practical guidance, and emphasis on innovation make it an ideal choice for fostering entrepreneurial competence and driving entrepreneurial success.

## 2.7 Conclusion

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### 2.7.1 Stage ONE: Background

All the frameworks of skills assessment aim to build consensus around a common understanding of entrepreneurship competence and its assessment methodology, that's why at the end it is important to remind the key finding from the review of the existing framework.



**Entrepreneurship as a competence:** Entrepreneurship is the ability to identify opportunities and ideas and turn them into value for others. This value can be financial, cultural, or social. To create an entrepreneurship competence model, we need to understand the entrepreneurship process and the competencies required for different phases of this process. This includes the discovery and implementation of ideas to find new and value-generating solutions (Venesaar et al., 2018). The definition of entrepreneurship focuses on value creation, regardless of the type of value or context. It covers value creation in any domain and possible value chain, whether in the private, public, or third sectors, or any hybrid combination of the three. It embraces different types of entrepreneurships, including intrapreneurship, social entrepreneurship, green entrepreneurship, and digital entrepreneurship. Entrepreneurship as a competence applies to all spheres of life. It enables citizens to develop themselves personally, contribute actively to social development, enter the job market as an employee or self-employed, and start-up or scale-up ventures with cultural, social, or commercial motives (Bacigalupo et al., 2016)

**Entrepreneurial skill acquisition** (Ekpe et al., 2016): refers to the process of learning a particular skill or type of behavior required for business through training or education (Amadi, 2012; Chukwunenye & Igboke, 2011; Ibru, 2009; IFC, 2007). This process enables individuals to identify and take advantage of entrepreneurial opportunities for self-employment (Samian & Buntat, 2012; Stohmeyer, 2007). It also helps entrepreneurs to build self-confidence and self-esteem, as well as participate in decision-making at household and community levels. (Cheston & Kuhn, 2002; Rufai et al., 2013).

**Entrepreneurship Education and Learning:** Over the past few decades, there has been a notable shift in the discussion surrounding entrepreneurial learning and education. Initially centered on business management and startup creation, the discourse has broadened to encompass a wider spectrum, emphasizing the cultivation of entrepreneurial behavior. Despite this shift, entrepreneurship education remains largely associated with business-related programs and studies. Challenges in entrepreneurship education often stem not from the knowledge component, but from determining the most effective pedagogical approaches to address entrepreneurial competences.

- **Entrepreneurship education** is curriculum-based courses at different levels (primary, secondary, tertiary and adult education) can be offered in various formats such as academic degree, vocational training.
- While **entrepreneurship learning** refers to the broader process of acquiring knowledge, skills and attitudes related to entrepreneurship through diverse learning experiences both formal and informal, that means not only self-directed learning and learn from real world entrepreneurial experiences (**experiential learning**). Entrepreneurship learning can occur inside and outside the classroom.



The objectives of entrepreneurship education (Ogbuanya & Usoro, 2012): according to Paul (2005) in Obeta (2006) are to:

- Provide meaningful education for the youth to be self-reliance and encourage them to derive profit and be self-employed.
- Provide graduates with enough skills that will make them to be creative and innovative in identifying new business opportunities.
- Provide graduate with enough training in risk management to make uncertainty bearing more possible and easier.
- Give young graduate training to establish a career in small and medium sized business.
- Provide graduate with training in skills that will enable them meet the manpower need of the society.
- Stimulate industrial and economic growth of rural and less developed areas.

Entrepreneurship education has several objectives. According to Paul (2005) in Obeta (2006). These objectives are:

- To provide meaningful education to the youth to encourage self-reliance and self-employment that leads to profit.
- To equip graduates with skills that allow them to be creative and innovative in identifying new business opportunities.
- To provide graduates with training in risk management, making uncertainty-bearing easier.
- To give young graduates the training needed to establish a career in small and medium-sized businesses.
- To provide graduates with the skills necessary to meet the manpower needs of society.
- To stimulate industrial and economic growth in rural and less developed areas.

Universities have different approaches of their entrepreneurial education programs. Some programs focus more on theoretical research on entrepreneurship characteristics of success, entrepreneurship management models, or leadership styles. Other programs focus more on practical learning of entrepreneurship, and developing practical abilities like interpersonal skills, business planning, idea creation, and negotiation skills (Bejinaru, 2018).

### 2.7.2 Stage TWO: Methodology

Developing an entrepreneurial skill assessment framework approach involves several key steps to ensure comprehensive coverage of essential competencies and effective evaluation of individuals' proficiency. Here's a methodology for creating such a framework:





1. **Define Entrepreneurial Competencies:** Identify the key competencies essential for success in entrepreneurship. These may include a combination of technical skills (e.g., financial management, marketing, operations) and soft skills (e.g., communication, leadership, problem-solving). Consult existing literature, research, and expert opinions to ensure a comprehensive understanding of the competencies required.
2. **Categorize Competencies:** Group the identified competencies into categories or domains based on their nature and relevance. For example, technical skills may be categorized into functional areas (e.g., finance, marketing), while soft skills may be grouped based on interpersonal abilities (e.g., communication, teamwork).
3. **Develop Assessment Criteria:** For each skill, define clear and measurable assessment criteria that indicate proficiency levels. These criteria should specify observable behaviors, performance indicators, or demonstration of knowledge and skills. Ensure that assessment criteria are relevant, specific, and aligned with the expectations and requirements of entrepreneurship.
4. **Select Assessment Methods:** Choose appropriate assessment methods for evaluating entrepreneurial competencies. Consider a mix of methods such as self-assessment, peer assessment, supervisor assessment, behavioral interviews, psychometric tests, and simulation exercises.
5. **Design Assessment Instruments:** Develop assessment instruments or tools for each chosen assessment method. These instruments should include guidelines, instructions, and rating scales to facilitate consistent and objective evaluation. Ensure that assessment instruments are user-friendly, easy to administer, and capable of capturing relevant information about individuals' skills and competencies.
6. **Pilot Test the Framework:** Conduct a pilot test of the entrepreneurial skill assessment framework to evaluate its feasibility, validity, and reliability. Involve a diverse group of participants representing different backgrounds, levels of experience, and entrepreneurial contexts. Gather feedback from participants and assessors to identify areas for improvement and refinement of the framework.
7. **Finalize the Framework:** Incorporate feedback and insights from the pilot test to finalize the entrepreneurial skill assessment framework. Make necessary revisions to enhance its effectiveness, usability, and validity. Ensure that the finalized framework is well-documented, including detailed descriptions of competencies, assessment criteria, methods, and instruments.
8. **Implement and Evaluate Use:** Roll out the finalized framework for use in entrepreneurial skill assessment activities. Provide training and support to assessors and participants to ensure proper implementation. Monitor the use of the framework and gather data on its efficacy, including its impact on individuals' skill development and entrepreneurial outcomes. Continuously evaluate and iterate the framework based on ongoing feedback, changing needs, and emerging trends in entrepreneurship.



### 2.7.3 Stage THREE: Outcomes

Learning outcomes are descriptions of what a learner knows, understands, and can do upon completing a learning experience. While they are commonly used for educational planning and accountability purposes, they are particularly challenging to define in entrepreneurial learning due to its dynamic nature.

EntreComp consists of a comprehensive list of learning outcomes. It's important to note that EntreComp learning outcomes shouldn't be viewed as strict guidelines for designing learning activities or measuring student performance directly. Instead, they provide a foundation for developing context-specific learning outcomes and performance indicators.

While most learning outcomes are formulated as statements about individual capacities, entrepreneurship competence extends beyond individuals to include groups like project teams, non-profit organizations, companies, public bodies, or civil society movements.

### 2.7.4 Final thoughts on the importance of continuous improvement in entrepreneurial skill assessment methodologies

Continuous improvement in entrepreneurial skill assessment methodologies is imperative for several compelling reasons.

Firstly, the entrepreneurial landscape is continually evolving, characterized by rapid technological advancements, shifting market trends, and evolving consumer preferences. In this dynamic environment, continuous improvement ensures that assessment methodologies remain relevant and adaptable, equipping individuals with the requisite skills and competencies to thrive amidst constant change.

Secondly, regular review and refinement of assessment methodologies are essential for enhancing accuracy and validity. By diligently scrutinizing and updating assessment practices, stakeholders can ensure that assessments effectively measure what they intend to measure. This proactive approach helps mitigate biases, improve reliability, and provide more insightful evaluations of individuals' entrepreneurial capabilities.

Furthermore, continuous improvement enables assessment methodologies to align with emerging best practices and evidence-based approaches in entrepreneurship education and assessment. By integrating insights from cutting-edge research and practical experience, methodologies can evolve to better capture the multifaceted nature of entrepreneurship and effectively support individuals' learning and development journeys.

Moreover, entrepreneurial skill assessment serves as a powerful tool for individual empowerment. Through continuous improvement, assessment methodologies can better



identify individuals' strengths, areas for improvement, and growth opportunities. By providing tailored feedback and support, assessment processes empower individuals to realize their entrepreneurial aspirations, unlock their full potential, and embark on successful entrepreneurial ventures.

At the end, continuous improvement in entrepreneurial skill teaching methods and assessment methodologies accentuating the need for a balance between innovation-focused learning and implementation-oriented assessment, because when it comes to teaching methods, assessment methods face similar challenges. A growing trend suggests a blending of teaching and assessment methods in modern pedagogical approaches, especially to identify when to learn what.



### 3 Frameworks for Assessing Digital Skills

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The Leads project aims to provide a roadmap to reach the implementation of digital skills certification for the Algerian higher education system. Therefore, the digital team has a mission to set up a first draft of the digital skills' framework. This report is designed according to a roadmap that analyzes the best practices in digital skills certifications according to different points. First of all, a definition of the concept of digital skills in literature was undertaken. Secondly, an identification and classification of skills that exist in literature were summarized. Based on this section, an identification of the main digital skills framework was analyzed according to different variables (scope, structure, main competencies, target audience, and global recognition). After that, the same certifications selected according to their scope and scale of application were again analyzed, but from the point of view of the level of skills acquired. The different sections cited before have enabled us to propose the first structure of levels dedicated to the Algerian higher education system and the profiles of learners corresponding to them, respectively.

#### 3.1 Definition of the digital skills concept

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Nowadays, digital competencies are crucial in several domains: academic, scientific, professional, social, economic, athletic, artistic, and cultural. They have assimilated into our lives and are still changing them by reflecting a person's proficiency and knowledge to use, manipulate, and communicate through the use of new information and communication technologies. These skills encompass a wide range of abilities that can be summarized in the following points:

- **Digital literacy**, according to UNESCO (The UNESCO-UNEVOC International Centre, s. d.), is the capacity to use digital technology for safe and appropriate access, management, understanding, integration, communication, evaluation, and creation of information in support of employment, decent jobs, and entrepreneurship.
- **Information Management**: Capacity to gather, store, retrieve, and evaluate digital data as well as manage, analyze, and interpret it (Van Laar et al., 2017).
- **Communication and Collaboration**: Ability to use digital tools like email, instant messaging, video conferencing, and project management systems to facilitate efficient communication, teamwork, and information sharing (Van Laar et al., 2017).
- **Digital Content Creation**: producing, modifying, and disseminating text, graphics, music, video, and multimedia presentations, as well as other digital content (Van Laar et al., 2017).



- **Cyber security:** Comprehending cybersecurity concepts, optimal methodologies, and instruments to safeguard digital resources, avert data breaches, and alleviate cyber hazards (Tremblay & Poellhuber, 2022).
- **Coding and Programming:** proficiency in web development, software development, programming languages, and automation for the creation and customization of digital solutions (Tremblay & Poellhuber, 2022).
- **Digital Marketing:** using digital platforms to reach and interact with target audiences, including social media, search engines, email marketing, and online advertising (Tremblay & Poellhuber, 2022).
- As part of the generalization of digitalization in Algeria, the acquisition of digital skills has transitioned from a convenience to an absolute necessity for all citizens. Students and teachers are more impacted by this generalization after the adoption of e-learning as an official form of Algerian higher education (وزارة التعليم العالي والبحث العلمي, s. d.).

### 3.2 Classification of digital skills

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Education has been significantly impacted by the digital revolution. The way that technology has been used in education has evolved gradually and differently, primarily based on the talents and dispositions of the teaching staff (Núñez-Canal et al., 2022). The design of a digital skills certification for Algerian higher education requires the effective use of information and communication technologies (ICT's). The aim is to go beyond the simple skills involved in using computers.

According to the literature in the field of Information and communication technologies (ICTs), there are two types of digital skills (Van Laar et al., 2017).

- **Fundamental digital skills for the 21st century**
- **Contextual digital skills for the 21<sup>st</sup> century**



The table below shows several fundamental digital skills with their description:

Skills	Description
Information management	The ability to effectively search, pick, and arrange information using ICT to decide which sources of information are best for a certain purpose
Critical thinking	The ability to successfully communicate information to people using ICT
Creativity	The ability to use ICT to create new or previously undiscovered ideas, or to establish ideas differently and turn them into a process, product, or service
Problem-solving	The ability to actively employ knowledge to solve problems, combined with the ability to use ICT to cognitively absorb and comprehend a problem scenario,
Collaboration	The ability to use ICT to create a social network and collaborate as a team to share knowledge, reach agreements, and make decisions that respect one another while working towards a common objective
Communication	The ability to successfully communicate information to people using ICT while making sure that its meaning is expressed effectively
Technical	The ability to identify particular online environments and use (mobile) devices and programs to do practical activities as well as to navigate and stay oriented

Table 7. Listing of fundamental digital skills for the 21<sup>st</sup> century

The table below shows several contextual digital skills with their description:

Skills	Description
Ethical awareness	The ability to use ICT in a socially responsible manner, exhibiting an understanding of and familiarity with legal and ethical issues
Cultural awareness	The capacity to respect the cultures of others and use ICT with cultural awareness.
Flexibility	The capacity to adapt one's thoughts, emotions, or behavior to changing ICT environments.
Self-direction	The ability to monitor your success when using ICT by setting goals and tracking your progress towards achieving them.
Lifelong learning	The ability to use ICT to continuously investigate new prospects and integrate it into one's environment to continuously improve one's capabilities

Table 8. Listing of contextual digital skills for the 21<sup>st</sup> century

According to those digital skills, the objective is to integrate a set of them at different levels in accordance with the Algerian context.



### 3.3 Identification of digital skills framework in literature

To establish a digital skills framework for Algerian higher education, an analysis of the main models of digital competence frameworks in different countries was carried out. The aim is to identify and describe the main trends as a starting point for designing the Algerian reference framework of digital skills. The comparative chart of digital literacy frameworks highlights a diverse array of efforts dedicated to improving digital skills and competencies among different groups and in various areas. Each framework has its distinct approach and focus, emphasizing the worldwide significance of digital literacy in contemporary society. The following analysis presents noteworthy observations and remarks regarding these frameworks, as depicted in the table below:

Framework	Purpose and Scope	Structure	Key Competencies	Target Audience	Global Recognition	Country/Continent
<b>DigComp 2.1</b> (Redecker, 2017)	Defining professional digital profiles, developing training materials and courses, and developing competency assessment techniques in the contexts of employment, education training, and social inclusion	21 distinct competencies divided into 5 competency areas	Information literacy, digital communication, content creation, online safety, problem-solving, and digital citizenship	People (EU) of all ages who want to enhance their digital skills: learners, educators, job researchers, and employees	EU standard for digital competence	Europe
<b>Essential Digital Skills</b> (GOV.UK, s. d.)	Define fundamental digital competencies crucial for success in modern society	Organized into four main categories focusing on practical skills	Communicating, Handling information and content, Transacting, Problem-solving, Being safe and legal online	Employers, Charities National and local government, departments, Academics, Individuals	Adults in the UK, particularly those with little experience with digital	UK
<b>ICDL</b> (ICDL.org, 2024)	Providing a comprehensive set of digital skills necessary for	Modular structure, allowing choice in skill development, with	Basic computer skills, word processing, spreadsheets, databases,	Wide, ranging from experts to students globally	Internationally recognized as a digital skills certification	In several countries



	individuals to use computer applications and technology effectively	certifications for each module.	presentations, online collaboration, digital literacy, and IT security		standard	
<b>ISTE Standards</b> ( <i>Standards / ISTE, s. d.</i> )	Promotes the use of technology in education through the standards for students, educators, and others	Establishes guidelines for various stakeholders and outlines the competencies needed to integrate technology into education	Digital citizenship, innovative design, computational thinking, knowledge construction, creative communication, and global collaboration	Educators, students, and administrators in the educational sector globally	The ISTE is recognized and utilized globally by educators and educational institutions	United States, Canada, the United Kingdom, Australia, New Zealand, and several European and Asian countries
<b>Mozilla Web Literacy</b> (Mozilla Foundation, s. d.)	Promote essential skills for navigating, understanding, and contributing to the web, emphasizing digital literacy, critical thinking, collaboration, creativity, and ethical behavior online	Organized around three themes: Read, Write, Participate, with skills within each	Navigation, web literacy, search, evaluation, credibility, security, privacy, remixing, collaboration, and communication	General internet users worldwide, with an emphasis on creators and educators	known in open-source and educational communities worldwide	Worldwide
<b>Northstar Digital Literacy</b> ( <i>Getting Started with Northstar Digital - CCC's Printable Student Guide, s. d.</i> )	Offering standardized assessments and learning resources to help individuals develop essential digital skills for success in the digital age	It focuses on basic skills across domains, with assessments to certify competency	Basic computer use, internet basics, email, operating systems, Microsoft Office applications, social media, and information literacy	The adults in the US, especially those with low levels of digital literacy	Recognized in the US and by organizations focused on adult education and digital inclusion	United States
<b>SFDCT</b> ( <i>English translation of the Spanish Framework for the Digital Competence of Teachers, 2023</i> )	It involves an adaptation of DigCompEdu in line with the stages of teacher professional development in Spain	SFDCT uses the basic DigCompEdu structure in six areas: Professional engagement, Digital content, Teaching and Learning, Assessment, and feedback. Empowering learners, Developing the digital	Technical skills, digital literacy, information management, communication, problem-solving, collaboration, project management, adaptability, critical thinking, and	Employees, job seekers, students, educators, and employers	Spain	Spain





		competence of learners	cybersecurity awareness			
<b>APEC</b> (APEC Privacy Framework, s. d.)	Providing a common language and reference for digital skills addressed for different countries in the Asia-Pacific region	The three pillars of the APEC framework are trade and investment liberalization, business facilitation, and economic and technical cooperation	Digital literacy, ICT application, digital ethics and security, ICT management, ICT innovation and creativity, ICT communication, ICT problem-solving, ICT critical thinking, ICT collaboration, and ICT adaptability	Individuals, organizations, educators, employers, government officials, and policymakers	Asia-Pacific region	Asia-Pacific region
<b>UNESCO</b> (The UNESCO-UNEVOC International Centre, s. d.)	Three components make up the UNESCO Competency Framework, which describes the expected attitudes, abilities, and behaviors for successful performance: Managerial competencies, core values, and core competencies	Organized into Five (05) main categories focusing on several skills: Information and data literacy; Communication and collaboration; Digital content creation; Safety; and Problem-solving.	Core competencies and managerial competencies: these dimensions are split up into 21 competencies	Citizens, learners and educators, national and international policy-makers, researchers and practitioners		
<b>IC3 Digital Literacy Certification</b> (CERTIPORT, s. d.-a)						

Table 9. Identification of the digital skills framework's features on a worldwide scale



### 3.4 Identification of different digital skills levels in Literature

A digital skills certification framework is a tool for classifying qualifications according to a set of criteria for levels of learning outcomes. In this section, we identify and summarize the different skill levels that exist in the principal frameworks analyzed above in the Table below.

Identification of certification	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
<b>DigComp 2.1</b>	Newcomer (A1) Awareness	Explorer (A2) Exploration	Integrator (B1) Integration	Expert (B2) Expertise	Leader (C1) Leadership	Pioneer (C2) Innovation
<b>Essential Digital Skills</b>	Entry level: 45 hours Get ready for additional education or training	Level: 1/45 hours Acquire knowledge and/or abilities in a subject area and/or get ready for more training or education	-	-	-	-
<b>ICDL</b>	ICDL Professional	ICDL Insight	ICDL Digital Citizen	ICDL Digital Student	-	-
<b>ISTE Standards</b>	Standard for student	Standard for educators	Standard for education leaders	Standard for coaches	-	-
<b>Mozilla Web Literacy</b>	The level is not specified in the framework					
<b>Northstar Digital Literacy</b>	Essential Computer Skills	Essential Software Skills	Using Technology in Daily Life	-	-	-
<b>UNESCO</b>	Knowledge acquisition	Knowledge deepening	Knowledge creation	-	-	-
<b>IC3 Digital Literacy Certification</b>	Level 1  Evaluates understanding of basic ideas and elements	Level 2  It requires a working knowledge of each of the seven skill groups	Level 3  Confirms a high level of comprehension of digital literacy and shows the candidate has the technical background	-	-	-
<b>SFDCT</b>	Stage A Individual analysis	Stage B Classroom	Level C1 School	Level C2 Teaching profession	-	-level
<b>APEC</b>	<b>There are several levels, up to 10, in some member countries</b>					

Table 10. Identification of the digital skills level



For the Algerian higher education system, we can propose that since every higher-level description includes every lower-level descriptor, the progression should be cumulative. In another word, while the progression of proficiency levels is cumulative, a student competent at an advanced level should be able to perform all the activities included in all lower levels. The table below shows the description of the students' profiles at different levels.

N°	Student's profile	Description of digital skill's level
1	<b>Beginner or Newcomer</b>	They mostly use digital tools for lesson planning, administrative tasks, and organizational communication, and have very little experience with them
2	<b>Pre-Intermediate or Explorer</b>	In certain areas of digital competency, they have begun utilizing digital technologies; nevertheless, they have not done so thoroughly or consistently. The explorers require support, wisdom, and motivation
3	<b>Intermediate or integrator</b>	Integrators incorporate digital technology into many of their operations and experiments. They employ them imaginatively to improve a variety of facets of their professional involvement. However, they continue to work on figuring out which tools are most useful in what circumstances and how to integrate digital technologies with instructional ideas and tactics
4	<b>Pre-advanced</b>	The pre-advanced students can improve their work by using a variety of digital technology with confidence, creativity, and critical thinking. They carefully choose digital technology for specific scenarios and make an effort to weigh the advantages and disadvantages. Aware that there are many things they haven't explored yet, they are inquisitive and receptive to new concepts. They employ experimentation to broaden, organize, and strengthen their toolkit of techniques
5	<b>Advanced</b>	Advanced students use digital tools to improve professional and pedagogical activities in a consistent and thorough manner. They use a wide range of digital tactics, and they are adept at selecting the one that is best suited for the circumstances at hand. They consider and improve their procedures on a constant basis. Through peer exchange, people stay informed about new concepts and advancements
6	<b>Proficient</b>	Proficient students, who are also Leaders in the field, disagree with the effectiveness of modern digital and pedagogical approaches. Their concerns stem from the limitations or disadvantages of current approaches, as well as the desire to push the boundaries of educational innovation even farther. Pioneers experiment with cutting-edge and sophisticated digital technology and/or create cutting-edge teaching strategies

Table 11. Description of the student's profile in each level

To establish the digital certification model of the Algerian higher education system, an analysis of different frameworks of digital competence for teachers, students, citizens, and policymakers was carried out. This analysis was based on the identification of the main stages of competencies, skills, and levels developed in global certification worldwide. After this analysis, it was considered a first guide to the good practices in different certifications.



The progression of the Algerian model requires going deeper by highlighting the following future recommendations:

- *Developing the contents of each digital skill level*
- *Identifying the limits according to each digital framework*

After consideration, of the different recommendations, an Algerian certification model that reflects the academic context of the country can be developed.

### 3.5 Case Studies and Practical Applications

#### 3.5.1 Developing the contents of digital skills levels

It is important to carefully analyze several factors when selecting the optimal digital certification model for the Algerian higher education system to make sure it fits the nation's unique requirements and circumstances. Here are a few things to think about:

- **Authenticity and Security:** Strong security measures should be given top priority in the certification model to guard against fraud and guarantee the legitimacy of digital certificates. To improve security, look for features like blockchain technology, digital signatures, and encryption. This section will evaluate the contents of several certifications based on their respective levels that can fit into the Algerian higher education framework.
- **Inclusivity and Accessibility:** Make sure that the digital certification model is usable by all parties involved, such as educational institutions, and students. To guarantee inclusion, it should be simple to use and adaptable to various devices and internet access levels.
- **Data Privacy and Protection:** Make sure that data privacy laws are followed, and put strong safeguards in place to guard sensitive personal data kept in digital certificates. Crucial factors to take into account include encryption, safe storage, and compliance with data protection regulations.
- **Scalability and Sustainability:** Select a certification program that can grow with Algeria's expanding student body and educational landscape. Think about the model's long-term viability in terms of upkeep, updates, and assistance.
- **Future-proofing:** Choose a model that is flexible and future-proof by considering future trends and technology developments in digital certification. Allowing for the adaptability of new features and standards will contribute to the certification system's durability and continued applicability.
- **21st-century skills dimensions:** emphasize the characteristics of 21st-century skills.



In this section, we will analyze the contents of five (05) certificates that can match with the Algerian higher education context, according to the contents of their levels. The analysis is restricted to instructors and students in higher education.

### A. The DigComp 2.1: contents levels

The European Commission created DigComp 2.2, also known as the "Digital Competence Framework for Citizens," as a framework to specify the digital skills people require in order to use digital technologies in an efficient manner. The following describes what's in each level of DigComp 2.2 (Vuorikari et al., 2022):

LEVEL 1: Foundation	LEVEL 2: Intermediate	LEVEL 3: Advanced:
<b>Information and data literacy</b> is the ability to comprehend, find, assess, manage, and distribute digital information.	<b>Improving digital information</b> , searching, assessing, managing, and sharing is known as information and data literacy.	<b>Managing digital identity</b> , digital rights, and licences is part of information and data literacy.
<b>Communication and Cooperation:</b> Using digital tools to interact, communicate, and work together.	<b>Communication and Cooperation:</b> Using digital technology to network and collaborate.	<b>Collaboration and Communication:</b> Using digital tools to communicate in an appropriate, responsible, and successful manner.
<b>Producing and modifying digital content</b> is known as digital content creation.	<b>Digital Content Creation:</b> Using design and programming techniques to create digital content	<b>Digital content creation</b> is the process of choosing, combining, and refining digital components to create sophisticated digital goods.
<b>Safety:</b> Guarding gadgets, private information, and internet privacy.	<b>Safety</b> includes controlling one's online persona and reputation as well as guarding against dangers and threats.	<b>Safety:</b> Preserving data privacy and security, assessing and controlling security threats.
<b>Problem-solving:</b> Applying digital technologies to resolve issues and arrive at wise choices.	<b>Problem solving</b> includes determining needs and technological solutions, troubleshooting, and using information and communication technology in a morally righteous, secure, and compliant manner.	<b>Solving problems:</b> Innovation in processes, goods, and services through the use of digital technologies.

Table 12. The contents of DigComp 2.2's levels (Vuorikari et al., 2022)

For the Digicom 2.2. Each level expands on the one before it, requiring deeper and more complicated digital competencies.

### B. The ISTE Standards: levels contents

A framework known as the ISTE (International Society for Technology in Education) Standards helps coaches, leaders, students, and educators use technology to design equitable, sustainable, scalable, and high-impact learning experiences. Every state in the



United States as well as numerous other nations has adopted them. The contents of each level of the ISTE standards are broken down as follows:

Standards for Students	Standards for Educators	Standards for Education Leaders
<b>Empowered Learner:</b> Students use technology to actively choose, accomplish, and demonstrate mastery of their learning objectives.	<b>Learner:</b> By studying with and learning from others, as well as by investigating tried-and-true methods that use technology to enhance student learning, educators may always improve their practices.	<b>Equity and Citizenship Advocate:</b> In their work, leaders set an example for equity, diversity, and digital citizenship.
<b>Digital Citizen:</b> Students understand that living, studying, and working in a linked digital environment comes with rights, obligations, and opportunities.	<b>Leader:</b> Teachers look for leadership opportunities to help students succeed and become empowered, as well as to enhance teaching and learning.	<b>Visionary Planner:</b> A vision, a strategic plan, and a continuous review cycle are established by leaders to revolutionize learning through the use of technology.
<b>Knowledge Constructor:</b> Using digital tools, students critically select a range of resources to build knowledge, create artistic artefacts, and create meaningful learning experiences for both themselves and others.	<b>Citizen:</b> Teachers encourage their pupils to participate in the digital world ethically and in a constructive way.	<b>Empowering Leader:</b> Leaders foster an environment where educators and students feel free to use technology in creative ways to improve instruction.
<b>Innovative Designer:</b> Students discover challenges and come up with novel, practical, or creative solutions using a range of technologies in a design process.	<b>Collaborator:</b> Teachers set aside time to work together with students and colleagues to solve problems, find and share resources and ideas, and enhance practice.	<b>System Designer:</b> To deploy, maintain, and continuously improve the use of technology to assist learning, leaders create teams and systems.
<b>Computational Thinker:</b> Students utilize technology to build and test solutions by developing and applying strategies for comprehending and solving challenges.	<b>Designer:</b> To accommodate learner heterogeneity and guarantee that every student has equal access to learning, educators create realistic, learner-driven activities and environments.	<b>Connected Learner:</b> Leaders set an example for others by continuing their own and their professional development.
<b>Creative Communicator:</b> Students use the platforms, techniques, styles, formats, and digital media that are appropriate for their aims to communicate clearly and creatively for a range of purposes.	<b>Facilitator:</b> Teachers use technology to support learning and help students meet the ISTE Standards for Students.	<b>Collaborative Leader:</b> Collaboration is a tool used by leaders to enhance student learning and encourage the wise use of technology.
<b>Global Collaborator:</b> Students collaborate with others and work well in teams both locally and globally by using digital tools to extend their horizons and enhance their education.	<b>Analyst:</b> Teachers comprehend data and apply it to inform their lessons and assist students in meeting their learning objectives.	

Table 13. The contents of ISTE Standards' levels (Standards | ISTE, s. d.)



These standards provide a framework for educators to integrate technology effectively into their practice and for students to develop essential digital-age skills.

### C. The UNESCO digital skills: levels contents

The "Digital Skills Framework," developed by the United Nations Educational, Scientific, and Cultural Organization (UNESCO), describes the fundamental abilities someone must possess to interact with digital technologies. An outline of the UNESCO framework for digital skills is provided below (Law et al., 2018) :

Basic Level: Knowledge acquisition	Intermediate Level: Knowledge deepening	Advanced Level: Knowledge creation
<b>Digital Concepts:</b> knowing the fundamentals of using information and communication technologies (ICTs) in a world that is becoming more digital.	<b>Configuring general digital tools to produce and consume digital content or enhance digital tools through basic programming skills:</b> required as working knowledge of spreadsheets and basic programming.	Programming and Industry 4.0 technology skills: Artificial intelligence (AI), big data, coding, cybersecurity, the Internet of Things (IoT), and mobile app development are among the skills involved, and they are usually learned through advanced formal education or non-traditional channels like coding boot camps.
<b>Digital Operations and Management:</b> displaying an understanding of the fundamentals of computer file management, software, and hardware operations.		
<b>Digital Applications:</b> generating documents and managing information using standard office application software packages as tools to address issues in day-to-day living.		
<b>Digital System Network:</b> Navigating the digital global system to search for information and resources, and communicating with others in everyday life		
<b>Digital Devices:</b> using mobile devices as tools for social media and information retrieval.		

Table 14. The contents of UNESCO digital skills levels (Law et al., 2018)

Because of their adaptability to various situations, UNESCO's frameworks are frequently utilized as a basis for the creation of national standards and regulations pertaining to teacher ICT competency. The Sustainable Development Goals (SDGs)—in particular, SDG 4.4.2, which seeks to raise the proportion of adults and kids possessing a minimum level of digital literacy—are intimately linked to the organization's work in this field (The UNESCO-UNEVOC International Centre, s. d.).



#### D. IC3 Digital Literacy Certification: levels contents

The three stages of the IC3 Digital Literacy Certification are basic, intermediate, and advanced, with each level emphasizing a distinct area of digital literacy. Three tests (Levels 1-3) make up the IC3 GS6 certification program. The exams cover the following objective topics in increasing detail and complexity: Digital Citizenship, Information Management, Technology Basics, Content Creation, Communication, Collaboration, and Safety & Security.

Basic Level	Intermediate Level	Advanced Level
<ul style="list-style-type: none"> <li>- Evaluates understanding of basic ideas and elements:</li> <li>- <b>Know:</b> The Level 1 exam attests to a candidate's possession of the fundamental skills and information required for digital literacy across seven competency domains.</li> </ul>	<ul style="list-style-type: none"> <li>- Requires a working knowledge of each of the seven skill groups</li> <li>- Tests the students' ability to apply their knowledge.</li> <li>- <b>Do:</b> The Level 2 exam certifies a candidate's ability to do essential</li> <li>- tasks in an online environment and within core applications</li> <li>- Across the seven objective domains</li> </ul>	<ul style="list-style-type: none"> <li>- confirms a sophisticated comprehension of digital literacy</li> <li>- Demands that students demonstrate a knowledge of digital literacy ideas and abilities.</li> <li>- <b>Lead:</b> The Level 3 test attests to a candidate's proficiency in digital literacy as well as their capacity for teamwork, system management, problem-solving, and mentoring.</li> </ul>

Table 15. The contents UNESCO digital skills levels ((CERTIPORT, s. d.-a):

The student receives an IC3 GS6 certification for that level upon completing each exam. They receive a master certificate and a badge to wear with it if they pass all three tests.





### E. Spanish Framework for the Digital Competencies: levels contents

The Spanish Framework for the Digital Competence of Teachers (SFDCT) is structured into six areas, each with specific competences and levels of achievement. These are the contents of every framework level (Moreno-Guerrero et al., 2022).

Area 1: Professional engagement	Area 2: Digital content	Area 3: Teaching and learning	Area 4: Assessment and feedback	Area 5: Empowering learners	Area 6: Developing the digital competence of learners
Professional engagement includes using digital tools for communication; coordinating, participating, and working with outside professionals as well as within the school; improving performance through self-reflection and professional development; and safeguarding students' digital wellbeing, privacy, and safety while they carry out their duties.	Digital educational material creation, sharing, searching, and editing.	The administration and planning of digital technology use in education.	Utilizing digital tools and techniques to enhance assessment for students as well as the teaching-learning process.	Use of digital technology to promote student participation in their own education, inclusivity, and awareness of individual diversity.	Enabling children to use digital technologies creatively and ethically for information, communication, and safe participation in the digital society, content creation, well-being, privacy, problem-solving and the development of personal projects.
Level A1: Initial access to the profession Level A2: Basic competence Level B1: Intermediate competence Level B2: Advanced competence Level C1: Expert competence Level C2: Innovative teaching practice					

Table 16. Contents of the Spanish framework for digital competencies

### 3.5.2 Identifying the limits according to each digital framework

In this section, we will list the limitations that have been identified in the main digital frameworks. The table below summarizes the application barriers encountered.



<p><b>The DigComp framework</b> (CEPIS-Council of European Professional Informatics Societies, s. d.) (Julia Cicone, 2024)</p>	<ul style="list-style-type: none"> <li>- <b>Adaptation to Local circumstances:</b> One drawback is that the framework must be modified to fit the unique digital competency requirements and circumstances of various European nations, which can differ greatly.</li> <li>- <b>Awareness and Implementation:</b> DigComp's effectiveness and reach are still being impacted by issues with low awareness and uneven implementation across European nations, despite efforts to promote it.</li> <li>- <b>Language and Accessibility:</b> Since the framework is mainly in European languages, non-native speakers may find it difficult to use and translation work may be necessary to improve accessibility.</li> <li>- <b>Technological Advancements:</b> The framework has difficulty keeping up with the rapid expansion of digital technologies, especially emergent ones like artificial intelligence and the Internet of Things, and staying relevant in a rapidly evolving digital ecosystem.</li> </ul>
<p><b>The ISTE Standards</b> (Crompton, 2023)</p>	<ul style="list-style-type: none"> <li>- <b>Limited Implementation Percentage:</b> Studies have indicated that quite a tiny portion of teachers truly apply the ISTE Standards; one research found that 60.9% of teachers did so. This implies difficulties with broad adoption.</li> <li>- <b>Requirement for Local Context Adaptation:</b> The ISTE Standards must be modified to meet the unique requirements and circumstances of many states and school districts across the United States.</li> <li>- <b>Rapid Technological Change:</b> The ISTE Standards find it challenging to stay current and fully relevant in a digital environment that is always evolving due to the rapid pace of technological breakthroughs. It is a constant struggle to update the standards and offer advice on evolving technology.</li> </ul>
<p><b>The UNESCO digital skills</b> (Alessandra Zini, s. d.)</p>	<ul style="list-style-type: none"> <li>- <b>Adaptation to Local Contexts:</b> As with other frameworks, the UNESCO digital skills framework may need to be customized for effective implementation to meet the unique requirements and circumstances of many areas and nations.</li> <li>- <b>Awareness and Implementation:</b> The UNESCO digital skills framework may not be widely used or implemented, with different degrees of adoption among institutions and educators. This could have an impact on the framework's overall efficacy.</li> <li>- <b>Rapid Technological Change:</b> It is difficult for the framework to stay current and relevant in light of new developments and trends in the rapidly changing digital ecosystem.</li> </ul>
<p><b>IC3 Digital Literacy Certification</b> (CERTIPORT, s. d.-b)</p>	<ul style="list-style-type: none"> <li>- <b>Adaptation to Local Contexts:</b> To be implemented successfully, the certification must be customized to meet the unique requirements and contexts of various geographic areas and educational systems.</li> <li>- <b>Awareness and Implementation:</b> The IC3 Digital Literacy Certification may not be widely known or used, and employers, students, and educators may adopt it at different rates, which could restrict its total influence and reach.</li> <li>- <b>Rapid Technological Change:</b> Maintaining the certification program's relevance and alignment with current digital literacy demands and trends in the face of the rapidly changing digital ecosystem is a challenge.</li> </ul>
<p><b>SFDCT framework</b> (García-Vandewalle García et al., 2023)</p>	<ul style="list-style-type: none"> <li>- <b>Restricted focus on teachers:</b> The framework was created especially for teachers, and it offers no recommendations for helping other education stakeholders, such as students or administrators, acquire digital competency.</li> <li>- <b>European framework adaptation:</b> The European DigCompEdu framework was modified for the Spanish setting. This enables compliance with European norms, but it might not adequately represent the particular requirements and difficulties faced by the Spanish educational system.</li> <li>- <b>Absence of thorough implementation guidelines:</b> Although the framework offers a resource for assessing and enhancing teachers' digital competencies, educational institutions are unable to successfully incorporate the development of digital competence into professional development and teacher training programs due to the absence of comprehensive implementation guidelines.</li> <li>- <b>Possible dissonance with the realities of the classroom:</b> Teachers' self-assessment forms the basis of the framework, however, they may not always fairly represent their true level of digital competency and their capacity to successfully incorporate technology into instruction.</li> </ul>

Table 17. *limitations encountered in the application of the main digital skills framework*



### 3.6 Conclusion and Recommendations

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Conceptual digital frameworks are "*practical tool, a process, and a product for organising and aligning all aspects of an inquiry*" (Walden University, s. d.). In general, conceptual frameworks convey assumptions, theories, and concepts that support and inform; however, they can take different forms for different purposes. To establish the digital certification model of the Algerian higher education system, an analysis of different frameworks of digital competence for teachers, students, citizens, and policymakers was carried out. This analysis was based on the identification of the main stages of competencies, skills, and levels developed in global certification worldwide. After that, an in-depth analysis of the content of each level of competences belonging to the main qualifications was analyzed and summarized, followed by a precise identification of the limits and obstacles encountered at the level of each framework, to guide the design of a digital qualification in line with the standards and context of Algerian higher education system.



## Conclusion

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In conclusion, the focus on linguistic, entrepreneurial, and digital skills reflects the evolving needs of the modern economy. By cultivating these skills, individuals can enhance their employability, drive innovation, and succeed in a rapidly changing and interconnected world.

Following what has been said in assessing linguistic skills, the CEFR seems to be the most adequate framework to inspire from. Nevertheless, the ultimate objective should be the development of a unique Algerian framework. Later, it will be the task of pertinent ministries (higher education, foreign affairs, etc.) to promote, advertise, display, spread, and get recognition of the Algerian Linguistic Certification around the world.

Afterward, the assessing entrepreneurship skills certification is characterized by a dynamic, evolving landscape that responds to the diverse needs of entrepreneurs globally. Key trends include specialization, a holistic approach to skills development, the integration of technology, and a focus on measurable impact. Continuous learning, adaptability, and the integration of soft skills are critical components in shaping the future of entrepreneurship education and certification.

In addition to these aforementioned points, in light of what has been said, it is clear that policymakers, educators, and stakeholders in the field of education are called to prioritize the development and promotion of skills certification programs as integral components of learning initiatives. By investing in the infrastructure and resources necessary for the administration and recognition of certification exams, stakeholders can foster a culture of lifelong learning and skill development, ultimately contributing to individual empowerment, socioeconomic mobility, and global competitiveness.



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